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DICTIONARY OF ORGANIC COMPOUNDS

VOLUME 2

DICTIONARY OF ORGANIC COMPOUNDS

The Constitution and Physical and Chemical Properties of the Principal
Carbon Compounds and their Derivatives, together with the relevant
Literature References

VOLUME TWO

D.A. — HYSTAZARIN

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INTRODUCTION

ALL the compounds in this dictionary are arranged in strictly alphabetical order. The dictionary is therefore its own index, and any required data and information should be readily accessible. A difficulty sometimes arises, however, on account of the fact that most organic compounds possess more than one name, and questions of orientation introduce a further complication. An alphabetical classification is thus inadequate *per se*, and some further rules are necessary if that otherwise simple system is to possess its maximum utility. In order to facilitate the use of the dictionary an explanation of the general rules which have been adopted and followed throughout the work is given in the following notes.

Arrangement of the Text

PRINCIPAL REFERENCES

The majority of compounds can be named in a variety of ways, some popular (or trivial) and others systematic or strictly chemical. But in practice it is found that for any one compound preference is usually given to one particular name, and it is this name which has been selected for the principal reference. It sometimes happens, however, that such a compound is one of a number of isomers having a systematic or chemical name. In certain cases of this kind the general rule has been departed from, the whole series of isomers being grouped together under the systematic name. For example, Orthanilic, Metanilic, and Sulphanilic Acids are not separated under letters O, M, and S, but are given together under letter A as Aniline-*o*-, *m*-, and *p*-sulphonic Acids respectively. Similarly Gamma Acid, J-Acid, M-Acid, and S-Acid are included with the other Aminonaphthol-sulphonic Acids. Trade and proprietary names are not used for the principal references, except where they come within the general rule as being in common use or where, usually for reasons of complex structure, no other names are feasible.

The name selected for a parent compound is, with a few exceptions, retained for all its derivatives. For example, Alizarin having been chosen for 1:2-Dihydroxyanthraquinone, all the derivatives of the latter will be found as derivatives of Alizarin.

CROSS-REFERENCES

A generous number of cross-references, sometimes as many as three or four, are given, by means of which the principal references can readily be found. For instance *N*-Carboxyurea, Carbamyl-carbamic Acid, and Ureidoformic Acid are given as cross-references to Allophanic Acid. Where cross-references are given for a parent compound, these are not, in general, repeated for the derivatives. Thus Diphenyl Ketone will be found as a cross-reference to Benzophenone, but Amino- and Bromo-diphenyl Ketones are not given as cross-references to Amino- and Bromo-benzophenones. Owing to their large number many nitriles are not included under Cyano-: those not so given will be found either under their own name (e.g. Acetonitrile, Benzonitrile) or under the parent acid.

FORMULÆ

The full constitutional formula is given for each compound with, of course, the exception of those whose constitutions have not yet been ascertained. In the case of many compounds of the carbohydrate, steroid, and polyterpene classes, the constitution is represented by simple skeletal structures and configuration by heavy or dotted lines in conformity with modern practice. Where there is a group of isomers, however, it is considered to be sufficient in most cases to set out the full formula for the first member only. This applies also to the molecular formula and molecular weight. For instance, the complete formula is given for *o*-Chlorotoluene, but none for the *m*-, and *p*-, which follow. For acyclic compounds, however, particularly those with long or branched chains or with varying degrees of unsaturation, orientation is less simple, and full formulæ are given in every case, e.g., the Hexenols.

The order of the elements in the molecular formulæ is C H O N Cl Br F S P, other elements following in alphabetical order. In calculating molecular (formula) weight the following approximate atomic weights have been employed: C 12, H 1, O 16, N 14, Cl 35.5, Br 80, I 127, F 19, S 32, P 31, Fe 56, Mg 24, Pb 207, Se 79, Si 28, and for other elements the whole number nearest to the atomic weight adopted by the International Committee on Atomic Weights in 1942.

DERIVATIVES

Functional derivatives, as distinct from substitution compounds, are given under the parent compound except where they are sufficiently important to justify separate inclusion as principal references. Thus under an acid will be found its esters, halides, anhydride, amide, nitrile, anilide, etc. Esters in which the alcohol or phenol component is of more importance than the acid component are given under the alcohol or phenol, as, *e.g.*, in the case of the acetates and benzoates of Borneol, Resorcinol and *sec.-n*-Octyl alcohol. Under a base are given its salts, acyl derivatives, addition compounds, etc.; under an alcohol or phenol, the ethers and certain esters (*v. supra*); under an aldehyde or ketone, the acetals, oximes, semicarbazones, phenylhydrazones, etc.

LITERATURE REFERENCES

The literature references relate primarily to the best method of preparation, but in some cases publications are cited which refer to earlier methods of preparation or which contain useful summaries or bibliographies. Where considerations of molecular structure or constitution are of importance, reference is made to the most recent views on the subject. This is particularly the case with many of the complex naturally occurring compounds. To some of the very common compounds, *e.g.*, Acetone, Acetic acid and Ethyl alcohol, no useful references can be given.

The journal abbreviations used are listed in the Table on p. xiii. They are largely those adopted for the *Chemical Abstracts* of the American Chemical Society (Index to *Chemical Abstracts*, 45, 1951).

Nomenclature and Orientation

In the introduction to Richter's *Lexicon* (1910) the following passage occurs: "Of the many difficulties which, in writing this work, presented themselves, the greatest was undoubtedly the question 'which nomenclature is to be adopted for the sake of uniformity and clearness.'" The vast number of compounds already known when that was written has since been continuously added to, and new types of compound have appeared, thus rendering the problem of nomenclature more difficult and complex to-day than it was in 1910. The only system which can be regarded as having the merit of completeness is that of Beilstein, but it is very complicated, and possesses other features which reduce its value as a practical scheme. The Geneva system, although occasionally utilised for aliphatic compounds, has never found universal favour. Many attempts have been made in recent years to introduce new systems both of nomenclature and of orientation, but none of these has been exclusively used in this Dictionary. Preference has usually been given to the nomenclature and orientation employed in the original publication, but, in cases where ambiguity may arise, adjustment has sometimes been necessary in the interests of clarity.

In order to avoid re-setting in a large number of compounds scattered over the 3,000 pages of this edition, the recently introduced convention of using small roman capitals, D, L, in place of italic, *d*-, *l*-, for optically active compounds, has not been adopted except in a few instances.

NOMENCLATURE

The prefixes cyclo-, homo-, iso-, etc., are treated as part of the name. Thus Cyclopentane, Homocatechol, Isophthalic Acid, are to be found under letters C, H, I, respectively. The prefixes allo-, epi-, and nor-, have also in general been preferred as part of the name, but where this has not been convenient sufficient cross-references have been given. An exception is made in the case of pseudo-, which is represented by the Greek letter ψ , ψ -Aconitine (Pseudo-aconitine), for instance, being included under letter A and not letter P. The prefixes benz- and naphtha- are used for condensed (fused) benzene and naphthalene rings, not benzo- and naphtho-. *E.g.*, Benzthiazole, Benzcarbazole, Naphthafluorene. For compounds containing the fused naphthalene ring and for whose names both benz- and naphtha- have been used, the preference has been given to the former in principal references, *e.g.*, Benzcoumarin not Naphthacoumarin, Benzaclidine not Naphthacridine. For acetylenic compounds -in- has been replaced by -yn-, *e.g.*, Butyne not Butine, Hexynol not Hexinol, and similarly ethynyl instead of ethinyl.

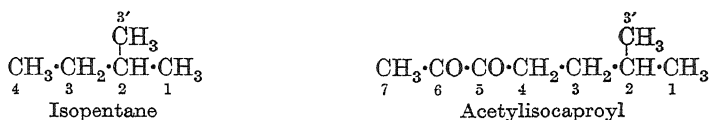
All "double" derivatives take the prefix di-. *E.g.*, Diallyl sulphide, not Allyl sulphide; Diethyl Ether, not Ethyl Ether; Dimethyl sulphate, not Methyl sulphate. The Greek di- is preferred to the Latin bi- or bis-, *e.g.*, di-semicarbazone, di-phenylhydrazone.

In substituted or derived compounds the order in which the substituent group names appear in the compound name is that given in the Table on p. xv, List of Substituents. Thus, for the common substituents the order is, Halogen (F, Cl, Br, I), Nitro, Hydroxy, Amino, Alkyl, Aryl, Acyl. Wherever possible, the aldehyde, carboxyl, and sulphonic groups are preferred as suffixes. *E.g.*, Anthraquinonesulphonic Acid, not Sulphoanthraquinone (but cf. *e.g.*, Disulphobenzoic Acid, Aldehydosalicylic Acid); Chloroanthraquinonecarboxylic Acid, not Chlorocarboxyanthraquinone.

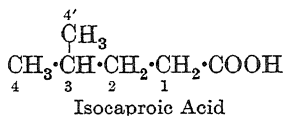
ORIENTATION

Acyclic Compounds. The numbering system is used in preference to Greek letters. The CHO, CN, and COOH groups are generally regarded as substituents and, as such, their carbon atoms are not numbered.

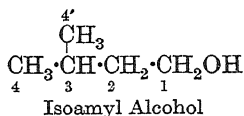
In the *saturated branched chains* numbering commences in the longest chain at the terminal carbon nearest to the side-chain. If there are two or more side-chains or groups of different lengths, numbering commences at the end carbon nearest to the shortest of such side-chains. *E.g.*,



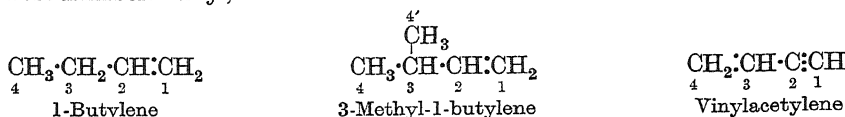
There are two exceptions to the above rule. (1) Where the chain contains a CHO, CN, or COOH group, numbering begins at the carbon carrying this group. *E.g.*,



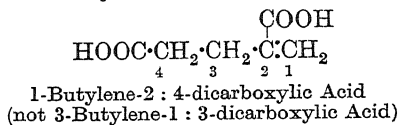
(2) In the primary alcohols numbering commences at the carbon of the $\text{—CH}_2\text{OH}$ group. *E.g.*,



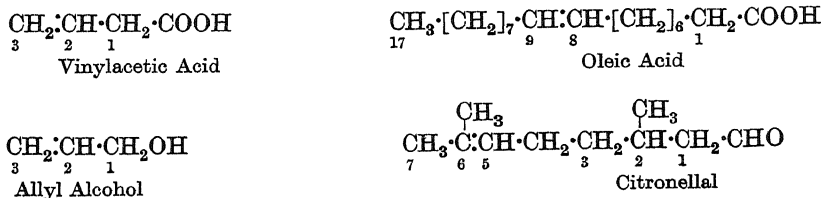
In the *unsaturated* compounds the double or triple bonds are given the lowest numbers possible whether the chain is branched or not. Where both double and triple bonds are present, the latter takes the lowest number. *E.g.*,



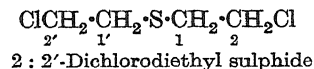
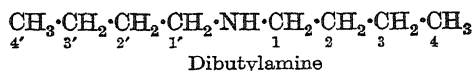
The rule applies to compounds containing the CHO, CN, or COOH groups provided the name of the parent hydrocarbon is retained. *E.g.*,



but in all other cases the rule for saturated compounds is followed, viz. numbering begins at the carbon carrying the CHO, CN, or COOH group or, in the case of primary alcohols, at the carbon of the CH_2OH group. Thus



In the case of carbon chains interrupted by O (ethers), NH (secondary amines), S (sulphides), etc., numbering commences at the carbon atoms attached to the oxygen, nitrogen, sulphur, etc. *E.g.*,

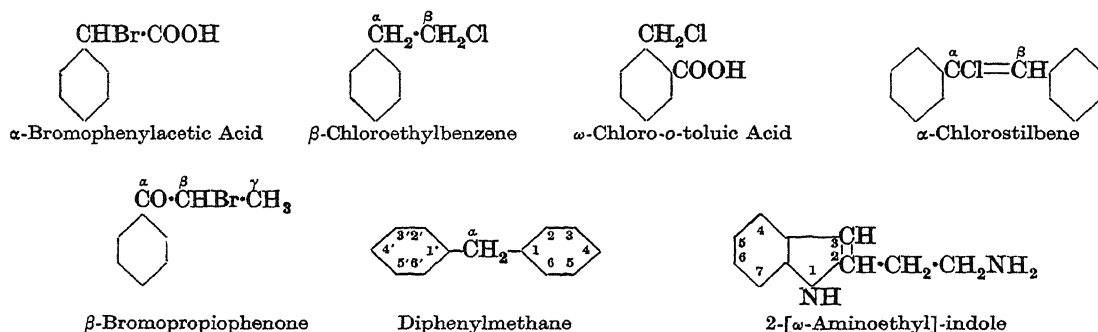


Homocyclic and Heterocyclic Compounds. As stated above, no one system of orientation of ring compounds has been exclusively followed, and no new departures have been made from those already in use. Where there is any doubt numbers have been inserted in the constitutional formulæ of the parent compounds. The numbering adopted for any particular ring system can therefore be readily ascertained by reference to the text. In the methylbenzenes (*i.e.* toluene and its derivatives) numbering begins in most cases at the carbon to which the methyl group is attached.

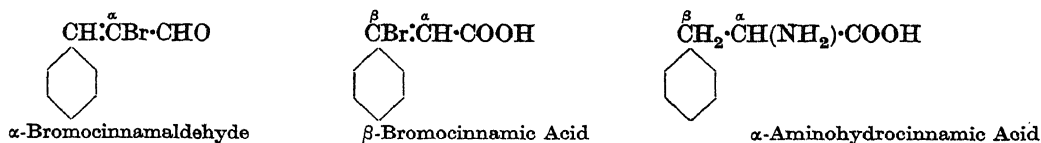
In heterocyclic rings containing both oxygen (or sulphur) and nitrogen the lowest number is given to the oxygen (or sulphur). *E.g.*, in the oxazoles (or thiazoles) numbering commences at the oxygen (or sulphur).

Where there is a choice of numbering of polysubstituted compounds the lowest number is, wherever possible, assigned to the functional groups (OH, NH₂, etc.). *E.g.*, 5-Chloro-1-aminoanthraquinone, not 1-Chloro-5-aminoanthraquinone, such a compound being regarded as a chloro derivative of aminoanthraquinone rather than an amino derivative of chloroanthraquinone. Similarly 6-Bromo-3-hydroxybenzyl Alcohol, not 2-Bromo-5-hydroxybenzyl Alcohol.

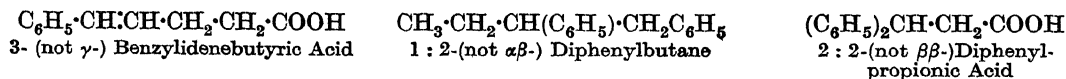
Aromatic-aliphatic (aralkyl) compounds. In the aralkyl compounds the general rule given above for the numbering of aliphatic chains has been departed from, the carbons in the aliphatic part of the molecule being designated by Greek letters in order to avoid confusion with the numbers of the rings. *E.g.*,



The letters begin at the carbon attached to the ring except in the case of the aromatic-aliphatic acids, aldehydes, nitriles, or primary alcohols. In these cases lettering begins at the carbon carrying the COOH, CHO, or CN group or at the carbon of the CH₂OH group. *E.g.*,



In many aralkyl compounds, however, the aromatic radical can, from the point of view of the name, be regarded merely as a substituent. In such cases the numbering of the parent aliphatic compound is retained provided no ambiguity is likely to result. Thus,



General Remarks

In the descriptive matter in the text the same order has been followed in all cases, viz. : sources, where of interest; physical properties (melting point, boiling point, solubility, density, refractive index, heat of combustion, optical rotation, etc.) : chemical properties (typical reactions, analytical tests, etc.). The data for derivatives then follow under separate sub-headings.

As regards abbreviations, these have been used freely in the text, but all abbreviations and contractions, such as Me, Et, Ph, CO₂H, etc., have been rigidly excluded from the constitutional formulæ.

As would be expected, the original literature reveals numerous instances of divergent and sometimes contradictory data for the same compound. As far as possible palpable inconsistencies have not been recorded, but where a choice could not be safely made the alternative data, *e.g.*, melting and boiling points, densities, etc., are given in parentheses. In some cases the information given in the literature is so scanty and uncertain that it has been considered advisable to omit the compound altogether. Nevertheless, although in some instances the recorded facts regarding chemical and physical properties are very meagre, the compound has been included by virtue of other valuable information contained in the literature references, such as method of preparation or proof of constitution.

TABLE OF ABBREVIATIONS

A	Acid (A_2 , two mols of acid).	Insol.	Insoluble.
Å	Angstrom unit. (10^{-8} cm.).	I.U.	International Unit.
Abs. EtOH	Absolute alcohol.	Jap. P.	Japanese Patent.
AcOH	Acetic acid.	<i>k</i>	Dissociation constant.
Ac ₂ O	Acetic anhydride.	<i>l</i>	Levorotatory.
AcOEt	Ethyl acetate.	Liq.	Liquid.
Add.	Additive.	<i>m</i>	Meta (position).
Add. comp.	Addition compound, molecular compound, adduct.	Max.	Maximum.
Addn.	Addition.	Me	Methyl.
A.G.F.A.	Aktien-Gesellschaft für Anilinfabrikation.	MeOH	Methyl alcohol.
Alc.	Alcohol, alcoholic.	Me ₂ CO	Acetone.
Alc. NH ₃	Alcoholic ammonia.	Min.	Mineral (inorganic).
Al.Hg.	Aluminium amalgam.	Misc.	Miscible.
Alk.	Alkaline.	M.L.B.	Meister, Lucius & Brüning.
[α]	Specific rotation.	mm.	Millimetre(s).
Amorph.	Amorphous.	Mod.	Moderately.
Anhyd.	Anhydrous.	Mol.	Molecule, molecular, molar.
Aq.	Aqueous.	M.p.	Melting point.
as.	Asymmetric.	<i>ms</i>	Meso (position).
Atm.	Atmosphere(s), atmospheric.	MW	Molecular weight (formula weight).
B	Base (B_2 , two mols of base).	mgm.	Milligramme(s).
Badische	Badische Anilin und Sodafabrik.	mμ	Millimicron(s). (10^{-7} cm.).
Belg. P.	Belgian Patent.	<i>n</i>	Normal (chain).
B.D.C.	British Dyestuffs Corporation.	<i>n_D</i>	Refractive index (D line, etc.).
Bibl.	Bibliography.	Na.Hg	Sodium amalgam.
B.p.	Boiling point.	NH ₃	Ammonia, aqueous ammonia.
B.P.	British Patent.	NH ₃ .AgNO ₃	Ammoniacal silver nitrate.
c.	Concentration.	<i>o</i>	Ortho (position).
C _p	Constant pressure.	Ord.	Ordinary.
C _v	Constant volume.	Org.	Organic.
Cal.	Calories.	Ox.	Oxidise, oxidation.
Can. P.	Canadian Patent.	<i>p</i>	Para (position).
Col.	Colour, coloration.	P	Patent.
Comb.	Combustion.	pH	— log ₁₀ hydrogen ion concentration.
Comp.	Compound.	pK	— log ₁₀ <i>k</i> (dissociation constant).
Conc.	Concentrated.	Part.	Partly, partial.
Corr.	Corrected.	Pet. ether	Petroleum ether.
Crit.	Critical.	PhNO ₂	Nitrobenzene.
Cryst.	Crystals, crystalline, crystallise.	PhOH	Phenol.
(COOH) ₂	Oxalic acid.	Ppd.	Precipitated.
(CH ₂ COOH) ₂	Succinic acid.	Ppt.	Precipitate.
D	Density.	Pptn.	Precipitation.
<i>D</i>	Dextro-.	Prac.	Practically.
<i>d</i>	Dextrorotatory.	Press.	Pressure(s).
<i>dl</i>	Racemic. Optically inactive by external compensation.	<i>ψ</i>	Pseudo.
Decomp.	Decomposed, decomposition.	Py	Pyridine.
Deriv.	Derivative.	<i>r</i>	Racemic.
Dil.	Dilute, dilution.	Red.	Reduce, reduction.
Diss.	Dissolves, dissolved.	Ref.	Reference.
Dist.	Distil, distillation.	Russ.P.	Russian Patent.
D.R.P.	German Patent.	S.C.I.	Société pour l'industrie chimique Basle.
Et	Ethyl.	Sec.	Secondary.
Et ₂ O	Ether (diethyl ether).	Sol.	Soluble, solution.
EtOH	Ethyl alcohol.	Spar.	Sparingly.
Evac.	Evacuated.	Sp. gr.	Specific gravity.
Fluor.	Fluoresces, fluorescence.	Sp. heat	Specific heat.
F.p.	Freezing point.	Spp.	Species.
F.P.	French Patent.	Suppl.	Supplement.
Form.	Formation.	Sym.	Symmetrical.
<i>γ</i>	10^{-6} gm. or 10^{-3} mgm. (microgrammes).	Temp.	Temperature(s).
gm.	Gramme(s).	Tert.	Tertiary.
Hyd.	Hydrolyses, hydrolysed, hydrolysis.	Undecomp.	Undecomposed.
<i>i</i>	Optically inactive by internal compensation.	Unsym.	Unsymmetrical.
I.C.I.	Imperial Chemical Industries.	UV.	Ultraviolet.
I.G.	Interessen Gemeinschaft Farbenindustrie Aktien-Gesellschaft.	Vac.	Vacuum.
		Vap.	Vaporisation.
		Vol.	Volume.

JOURNAL ABBREVIATIONS

Journals not listed here are given their full titles in the text.

<i>Acta Chem. Scand.</i>	Acta Chemica Scandinavica.	<i>Bull. soc. chim.</i>	Bulletin de la société chimique de France.
<i>Acta Phytochim.</i>	Acta Phytochimica (Japan).	<i>Bull. soc. chim. Belg.</i>	Bulletin de la société chimique de Belgique. Now Bulletin des sociétés chimiques Belges.
<i>Am. Chem. J.</i>	American Chemical Journal.	<i>Bull. soc. chim. biol.</i>	Bulletin de la société de chimie biologique.
<i>Am. J. Pharm.</i>	American Journal of Pharmacy.	<i>Can. Chem. Met.</i>	Canadian Chemistry and Metallurgy.
<i>Am. J. Sci.</i>	American Journal of Science.	<i>Can. J. Research</i>	Canadian Journal of Research.
<i>Anales asoc. quim. Argentina</i>	Anales de la Asociación Química Argentina.	<i>Chem. Abstracts</i>	Chemical Abstracts (of the American Chemical Society).
<i>Anales soc. españ. fis. quim.</i>	Anales de la sociedad española de física y química.	<i>Chem. Ind.</i>	Die Chemische Industrie.
<i>Angew. Chem.</i>	Angewandte Chemie.	<i>Chem. Met. Eng.</i>	Chemical and Metallurgical Engineering.
<i>Ann.</i>	Annales de chimie.	<i>Chem. News</i>	Chemical News (and Journal of Industrial Science).
<i>Ann. chim.</i>	Annali di chimica applicata.	<i>Chem. Reviews</i>	Chemical Reviews.
<i>Ann. chim. applicata</i>	Annales de chimie et de physique.	<i>Chem.-Tech. Rundschau</i>	Chemische-Technische Rundschau.
<i>Ann. chim. phys.</i>	Annales Pharmaceutiques Française.	<i>Chem. Trade J.</i>	Chemical Trade Journal (and Chemical Engineer).
<i>Ann. pharm. franç.</i>	Annales de physique.	<i>Chem. Umschau</i>	Chemische Umschau (auf dem Gebiete der Fette, Öle, Wachse, und Harze). Now Fettchemische Umschau.
<i>Ann. physik</i>	Annalen der Physik.	<i>Chem. Weekblad</i>	Chemisch Weekblad.
<i>Ann. Rev. Biochem.</i>	Annual Review of Biochemistry.	<i>Chem. Zentr.</i>	Chemisches Zentralblatt.
<i>Ann. Sci. Univ. Jassy</i>	Annales scientifiques de l'Université de Jassy.	<i>Chem.-Ztg.</i>	Chemiker-Zeitung.
<i>Ann. Trop. Med. and Parasit.</i>	Annals of Tropical Medicine and Parasitology.	<i>Compt. rend.</i>	Comptes rendus (hebdomadaires des séances de l'académie des sciences).
<i>Arch. Biochem.</i>	Archives of Biochemistry (name changed to next in 1951).	<i>Compt. rend. acad. sci. U.R.S.S.</i>	Comptes rendus de l'Académie des Sciences de l'U.R.S.S.
<i>Arch. Biochem. Biophys.</i>	Archives of Biochemistry and Biophysics.	<i>Compt. rend. soc. biol.</i>	Comptes rendus des séances de la société de biologie.
<i>Arch. Pharm.</i>	Archiv der Pharmazie (und Berichte der deutschen pharmazeutischen Gesellschaft).	<i>Color Trade J.</i>	Color Trade Journal and Textile Chemist.
<i>Arkiv Kemi, Mineral. Geol.</i>	Arkiv för Kemi, Mineralogi och Geologi.	<i>Dinglers polytech. J.</i>	Dinglers polytechnisches Journal.
<i>Atti accad. Lincei</i>	Atti della reale accademia nazionale dei Lincei.	<i>Fettchem. Umschau</i>	Fettchemische Umschau.
<i>Ber.</i>	Berichte der deutschen chemischen Gesellschaft. Now Chemische Berichte.	<i>Gazz. chim. ital.</i>	Gazzetta chimica italiana.
<i>Ber. deut. pharm. Ges.</i>	Berichte der deutschen pharmazeutischen Gesellschaft.	<i>Giorn. chim. applicata</i>	Giornale di chimica applicata.
<i>Ber. ges. Physiol. expit. Pharmacol.</i>	Berichte über die gesamte Physiologie und experimentelle Pharmakologie.	<i>Giorn. chim. ind.</i>	Giornale di chimica industriale.
<i>Bihang till Svenska Vet.-Akad. Handlingen</i>	Bihang till Kungliga Svenska Vetenskapsakademiens Handlingen.	<i>Giorn. chim. ind. applicata</i>	Giornale di chimica industriale ed applicata.
<i>Biochem. J.</i>	Biochemical Journal.	<i>Helv. Chim. Acta</i>	Helvetica Chimica Acta.
<i>Biochem. Z.</i>	Biochemische Zeitschrift.	<i>Ind. Eng. Chem.</i>	Industrial and Engineering Chemistry.
<i>Biol. Zentr.</i>	Biologisches Zentralblatt.	<i>Jahresber. Fortschr. Chem.</i>	Jahresbericht über die Fortschritte der Chemie.
<i>Brit. Chem. Abstracts</i>	British Chemical Abstracts.	<i>Japan. J. Chem.</i>	Japanese Journal of Chemistry.
<i>Brit. J. Exptl. Path.</i>	British Journal of Experimental Pathology.	<i>J. Am. Chem. Soc.</i>	Journal of the American Chemical Society.
<i>Brit. J. Pharmacol.</i>	British Journal of Pharmacology and Chemotherapy.	<i>J. Am. Pharm. Assocn.</i>	Journal of the American Pharmaceutical Association.
<i>Bull. acad. sci. U.S.S.R.</i>	Bulletin of the Academy of Sciences of the U.S.S.R.	<i>J. appl. Chem.</i>	Journal of Applied Chemistry. Formerly Journal of the Society of Chemical Industry.
<i>Bull. Chem. Soc. Japan</i>	Bulletin of the Chemical Society of Japan.	<i>J. Applied Chem., U.S.S.R.</i>	Journal of Applied Chemistry U.S.S.R.
<i>Bull. Imp. Inst.</i>	Bulletin of the Imperial Institute.	<i>J. Bact.</i>	Journal of Bacteriology.
<i>Bull. Inst. Phys. Chem. Research, Tokyo</i>	Bulletin of the Institute of Physical and Chemical Research, Tokyo.		
<i>Bull. sci. acad. roy. Belg.</i>	Bulletin de la classe des sciences, academie royale de Belgique.		
<i>Bull. sci. pharmacol.</i>	Bulletin des sciences pharmacologiques.		

<i>J. Biochem. Japan</i>	Journal of Biochemistry of Japan.	<i>Pharm. Zentralhalle</i>	Pharmazeutische Zentralhalle.
<i>J. Biol. Chem.</i>	Journal of Biological Chemistry.	<i>Phil. Mag.</i>	Philosophical Magazine and Journal of Science.
<i>J. Chem. Education</i>	Journal of Chemical Education.	<i>Physical Rev.</i>	Physical Reviews.
<i>J. Chem. Ind. Japan</i>	Journal of Chemical Industry (Japan). Now J. Soc. Chem. Ind. Japan.	<i>Physiol. Rev.</i>	Physiological Review.
<i>J. Chem. Physics</i>	Journal of Chemical Physics.	<i>Proc. Acad. Sci., Amsterdam</i>	Proceedings of the Royal Academy of Sciences of Amsterdam.
<i>J. Chem. Soc.</i>	Journal of the Chemical Society (London).	<i>Proc. Chem. Soc.</i>	Proceedings of the Chemical Society (London).
<i>J. Chem. Soc. Abstracts</i>	Abstracts of the Chemical Society (London).	<i>Proc. Imper. Acad., Tokyo</i>	Proceedings of the Imperial Academy, Tokyo.
<i>J. Chem. Soc. Japan</i>	Journal of the Chemical Society of Japan.	<i>Proc. Ind. Acad. Sci.</i>	Proceedings of the Indiana Academy of Science.
<i>J. chim. phys.</i>	Journal de chimie physique.	<i>Proc. Indian Acad. Sci.</i>	Proceedings of the Indian Academy of Science.
<i>J. Chinese Chem. Soc.</i>	Journal of the Chinese Chemical Society.	<i>Proc. Roy. Soc.</i>	Proceedings of the Royal Society (London).
<i>J. Gen. Chem. U.S.S.R.</i>	Journal of General Chemistry, U.S.S.R.	<i>Proc. Soc. Exptl. Biol. Med.</i>	Proceedings of the Society for Experimental Biology and Medicine, New York.
<i>J. gen. Microbiol.</i>	Journal of General Microbiology.		
<i>J. Indian Chem. Soc.</i>	Journal of the Indian Chemical Society.	<i>Quart. J. Indian Chem. Soc.</i>	Quarterly Journal of the Indian Chemical Society.
<i>J. Indian Inst. Sci.</i>	Journal of the Indian Institute of Science.	<i>Quart. J. Pharm. Pharmacol.</i>	Quarterly Journal of Pharmacy and Pharmacology.
<i>J. Inst. Petroleum</i>	Journal of the Institute of Petroleum.	<i>Rec. trav. chim.</i>	Recueil des travaux chimiques des Pays-Bas.
<i>J. Org. Chem.</i>	Journal of Organic Chemistry.	<i>Rev. chim. ind.</i>	Revue de chimie industrielle.
<i>J. pharm. Belg.</i>	Journal de pharmacie de Belgique.	<i>Rev. prod. chim.</i>	Revue des produits chimiques.
<i>J. pharm. chim.</i>	Journal de pharmacie et de chimie.		
<i>J. Pharm. Soc. Japan</i>	Journal of the Pharmaceutical Society (Japan).	<i>Sci. Papers Inst. Phys. Chem. Research, Tokyo</i>	Scientific Papers of the Institute of Physical and Chemical Research (Tokyo).
<i>J. Pharmacol.</i>	Journal of Pharmacology and Experimental Therapeutics.	<i>Sci. Proc. Roy. Dublin Soc.</i>	Scientific Proceedings of the Royal Dublin Society.
<i>J. Pharm. Pharmacol.</i>	Journal of Pharmacy and Pharmacology.	<i>Sci. reps. Natl. Tsinghua Univ.</i>	Science Reports of the National Tsinghua University.
<i>J. Phys. Chem.</i>	Journal of Physical Chemistry.	<i>Sci. reps. Natl. Univ. Peking</i>	Science Reports of the National University of Peking.
<i>J. prakt. Chem.</i>	Journal für praktische Chemie.	<i>Sitzb. Akad. Wiss. Wien</i>	Sitzungsberichte Akademie der Wissenschaften in Wien.
<i>J. Proc. Roy. Soc. N.S. Wales</i>	Journal and Proceedings of the Royal Society of New South Wales.	<i>Svensk Farm. Tids.</i>	Svensk Farmaceutische Tidskrift.
<i>J. Russ. Phys.-Chem. Soc.</i>	Journal of the Russian Physical-Chemical Society.	<i>Svensk Kem. Tid.</i>	Svensk Kemisk Tidskrift.
<i>J. Soc. Chem. Ind. Now J. appl. Chem.</i>	Journal of the Society of Chemical Industry.	<i>Trans. Faraday Soc.</i>	Transactions of the Faraday Society.
<i>J. Soc. Chem. Ind. Japan</i>	Journal of the Society of Chemical Industry (Japan).	<i>Trans. Roy. Soc.</i>	Transactions of the Royal Society (London).
<i>J. Soc. Dyers Colourists</i>	Journal of the Society of Dyers and Colourists.	<i>Trans. Roy. Soc. Canada</i>	Transactions of the Royal Society of Canada.
<i>Mem. Coll. Sci., Kyoto Imp. Univ.</i>	Memoirs of the College of Science, Kyoto Imperial University.	<i>Z. anal. Chem.</i>	Zeitschrift für analytische Chemie.
<i>Monatsh.</i>	Monatshefte für Chemie und verwandte Teile anderer Wissenschaften.	<i>Z. angew. Chem.</i>	Zeitschrift für angewandte Chemie. Later Angewandte Chemie, now Die Chemie.
<i>Naturwiss.</i>	Naturwissenschaften.	<i>Z. anorg. allgem. Chem.</i>	Zeitschrift für anorganische und allgemeine Chemie.
<i>Org. Chem. Ind. U.S.S.R.</i>	Promischlennosti Organitscheskoi Chimii, U.S.S.R.	<i>Z. Chem.</i>	Zeitschrift für Chemie.
<i>Pharm. Acta Helv.</i>	Pharmaceutica Acta Helvetiae.	<i>Z. Elektrochem.</i>	Zeitschrift für Elektrochemie und angewandte physikalische Chemie.
<i>Pharm. J.</i>	Pharmaceutical Journal and Pharmacist.	<i>Z. ges. Naturwiss.</i>	Zeitschrift für die gesamte Naturwissenschaft.
<i>Pharm. Weekblad</i>	Pharmaceutisch Weekblad.	<i>Z. physik. Chem.</i>	Zeitschrift für physikalische Chemie.
<i>Pharm. Ztg.</i>	Die deutsche Pharmazeutische Zeitung.	<i>Z. physiol. Chem.</i>	Zeitschrift für physiologische Chemie (Hoppe-Seyler).

LIST OF SUBSTITUENTS

In the following table is given a list of the principal substituent groups as they are used in the dictionary.

1 —F	Fluoro	54 —CH ₂ ·[CH ₂] ₇ ·CH ₃	Nonyl
2 —Cl	Chloro	55 —CH ₂ ·[CH ₂] ₈ ·CH ₃	Decyl
3 —Br	Bromo	56 —CH ₂ ·[CH ₂] ₉ ·CH ₃	Undecyl
4 —I	Iodo	57 —CH ₂ ·[CH ₂] ₁₀ ·CH ₃	Dodecyl
5 —NO	Nitroso	58 —CH ₂ ·[CH ₂] ₁₁ ·CH ₃	Tridecyl
6 —NO ₂	Nitro	59 —CH ₂ ·[CH ₂] ₁₂ ·CH ₃	Tetradecyl
7 —N=N—N	Azido, Triazo	60 —CH ₂ ·[CH ₂] ₁₃ ·CH ₃	Pentadecyl
8 —OH	Hydroxy (followed by —OCH ₃ Methoxy, —OC ₂ H ₅ Ethoxy, —O·CH ₂ ·O— methylenedioxy, —OC ₆ H ₅ Phenoxy, —O·CO·CH ₃ Acetoxy, etc. in the order of the group attached to the oxygen)	61 —CH ₂ ·[CH ₂] ₁₄ ·CH ₃	Cetyl, Hexadecyl
9 —SH	Mercapto	62 —CH ₂ ·[CH ₂] ₁₅ ·CH ₃	Heptadecyl
10 —SO	Thionyl, Sulphenyl	63 —CH ₂ ·[CH ₂] ₁₆ ·CH ₃	Octadecyl
11 —SO ₂	Sulphonyl	64 —CH ₂ ·[CH ₂] ₁₇ ·CH ₃	Eicosyl
12 —SO ₂ ·CH ₃	Mesyl	65 —CH ₂ ·[CH ₂] ₁₈ ·CH ₃	Heneicosyl
13 —SCN	Thiocyano	66 —CH ₂ ·[CH ₂] ₁₉ ·CH ₃	Ceryl
14 =O (in C—CO—C)	Keto	67 —CH ₂ ·[CH ₂] ₂₀ ·CH ₃	Myricyl, Melissyl
15 >NH	Imino	68 —CH— CH ₂	Cyclopropyl (followed by Cyclobutyl, Cyclopentyl, Cyclohexyl, Cycloheptyl (Suberyl) in that order)
16 =N·OH	Isonitroso, Oximino	69 —CH·CH ₂	Vinyl
17 —S—	Thio	70 —CH·CH·CH ₂	Propenyl
18 —SO ₃ H	Sulpho	71 —C(CH ₃)·CH ₂	Isopropenyl
19 —NH ₂	Amino	72 —CH ₂ ·CH·CH ₂	Allyl
20 —NH·C ₆ H ₅	Anilino, Phenylimino	73 —CH·CH·CH ₂ ·CH ₂	α-Butenyl
21 —NH·C ₆ H ₄ ·CH ₃	Toluidino	74 —CH ₂ ·CH·CH·CH ₂	β-Butenyl, Crotyl
22 —NH·CO·NH ₂	Ureido	75 —CH ₂ ·CH·CH·CH ₂ ·CH ₂	γ-Butenyl, Allylomethyl
23 —NH·C(NH)·NH ₂	Guanidino	76 —CH·CH·CH ₂ ·CH ₂ ·CH ₂	α- (β- etc.) Pentenyl
24 —NH·OH	Hydroxylamino	77 —CH·CH·CH ₂ ·CH ₂ ·CH ₂	α- (β- etc.) Hexenyl
25 —NH·NH ₂	Hydrazino	78 —CH ₂ ·[CH ₂] ₇ ·CH·CH·[CH ₂] ₇ ·CH ₂	Octadecenyl
26 —NH·NH—	Hydrazo	79 —C≡CH	Ethyne, Acetylenyl
27 —N·N—	Azo	80 —CH ₂ ·C≡CH	Propargyl
28 ·N·N·X	Diazonium, Diazo (X = OH, Cl, etc.)	81 —C ₆ H ₅	Phenyl
29 —N=N— O	Azoxy	82 —C ₆ H ₅ ·CH ₂	Tolyl
30 —As·As—	Arseno	83 —CH ₂ ·C ₆ H ₅	Benzyl
31 —NH·N·N— (open)	Diazoamino	84 —CH ₂ ·C ₆ H ₄ ·OH (-o)	Salicyl
32 —NH·N·N— (cyclic)	Aziminio	85 —CH ₂ ·C ₆ H ₄ ·OCH ₃ (-p)	Anisyl
33 —CH ₃	Methyl	86 —CH ₂ ·CH ₂ ·C ₆ H ₅	Phenylethyl
34 —CH ₂ OH	Hydroxymethyl, Methylo	87 —CH ₂ ·C ₆ H ₄ ·CH ₂	Xylol
35 —C ₂ H ₅	Ethyl	88 —CH ₂ ·C ₁₀ H ₇	Menaphthyl
36 —CH ₂ ·CH ₂ ·CH ₂	n-Propyl	89 —C ₆ H ₅ ·CH(CH ₃) ₂	Cumyl
37 —CH(CH ₃) ₂	Isopropyl	90 —C ₆ H ₅ (CH ₃) ₃ (1 : 2 : 4)	ψ-Cumyl
38 —CH ₂ ·CH ₂ ·CH ₂ ·CH ₂	n-Butyl	91 —C ₆ H ₅ (CH ₃) ₃ (1 : 3 : 5)	Mesityl
39 —CH ₃ ·CH·CH ₂ ·CH ₃	sec.-Butyl	92 —CH·CH·C ₆ H ₅	Styryl
40 —CH ₃ ·CH(CH ₃) ₂	Isobutyl	93 —CH ₂ ·CH·CH·C ₆ H ₅	Cinnamyl
41 —C(CH ₃) ₃	tert.-Butyl	94 —C ₁₀ H ₇	Naphthyl
42 —CH ₂ ·[CH ₂] ₂ ·CH ₂	n-Amyl	95 —C ₆ H ₄ ·C ₆ H ₅	Diphenyl, Xenyl
43 —CH ₃ ·CH·CH ₂ ·CH ₂ ·CH ₃	sec.-Amyl	96 —CH(C ₆ H ₅) ₂	Benzhydryl, Diphenylmethyl
44 —CH ₂ ·CH ₂ ·CH(CH ₃) ₂	Isoamyl	97 —C ₁₄ H ₉	Anthryl, anthranyl
45 —CH ₃ ·CH·CH(CH ₃) ₂	sec.-Isoamyl	98 —C ₁₄ H ₉	Phenanthryl
46 —CH ₂ ·CH— CH ₃ C ₂ H ₅	active Amyl	99 —C(C ₆ H ₅) ₃	Triphenylmethyl
47 —C— CH ₃ C ₂ H ₅ CH ₃	tert.-Amyl	100 —CH ₂ ·CH ₂ —	Ethylene, Dimethylene
48 —CH(CH ₂ ·CH ₃) ₂	Diethylmethyl	101 —CH(CH ₃)·CH ₂ —	Propylene
49 —CH ₂ ·[CH ₂] ₄ ·CH ₃	n-Hexyl	102 —CH ₂ ·CH ₂ ·CH ₂ —	Trimethylene
50 —CH ₂ ·[CH ₂] ₂ ·CH(CH ₃) ₂	Isohexyl	103 —CH ₂ ·CH ₂ ·CH ₂ ·CH ₂ —	Tetramethylene
51 —CH ₂ ·[CH ₂] ₃ ·CH ₃	n-Heptyl, Oenanthy	104 —C(CH ₃) ₂ ·CH ₂ —	Isobutylene
52 —CH ₂ ·[CH ₂] ₃ ·CH(CH ₃) ₂	Isoheptyl	105 —CH ₂ ·[CH ₂] ₃ ·CH ₂ —	Pentamethylene
53 —CH ₂ ·[CH ₂] ₆ ·CH ₃	Octyl, Capryl	106 —CH ₂ ·[CH ₂] ₄ ·CH ₂ —	Hexamethylene
		107 —CH ₂ ·[CH ₂] ₅ ·CH ₂ —	Heptamethylene
		108 —CH ₂ ·[CH ₂] ₆ ·CH ₂ —	Octamethylene
		109 —CH·CH—	Vinylene
		110 —C ₆ H ₅ —	Phenylene
		111 —C ₆ H ₄ (CH ₃)—	Tolylene
		112 —CH ₂ —	Methylene
		113 =CH·CH ₂	Ethylidene
		114 =CH·CH ₂ ·CH ₂	Propylidene
		115 =C(CH ₃) ₂	Isopropylidene
		116 =CH·CH ₂ ·CH ₂ ·CH ₂	Butylidene

117	$\text{=CH}\cdot\text{CH}(\text{CH}_3)_2$	Isobutyridene	146	$\text{—CO}\cdot\text{C}_6\text{H}_4\cdot\text{OCH}_3$ (<i>-p</i>)	Anisoyl
118	$\text{H}_2\text{C}\begin{array}{c} \diagup \text{CH}_2\text{—CH}_2 \\ \diagdown \text{CH}_2\text{—CH}_2 \end{array}\text{C=}$	Cyclohexylidene	147	$\text{—CO}\cdot\text{CH}_2\cdot\text{C}_6\text{H}_5$	Phenylacetyl
119	$\text{=C}\cdot\text{CH}_3$	Vinylidene	148	$\text{—CO}\cdot\text{C}_6\text{H}_4\cdot\text{CH}_3$	Toluyyl
120	$\text{=CH}\cdot\text{CH}\cdot\text{CH}_3$	Allylidene	149	$\text{—CO}\cdot\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Cinnamoyl
121	$\text{CH}_3\cdot\text{CH}\cdot\text{CH}\cdot\text{CH=}$	Crotylidene	150	$\text{—CO}\cdot\text{C}_{10}\text{H}_7$	Naphthoyl
122	$\text{=CH}\cdot\text{C}_6\text{H}_5$	Benzylidene	151	$\text{—CO}\cdot\text{CO—}$	Oxalyl
123	$\text{=CH}\cdot\text{C}_6\text{H}_4\cdot\text{OH}$ (<i>-o</i>)	Salicylidene	152	$\text{—CO}\cdot\text{CH}_2\cdot\text{CO—}$	Malonyl
124	$\text{=CH}\cdot\text{C}_6\text{H}_4\cdot\text{OCH}_3$ (<i>-p</i>)	Anisylidene	153	$\text{—CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CO—}$	Succinyl
125	$\text{=CH}\cdot\text{C}_6\text{H}_4\cdot\text{CH}(\text{CH}_3)_2$ (<i>-p</i>)	Cuminylidene	154	$\text{—CO}\cdot\text{C}_6\text{H}_4\cdot\text{CO—}$	Phthaloyl, Isophthaloyl, Terephthaloyl
126	$\text{=CH}\cdot\text{CH}\cdot\text{CH}\cdot\text{C}_6\text{H}_5$	Cinnamylidene	155	—COOH ($\text{—CO}\cdot\text{OCH}_3$, $\text{—CO}\cdot\text{OC}_2\text{H}_5$, etc.)	Carboxy, (Carbomethoxy, Carbethoxy, etc.)
127	$\text{—CH}_2\cdot\text{CO}\cdot\text{CH}_3$	Acetonyl	156	$\text{—CO}\cdot\text{NH}_2$	Carbamyl
128	$\text{—CH}_2\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Phenacyl	157	$>\text{CO}$	Carbonyl
129	$\text{—CH}_2\cdot\text{CO}\cdot\text{C}_6\text{H}_4\cdot\text{CH}_3$	Tolacyl	158	$\text{—C}(\text{:NH})\cdot\text{NH}_2$	Guanyl
130	$\text{C}_6\text{H}_5\cdot\text{CH}\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Desyl	159	—CN	Cyano
131	—CHO	Aldehydo, Formyl	160	$\text{—CO}\cdot\text{CH}_2\cdot\text{NH}_2$	Glycyl
132	=CH	Methynyl	161	$\text{—CO}\cdot\text{CH}(\text{NH}_2)\cdot\text{CH}_3$	α -Alanyl
133	$\text{—CO}\cdot\text{CH}_3$	Acetyl, Aceto	162	$\text{—CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{NH}_2$	β -Alanyl
134	$\text{—CO}\cdot\text{CH}_2\cdot\text{CH}_3$	Propionyl	163	$\text{—CO}\cdot\text{CH}(\text{NH}_2)\cdot\text{CH}(\text{CH}_3)_2$	Valyl
135	$\text{—CO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{CH}_3$	Butyryl	164	$\text{—CO}\cdot\text{CH}(\text{NH}_2)\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$	Leucyl
136	$\text{—CO}\cdot\text{CH}(\text{CH}_3)_2$	Isobutyryl	165	$\text{—CO}\cdot\text{CH}_2\cdot\text{NH}\cdot\text{CO}\cdot\text{C}_6\text{H}_5$	Hippuryl
137	$\text{—CO}\cdot\text{CH}_2\cdot[\text{CH}_2]_2\cdot\text{CH}_3$	Valeryl	166	$\text{—C}_4\text{H}_9\text{O}$	Furyl
138	$\text{—CO}\cdot\text{CH}_2\cdot\text{CH}(\text{CH}_3)_2$	Isovaleryl	167	$\text{—C}_4\text{H}_9\text{S}$	Thienyl
139	$\text{—CO}\cdot\text{CH}_2\cdot[\text{CH}_2]_3\cdot\text{CH}_3$	Caproyl	168	$\text{—CH}_2\cdot\text{C}_4\text{H}_9\text{O}$	Furfuryl
140	$\text{—CO}\cdot\text{CH}_2\cdot[\text{CH}_2]_{12}\cdot\text{CH}_3$	Palmityl	169	$\text{=CH}\cdot\text{C}_4\text{H}_9\text{O}$	Furfurylidene
141	$\text{—CO}\cdot\text{CH}_2\cdot[\text{CH}_2]_{15}\cdot\text{CH}_3$	Stearyl	170	$\text{—CO}\cdot\text{C}_4\text{H}_9\text{O}$	Furoyl, Pyromucyl
142	$\text{—CO}\cdot[\text{CH}_2]_7\cdot\text{CH}\cdot\text{CH}\cdot[\text{CH}_2]_7\cdot\text{CH}_3$	Oleyl	171	$\text{—C}_4\text{H}_9\text{NH}$	Pyrryl
143	$\text{—CO}\cdot\text{COOH}$	Oxalo	172	$\text{—C}_5\text{H}_4\text{N}$	Pyridyl
144	$\text{—CO}\cdot\text{C}_6\text{H}_5$	Benzoyl	173	$\text{—C}_5\text{H}_{10}\text{N}$	Piperidyl
145	$\text{—CO}\cdot\text{C}_6\text{H}_4\cdot\text{OH}$ (<i>-o</i>)	Salicyloyl	174	$\text{—NC}_5\text{H}_{10}$	Piperidino

DICTIONARY OF ORGANIC COMPOUNDS

D

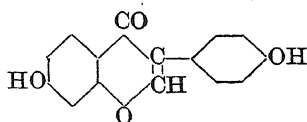
D.A.

See Diphenylchloroarsine.

Dahl's Acid.

See 1-Naphthylamine-4:6-disulphonic Acid and 1-Naphthylamine-4:7-disulphonic Acid.

Daidzein (7:4'-Dihydroxyisoflavone)



$C_{15}H_{10}O_4$

MW, 254

The aglucone from daidzin. Pale yellow prisms from 50% EtOH.Aq. M.p. 323°.

Diacyl: m.p. 187°.

Di-Me ether: formo-ononetin methyl ether. Plates. M.p. 162-4°.

Baker, Robinson, Simpson, *J. Chem. Soc.*, 1933, 274.

Mahal, Rai, Venkataraman, *J. Chem. Soc.*, 1934, 1770.

Wessely, Kornfeld, Lechner, *Ber.*, 1933, 66, 685.

Daidzin

$C_{21}H_{20}O_9$

MW, 416

Glucoside from soya bean meal. Prisms + $1H_2O$ from H_2O . Anhyd. at 120°. M.p. 234-6°. $[\alpha]_D^{20}$ -36.4° in 0.02N KOH. Hyd. → glucose + daidzein.

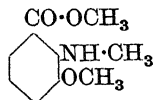
Acetyl deriv.: m.p. 203°.

Benzoyl deriv.: m.p. 145-50°.

Mono-Me ether: cryst. from EtOH.Aq. M.p. 206°.

Walz, *Ann.*, 1931, 489, 129.

Damascenine (3-Methoxy-2-methylamino-benzoic methyl ester, 3-methoxy-N-methylanthranilic methyl ester, methyl damasceninate)



$C_{10}H_{13}O_3N$

MW, 195

Alkaloid in seeds of *Nigella damascena*, Linn. Prisms. M.p. 26°. B.p. 270° slight decomp., 147-8°/10 mm. Sol. EtOH, Et₂O, CHCl₃, pet. ether. Insol. H₂O. Sols. show blue fluor. Volatile in steam.

B.HCl: prisms + $1H_2O$. M.p. 122°, anhyd. 156°.

$B_2H_2SO_4$: m.p. 168-70°.

$B.HNO_3$: m.p. 96°.

$B_2H_2PtCl_6$: m.p. 194°.

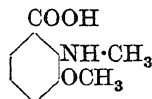
Picrate: m.p. 158-9°.

Kaufmann, Rothlin, *Ber.*, 1916, 49, 578.

Keller, Schulze, *Chem. Zentr.*, 1926, II, 750.

Ewins, *J. Chem. Soc.*, 1912, 101, 544.

Damasceninic Acid (3-Methoxy-2-methylaminobenzoic acid, 3-methoxy-N-methylanthranilic acid)



$C_9H_{11}O_3N$

MW, 181

M.p. 78°, anhyd. 144°. Hygroscopic.

B.HCl: prisms. M.p. 210-11°.

B.HBr.H₂O: prisms from H₂O. M.p. 204-6°.

B.HI.H₂O: yellow prisms. M.p. 179°.

B.H₂SO₄.H₂O: needles. M.p. 209-10°.

Me ester: see Damascenine.

$B_2H_2PtCl_6$: m.p. 202°.

Picrate: m.p. 190°.

Kaufmann, Rothlin, *Ber.*, 1916, 49, 583.

Dambonite.

See under Inositol.

Dambose.

See Inositol.

Dammarolic Acid

$C_{29}H_{45}(OH)_4COOH$

$C_{30}H_{50}O_6$

MW, 506

Triterpene from dammar resin. Cryst. from EtOH-Me₂CO. M.p. 325°. Sol. Et₂O.

Tetra-acetyl deriv.: m.p. 155°.

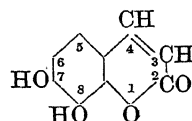
Bauer, Moll, *Chem. Abstracts*, 1937, 31, 8961.

Mladenovic, Barkovic, *Monatsh.*, 1940, 73, 206.

Daphnetic Acid.

See 2:3:4-Trihydroxycinnamic Acid.

Daphnetin (7:8-Dihydroxycoumarin)



$C_9H_6O_4$

MW, 178

Occurs as glucoside daphnin in *Daphne odora*, Thunb., and other species. Pale yellow needles. M.p. 256°. Sol. alkalis \rightarrow yellow col. $\text{FeCl}_3 \rightarrow$ green col.

7-Me ether: $\text{C}_{10}\text{H}_8\text{O}_4$. MW, 192. M.p. 175.5°.

8-Me ether: m.p. 185°.

7:8-Di-Me ether: $\text{C}_{11}\text{H}_{10}\text{O}_4$. MW, 206. Needles from H_2O . M.p. 119–21°.

7-Et ether: $\text{C}_{11}\text{H}_{10}\text{O}_4$. MW, 206. M.p. 155°.

7:8-Di-Et ether: $\text{C}_{13}\text{H}_{14}\text{O}_4$. MW, 234. M.p. 72°.

7-Me-8-Et ether: $\text{C}_{12}\text{H}_{12}\text{O}_4$. MW, 220. M.p. 85–5°.

8-Me-7-Et ether: m.p. 81°.

8-Acetyl: m.p. 174–5°.

Diacetyl: m.p. 137° (128–30°).

Dibenzoyl: cryst. from EtOH. M.p. 152°.

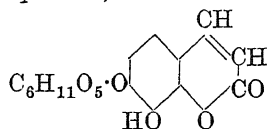
Asai, *Chem. Abstracts*, 1930, **24**, 3510.

Hattori, *ibid.*, 4787.

Wessely, *Sturm, Ber.*, 1930, **63**, 1299.

Gandini, *Gazz. chim. ital.*, 1940, **70**, 611.

Daphnin (7-Glucosido-8-hydroxycoumarin, 7-glucosido-daphnetin)



$\text{C}_{15}\text{H}_{16}\text{O}_9$

MW, 340

Glucoside occurring in bark of *Daphne odora*, Thunb., and other species. Prisms + $2\text{H}_2\text{O}$ from EtOH.Aq. M.p. 215° decomp. (223–4°). $[\alpha]_D^{25} - 114.7^\circ$ in MeOH. Sol. alkalis \rightarrow yellow col. Hyd. by dil. min. acids \rightarrow daphnetin + glucose.

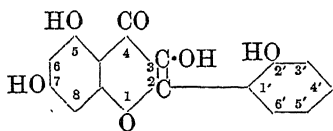
Hattori, *Chem. Abstracts*, 1930, **24**, 4787.

Wessely, *Sturm, Ber.*, 1930, **63**, 1299.

Leone, *Gazz. chim. ital.*, 1925, **55**, 673.

Gandini, *Gazz. chim. ital.*, 1940, **70**, 611.

Datiscetin (3:5:7:2'-Tetrahydroxyflavone)



$\text{C}_{15}\text{H}_{10}\text{O}_6$

MW, 286

Occurs as glucoside datiscin in leaves of Bastard Hemp (*Datisca cannabina*, Linn.). Pale yellow needles from EtOH. M.p. 276°.

3:2'-Di-Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_6$. MW, 314. Needles from EtOH. M.p. 218–19°.

3:7:2'-Tri-Me ether: $\text{C}_{18}\text{H}_{16}\text{O}_6$. MW, 328. Needles from MeOH. M.p. 111–112.5°.

5:7:2'-Tri-Me ether: yellow needles from EtOH. M.p. 158–60°.

Diacetyl deriv.: m.p. 142°.

Tetra-acetyl: m.p. 141°.

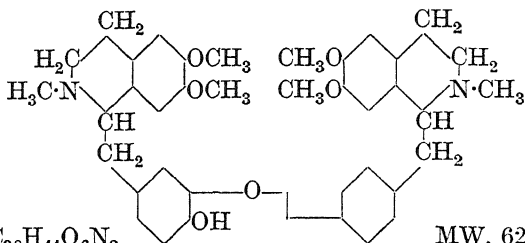
Benzoyl deriv.: m.p. 191–2°.

Tetrabenzenesulphonyl: needles from AcOH. M.p. 188°.

Kalff, Robinson, *J. Chem. Soc.*, 1925, **127**, 1971.

Bargellini, Peratoner, *Gazz. chim. ital.*, 1919, **49**, ii, 64.

Dauricine



$\text{C}_{38}\text{H}_{44}\text{O}_6\text{N}_2$ MW, 624

Alkaloid from *Menispermum dauricum*. M.p. 115°. Sol. MeOH, EtOH, Me_2CO , C_6H_6 . $[\alpha]_D^{25} - 139^\circ$ in MeOH.

Methiodide: needles. M.p. 204°. $[\alpha]_D^{25} - 110^\circ$ in MeOH.

Kondo, Narita, *J. Pharm. Soc. Japan*, 1927, **542**, 40.

Kondo, Narita, Uyeo, *Ber.*, 1935, **68**, 519.

Faltis, Fravendorfer, *Ber.*, 1930, **63**, 809.

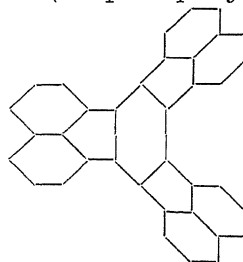
D.C.

See Diphenylcyanoarsine.

D.D.T.

See *pp'*-Dichlorodiphenyltrichloroethane.

Decacycene (Tri-perinaphthylenebenzene)



$\text{C}_{36}\text{H}_{18}$

MW, 450

Lustrous yellow needles. M.p. 387°. Sol. hot PhNO_2 . Mod. sol. aniline. Spar. sol. hot Py, xylene. Prac. insol. CS_2 , C_6H_6 , toluene. Insol. EtOH, Et_2O , AcOH. Brownish-olive sol. in conc. H_2SO_4 .

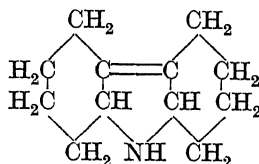
Picrate: m.p. 295–6° decomp.

Dziewoński, *Ber.*, 1903, **36**, 968.

Dziewoński, Suknarowski, *Ber.*, 1918, **51**, 460.

Dziewoński, Suszko, *Chem. Abstracts*, 1924, **18**, 982.

Decahydrocarbazole



$\text{C}_{12}\text{H}_{19}\text{N}$

MW, 177

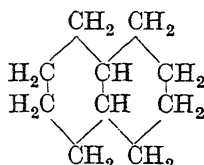
Needles from Et₂O. M.p. 75°.

Picrate: yellow prisms from MeOH. M.p. 210° decomp.

N-Me: C₁₃H₂₁N. MW, 191. B.p. 128°/13 mm. *Picrate*: yellow plates from toluene. M.p. 162-3°.

Perkin, Plant, *J. Chem. Soc.*, 1924, 125, 1509.

Decahydronaphthalene (*Decalin*, *naphthane*)



C₁₀H₁₈

MW, 138

Cis-.

M.p. -43°. B.p. 193°/768 mm. D₄²⁰ 0.8963. n_D²⁰ 1.48113. Heat of comb. C_p 1503 Cal. Sp. heat 0.4331 between 2.8° and 89.6°.

Trans-.

M.p. -31.47°. B.p. 185°. D₄¹⁸ 0.8703. n_D¹⁸ 1.46968. Sp. heat 0.4251 between 1.3° and 87.6°.

Commercial product is a mixture of *cis*- and *trans*- forms. Good solvent for org. substances. Non-toxic. Does not form a picrate.

Hückel, *Ber.*, 1925, 58, 1449.

Eisenlohr, Polenske, *Ber.*, 1924, 57, 1639.

Brückner, *Chem.-Ztg.*, 1931, 55, 401, (*Chem. Zentr.*, 1931, II, 629).

Lush, *J. Soc. Chem. Ind.*, 1927, 46, 454.

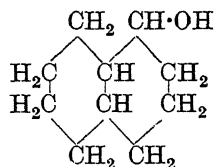
Varga, F.P. 683,070, (*Chem. Abstracts*, 1930, 24, 4523).

Grillitsch, *Chem.-Ztg.*, 1932, 56, 294 (*Review*).

Seyer, Walker, *J. Am. Chem. Soc.*, 1938, 60, 2125.

Bastiansen, Hassel, *Nature*, 1946, 157, 765.

Decahydro-1-naphthol (*α-Naphthanol*, *α-decalol*, *1-hydroxydecahydronaphthalene*)



C₁₀H₁₈O

MW, 154

Cis-.

Two forms.

(1) M.p. 93°. B.p. 246° corr./745 mm.

Acetyl: b.p. 129°/15 mm. D₄²⁰ 1.019. n_D²⁰ 1.4779.

Oxalyl: two forms. (a) Cryst. from pet. ether. M.p. 139°. (b) Cryst. from EtOH. M.p. 100°.

Acid succinyl: m.p. 66°.

Neutral succinyl: m.p. 150°.

Acid phthaloyl: m.p. 176°.

p-Nitrobenzoyl: m.p. 83°.

p-Toluenesulphonyl: m.p. 96-8° decomp.

Orthosilicate: m.p. 116-18°.

Phenylurethane: cryst. from Me₂CO.Aq. M.p. 118°.

(2) M.p. 55°.

Acid phthaloyl: m.p. 142°.

Trans-.

Two forms.

(1) M.p. 63°. B.p. 236.5°/745 mm., 124-6°/18 mm.

Acetyl: b.p. 121°/12 mm. D₄²⁰ 0.994. n_D²⁰ 1.4721.

Oxalyl: m.p. 111°.

Acid succinyl: m.p. 85°.

Acid phthaloyl: cryst. from C₆H₆ or MeOH.Aq. M.p. 168°.

p-Nitrobenzoyl: m.p. 86°.

p-Toluenesulphonyl: m.p. 99-100°.

Borate: m.p. 155°.

Orthosilicate: m.p. 105°.

Phenylurethane: m.p. 114°.

(2) M.p. 49°. B.p. 232.5°/745 mm.

Acetyl: m.p. 30°. B.p. 115°/10 mm. D₄²⁰ 0.999. n_D²⁰ 1.4711.

Oxalyl: two forms. (1) Dimorphous. (a) Cryst. from EtOH. M.p. 77-8°. (b) Cryst. from EtOH. M.p. 85°. (2) Cryst. from pet. ether. M.p. 143°.

Acid succinyl: m.p. 107°.

Acid phthaloyl: m.p. 121°.

p-Nitrobenzoyl: m.p. 116°.

p-Aminobenzoyl: cryst. from EtOH.Aq. M.p. 143°. *Hydrochloride*: m.p. 180-2° decomp.

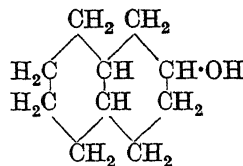
p-Toluenesulphonyl: m.p. 73°.

Phenylurethane: m.p. 134°.

Hückel, Gercke, *Ann.*, 1930, 477, 143.

Hückel, Danneel, Gross, Naab, *Ann.*, 1933, 502, 99.

Decahydro-2-naphthol (*β-Naphthanol*, *β-decalol*, *2-hydroxydecahydronaphthalene*)



C₁₀H₁₈O

MW, 154

Cis-.

Two forms.

(1) *cis*-β-Decalol I. M.p. 105°. B.p. 243°/746 mm.

Acetyl: m.p. 32°. B.p. 122°/9 mm. D₄²⁰ 1.015. n_D²⁰ 1.4756.

Oxalyl: two forms. (a) M.p. 120°. (b) Cryst. from EtOH. M.p. 64-5°.

Benzoyl: m.p. 57–8°.
p-Toluenesulphonyl: cryst. from MeOH. M.p. 78°.
Orthosilicate: m.p. 97–8°.
Phenylurethane: m.p. 134°.
 (2) *cis-β-Decalol* II. Exists in two forms.
 (a) *Racemic mixture*.
 M.p. 18°. B.p. 243°/746 mm.
Oxalyl: m.p. 131–2°.
Acid succinyl: cryst. from pet. ether. M.p. 59°.
p-Nitrobenzoyl: cryst. from EtOH. M.p. 77°.
p-Aminobenzoyl: cryst. from EtOH. M.p. 155°. *B,HCl*: cryst. from EtOH. M.p. 216° decomp.
Acid phthaloyl: m.p. 153°.
Phenylurethane: m.p. 102°.
d(+ cis-β-Decalol II)-.
 M.p. 38°. $[\alpha]_D^{21} + 12.5^\circ$ in EtOH, $+ 3.9^\circ$ in C_6H_6 .
Acid phthaloyl: m.p. 146°. $[\alpha]_D^{20} - 17.8^\circ$ in EtOH.
l(- cis-β-Decalol II)-.
 M.p. 38°. $[\alpha]_D^{23.5} - 12.4^\circ$ in EtOH.
Acid phthaloyl: m.p. 146°. $[\alpha]_D^{20} + 17.5^\circ$ in EtOH.
 (b) *Racemic compound*.
 M.p. 31° and 37°. B.p. 130°/16 mm.
Acid phthaloyl: m.p. 153°.
Trans-.
 Two forms.
dl-.
 (1) M.p. 75°. B.p. 236°/746 mm.
Acetyl: b.p. 118°/9 mm. D_4^{20} 0.990. n_D^{20} 1.4709.
Oxalyl: two forms. (a) M.p. 147°. (b) Cryst. from EtOH. M.p. 90–102°.
Acid succinyl: m.p. 81°.
Acid phthaloyl: m.p. 180°.
Benzoyl: m.p. 48°.
p-Nitrobenzoyl: m.p. 141°.
p-Aminobenzoyl: cryst. from pet. ether. M.p. 103–4°. *B,HCl*: needles from EtOH. M.p. 211–13° decomp.
p-Toluenesulphonyl: cryst. from MeOH. M.p. 63°.
Phosphate: m.p. 159°.
Orthosilicate: m.p. 124–5°.
Phenylurethane: m.p. 165°.
l-.
 M.p. 72°. $[\alpha]_D^{16.5} - 2.7^\circ$ in cyclohexene.
Acid phthaloyl: m.p. 173°. $[\alpha]_D^{20} - 1.4^\circ$ in EtOH.
p-Toluenesulphonyl: $[\alpha]_D^{20} - 1.75^\circ$ in EtOH.
 (2) M.p. 53°. B.p. 230–1°/746 mm.
Acetyl: b.p. 110°/9 mm. D_4^{20} 0.998. n_D^{20} 1.4728.
Oxalyl: m.p. 143°.
Acid succinyl: cryst. from pet. ether. M.p. 64°.

p-Nitrobenzoyl: yellow plates from EtOH. M.p. 112°.

p-Aminobenzoyl: cryst. from pet. ether. M.p. 118°. *B,HCl*: m.p. 167–8° decomp.

p-Toluenesulphonyl: cryst. from MeOH. M.p. 111°.

Phenylurethane: m.p. 99°.

Hückel, Mentzel, Brinkmann, Kamenz, *Ann.*, 1927, 451, 117.

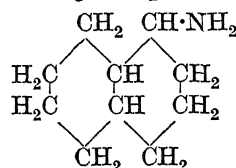
Hückel, Neunhoffer, Gercke, Frank, *Ann.*, 1930, 477, 143.

Hückel, Kumetat, *Ber.*, 1934, 67, 1890.

Hückel, Kuhn, *Ber.*, 1937, 70, 2479.

Hückel, Sowa, *Ber.*, 1941, 74, 57.

Decahydro-1-naphthylamine (α -Decalylamine, 1-aminodecahydronaphthalene)



$C_{10}H_{19}N$

MW, 153

Cis-.

Two forms.

(1) M.p. 8° (– 18°). B.p. 98°/10 mm.

N-Acetyl: cryst. from Me_2CO . M.p. 181°.

N-Benzoyl: cryst. from MeOH. M.p. 206°.

(2) M.p. – 2°. B.p. 100°/12 mm.

N-Acetyl: m.p. 141°.

N-Benzoyl: cryst. from Me_2CO . M.p. 193°.

Trans-.

Two forms.

(1) M.p. – 18°. B.p. 99°/11 mm.

N-Acetyl: cryst. from Me_2CO . M.p. 130°.

N-Benzoyl: cryst. from MeOH. M.p. 112°.

(2) M.p. – 1°. B.p. 106°/16 mm.

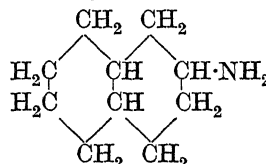
N-Acetyl: m.p. 182°.

N-Benzoyl: cryst. from MeOH. M.p. 195°.

Hückel, Danneel, Gross, Naab, *Ann.*, 1933, 502, 110.

Hückel, *Ann.*, 1938, 533, 1.

Decahydro-2-naphthylamine (β -Decalylamine, 2-aminodecahydronaphthalene)



$C_{10}H_{19}N$

MW, 153

Cis-.

Two forms known, one of which has been resolved.

(1) (a) *Racemate*.

M.p. 15°.

B,HCl: decomp. at 270°.

N-Acetyl: m.p. 153°.

N-Benzoyl: cryst. from EtOH. M.p. 204°.

(b) (+)-Form.

M.p. 30.5°.

 B, HCl : $[\alpha]_D^{20} + 15.49^\circ$ in H_2O .N-Acetyl: m.p. 173°. $[\alpha]_D^{23} + 21.44^\circ$ in EtOH.N-Benzoyl: m.p. 205°. $[\alpha]_D^{20} + 1.72^\circ$ in $CHCl_3$.d-Camphorsulphonyl: $[\alpha]_D^{20} + 31.45^\circ$ in EtOH.

(c) (−)-Form.

M.p. 30.5°.

 B, HCl : $[\alpha]_D^{20} - 15.53^\circ$ in H_2O .N-Acetyl: m.p. 173°. $[\alpha]_D^{23} - 21.35^\circ$ in EtOH.N-Benzoyl: m.p. 205°. $[\alpha]_D^{21} - 1.68^\circ$ in $CHCl_3$. α -Camphorsulphonyl: $[\alpha]_D^{18} + 15.14^\circ$ in EtOH.

(2) M.p. below 20°.

 B, HCl : decomp. at 255–60°.

N-Acetyl: m.p. 88°.

N-Benzoyl: cryst. from Me_2CO . M.p. 128°.

Trans.

Two forms.

(1) M.p. −47°.

 B, HCl : decomp. at 238°.

N-Acetyl: m.p. 130°.

N-Benzoyl: m.p. 177°.

(2)

dl.

M.p. 15°.

 B, HCl : decomp. at 245–50°. $B, H\cdot COOH$: m.p. 124°.

N-Formyl: m.p. 84° from pet. ether.

N-Acetyl: m.p. 163°.

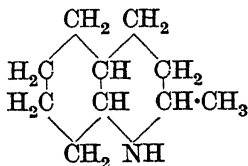
N-Benzoyl: m.p. 176–7°.

N-Carbomethoxyl: m.p. 109°.

d.

M.p. 10.6°. $[\alpha]_D^{22} + 2.14^\circ$. B, HCl : $[\alpha]_D^{23} + 0.92^\circ$.N-Acetyl: m.p. 175–6°. $[\alpha]_D^{23} + 25.3^\circ$.N-Benzoyl: m.p. 174°. $[\alpha]_D^{20} + 1.89^\circ$. α -Bromo-d-camphorsulphonate: m.p. 158° from $Me_2CO.Aq$. $[\alpha]_D^{25} + 71.7^\circ$.

l.

d-Tartrate: $[\alpha]_D^{21} + 12.45^\circ$.Hückel, *Ann.*, 1938, **533**, 1.Hückel, Mentzel, Brinkmann, Kamenz, *Ann.*, 1927, **451**, 127.Hückel, Kuhn, *Ber.*, 1937, **70**, 2479.Hückel, Sowa, *Ber.*, 1941, **74**, 57.**Decahydroquinaldine (Decahydro-2-methylquinoline)** $C_{10}H_{19}N$

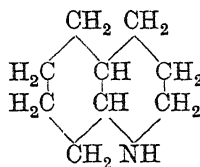
MW, 153

B.p. 216°/752 mm. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9308. n_D^{20} 1.497. Alk. to litmus. Absorbs $CO_2 \rightarrow$ carbonate. B, HCl : m.p. 284°. Deliquescent.

Phenylurethane: m.p. 148°.

Picrate: m.p. 134°.

Methiodide: m.p. 230°.

Sabatier, Murat, *Compt. rend.*, 1914, **158**, 309.**Decahydroquinoline** $C_9H_{17}N$

MW, 139

Cis.

M.p. −40°. B.p. 205–6° (205–6°/735 mm.), 90°/20 mm. D_4^{20} 0.9426, D_4^{25} 0.9191. n_D^{20} 1.4926. B, HCl : m.p. 226°. B, HBr : m.p. 232°.

N-Benzoyl: m.p. 96°.

 $B, H\cdot AuCl_4$: m.p. 157–8°.

Phenylurethane: m.p. 163–5°.

Picrate: m.p. 142–5° (135–6°).

Trans.

dl.

M.p. 48°. B.p. 203°/735 mm. Sublimes. Sol. warm H_2O . D_4^{25} 0.9021. Volatile in steam and Et_2O vapour. Absorbs CO_2 . Reduces $NH_3, AgNO_3$. B, HCl : m.p. 276° decomp. (287°). B, HBr : m.p. 277–9° decomp. B, HI : m.p. 253° decomp.

N-Benzoyl: m.p. 56°.

 $B, H\cdot AuCl_4$: m.p. 126°. B_2, H_2PtCl_6 : m.p. 228° decomp.

Phenylurethane: m.p. 153–5°.

Picrate: m.p. 158°.

d.

M.p. 75°. B.p. 200–2°. $[\alpha]_D^{25} + 4.8^\circ$ in EtOH. B, HCl : m.p. 303–4° decomp.

l.

M.p. 74–5°. B.p. 200–1°. $[\alpha]_D^{25} - 4.5^\circ$ in EtOH. B, HCl : m.p. 305°.Hückel, Stepf, *Ann.*, 1927, **453**, 172.Fujise, *Chem. Abstracts*, 1928, **22**, 3890.Tsushima, Sudyuki, *J. Chem. Soc. Japan*, 1943, **64**, 1295.**Decalin.**

See Decahydronaphthalene.

Decalol.

See Decahydronaphthol.

Decalone.

See Ketodecahydronaphthalene.

Decalylamine.

See Decahydronaphthylamine.

Decamethylene bromide.

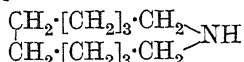
See 1 : 10-Dibromodecane.

Decamethylene chloride.

See 1 : 10 Dichlorodecane.

Decamethylenediamine

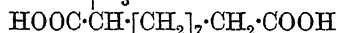
See 1 : 10-Diaminodecane.

Decamethyleneimine $\text{C}_{10}\text{H}_{21}\text{N}$ MW, 155B.p. 108–9°/20 mm. D_4^{25} 0.8987. n_D^{25} 1.4792.
pK 9.04.

Picrate : m.p. 192–192.5°.

Ruzicka, Kobelt, Hafliger, Prelog, *Helv. Chim. Acta*, 1949, 32, 544.**Decanal.**

See Capric Aldehyde.

n-Decane $\text{C}_{10}\text{H}_{22}$ MW, 142M.p. –30°. B.p. 174°, 107°/100 mm., 63°/15 mm. D_4^{20} 0.73014. n_D^{20} 1.41203.Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, 53, 1948.Simon, *Chem. Abstracts*, 1929, 23, 4440.Maman, *Chem. Abstracts*, 1936, 30, 7095.**Decane-1 : 9-dicarboxylic Acid** $\text{C}_{12}\text{H}_{22}\text{O}_4$ MW, 230Needles from hot H_2O . M.p. 80–80.5°. B.p. 219°/3 mm.Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 167.**Decane-1 : 10-dicarboxylic Acid** $\text{C}_{12}\text{H}_{22}\text{O}_4$ MW, 230Needles from hot H_2O or AcOEt . M.p. 129° corr. B.p. 245°/10 mm.Mono-Me ester : $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. Prisms from EtOH . M.p. 51.5–52°.Di-Me ester : $\text{C}_{14}\text{H}_{26}\text{O}_4$. MW, 258. M.p. 31°. B.p. 167–9°/9 mm.Di-Et ester : $\text{C}_{16}\text{H}_{30}\text{O}_4$. MW, 286. M.p. approx. 16°. B.p. 204–5°/15 mm., 165–6°/3.5 mm. D^{20} 0.849.

Di-1-menthyl ester : b.p. 225–8°/2 mm.

Diamide : $\text{C}_{12}\text{H}_{24}\text{O}_2\text{N}_2$. MW, 228. M.p. 189°.

Anhydride : two forms, m.p. 76–8° and 86–7°.

Dinitrile : $\text{C}_{12}\text{H}_{20}\text{N}_2$. MW, 192. B.p. 225–8°/17 mm.

Monoanilide : m.p. 123°.

Dianilide : m.p. 191° (170–1°).

Di-p-bromoanilide : m.p. 213°.

Di-o-toluidide : m.p. 164°.

Di-p-toluidide : m.p. 165°.

Chuit, *Helv. Chim. Acta*, 1926, 9, 267.Bhattacharya, Saletore, Simonsen, *J. Chem. Soc.*, 1928, 2678.**Decanol.**

See n-Decyl Alcohol, Methyloctylcarbinol, and Ethylheptylcarbinol.

Decanone.

See Methyl octyl Ketone, Ethyl n-heptyl Ketone and Propyl hexyl Ketone.

Decene.

See Decylene.

3-Decenone-2.

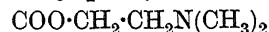
See Methyl 1-octenyl Ketone.

Decevinic Acid $\text{C}_{14}\text{H}_{28}\text{O}_6$ MW, 278Degradation product of cevine. M.p. 273–8°. $[\alpha]_D^{25} +47.6^\circ$ in Py. S at 300° \rightarrow 2-hydroxy-1 : 8-naphthalic anhydride.

Me ester : m.p. 242–5°.

Di-Me ester : m.p. 165–6°.

Acetyl deriv. : m.p. 169–71°.

Craig, Jacobs, *J. Biol. Chem.*, 1940, 134, 123.**Decicaine** (Pantocaine, hydrochloride of β -dimethylaminoethyl p-butylaminobenzoate)

HCl

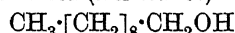
 $\text{C}_{15}\text{H}_{25}\text{O}_2\text{N}_2\text{Cl}$ MW, 300.5

Three cryst. modifications. M.p.s 147°, 139° and 130°. B.p. 220–4°/3–4 mm. Local anaesthetic.

Free base : amethocaine. M.p. 43°. B.p. 210°/4 mm. Nitrate : m.p. 131–2°. Picrate : m.p. 120°.

Winthrop, U.S.P. 1,889,645 (*Chem. Zentr.*, 1933, I, 1653).Anon., *Pharm. J.*, 1937, 139, 467.Shapiro, *J. Soc. Chem. Ind.*, 1945, 64, 177.Fel'dman, Kopeliovich, *Chem. Abstracts*, 1946, 40, 2268.**2-n-Decylacrylic Acid.**

See 1-Tridecylenic Acid.

n-Decyl Alcohol (1-Decanol) $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158F.p. 7°. B.p. 228–32°, 120°/12 mm. 107–8°/7 mm. D_4^{20} 0.8297. n_D^{20} 1.43719. $\text{KMnO}_4 \rightarrow$ capric acid.

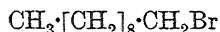
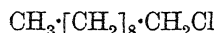
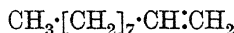
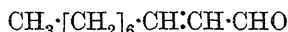
p-Nitrobenzoyl : m.p. 30°.

3 : 5-Dinitrobenzoyl : m.p. 52°.

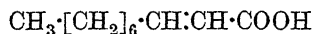
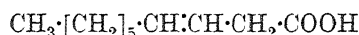
Schrauth, Schenck, Stickdorn, *Ber.*, 1931, 64, 1318.Komppa, Talvitie, *J. prakt. Chem.*, 1932, 135, 193.

n-Decyl Aldehyde.

See Capric Aldehyde.

n-Decyl bromide (1-Bromodecane)C₁₀H₂₁Br MW, 221B.p. 117.6–118°/15.5 mm., 104–4.4°/8 mm.
D₄²⁰ 1.0683. n_D²⁰ 1.45504.Komppa, Talvitie, *J. prakt. Chem.*, 1932, 135, 193.**n-Decyl chloride (1-Chlorodecane)**C₁₀H₂₁Cl MW, 176.5B.p. 223°, 137–142°/24 mm., 106°/16 mm.
D₄²⁰ 0.8696. n_D²⁰ 1.43799.Rossander, Marvel, *J. Am. Chem. Soc.*, 1928, 50, 1495.Komppa, Talvitie, *J. prakt. chem.*, 1932, 135, 193.**1-Decylene (1-Decene)**C₁₀H₂₀ MW, 140M.p. –87°. B.p. 53.5°/3 mm. D₄²⁰ 0.7421.
n_D²⁰ 1.42170.Vaughn, *J. Am. Chem. Soc.*, 1934, 56, 2064.Maman, *Chem. Abstracts*, 1936, 30, 7095.**1-Decylene-aldehyde (1-Nonene-1-aldehyde)**C₁₀H₁₈O MW, 154Constituent of essential oil of coriander at flowering stage and of oil of *Achasma walang*.
B.p. 229–31°, 107–7.5°/11.5 mm. D₁₅^{17.5} 0.846.
n_D^{17.5} 1.4533.

Semicarbazone: needles from EtOH. M.p. 168.5°.

Delaby, *Bull. soc. chim.*, 1936, 3, 2375.van Romburgh, *Rec. trav. chim.*, 1938, 57, 494.Swift *et al.*, *J. Am. Chem. Soc.*, 1949, 71, 1512.**1-Decylenic Acid (1-Nonene-1-carboxylic acid)**C₁₀H₁₈O₂ MW, 170M.p. 12°. B.p. 165°/15 mm., 148–9°/4.5 mm.
D₁₅¹⁵ 0.9280. n_D²⁰ 1.46161.Chloride: C₁₀H₁₇OCl. MW, 188.5. B.p. 120–122°/14 mm., 95–7°/2.5 mm. D₂₀²⁰ 0.9640.Amide: C₁₀H₁₉ON. MW, 169. Cryst. from Et₂O. M.p. 122°.Zaar, *Chem. Zentr.*, 1930, I, 363.van Romburgh, *Rec. trav. chim.*, 1938, 57, 494.**2-Decylenic Acid (2-Nonene-1-carboxylic acid)**C₁₀H₁₈O₂ MW, 170

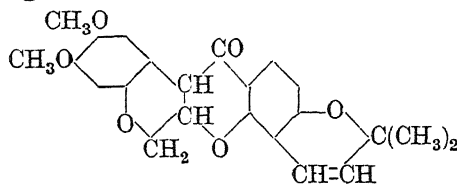
M.p. 5°. B.p. 154–63°/11 mm.

Dibromo deriv.: C₁₀H₁₈O₂Br₂. M.p. 44–5°.Tulus, *Chem. Abstracts*, 1946, 40, 3722.**3-Decylenic Acid.**

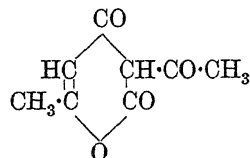
See Obtusilic Acid.

n-Decylic Acid.

See n-Capric Acid.

n-Decyl iodide (1-Iododecane)C₁₀H₂₁I MW, 268B.p. 132°/15 mm. D₄²⁰ 1.2567. n_D²⁰ 1.48589.Krafft, *Ber.*, 1892, 19, 2219.Komppa, Talvitie, *J. prakt. Chem.*, 1932, 135, 193.**Deguelin**C₂₃H₂₂O₆ MW, 394Occurs in roots of *Tephrosia toxicaria*, Pers., in derris and cubé roots, and in leaves of *Tephrosia Vogeli*, Hook. Cryst. from EtOH. M.p. 171°.Clark, *J. Am. Chem. Soc.*, 1932, 54, 3000.Haller, La Forge, *J. Am. Chem. Soc.*, 1934, 56, 2415.Boam, Cahn, Stuart, *J. Soc. Chem. Ind.*, 1937, 56, 91r.**Deguelinol II.**

See Isotephrosin.

Dehydracetic Acid (6-Methyl-3-acetopyrone-2)C₈H₈O₄ MW, 168Rhombic needles or plates from EtOH. M.p. 109°. B.p. 270°, 132–3°/5 mm. Sol. Et₂O, hot EtOH. Alc. KOH → acetoacetic acid. Decomp. by hot conc. NaOH.Aq. k = 1 × 10^{–6} at 25°. Sublimes. Mod. volatile in steam.Me ester: C₉H₁₀O₄. MW, 182. Yellow prisms. M.p. 91°. Sol. H₂O.Et ester: C₁₀H₁₂O₄. MW, 196. Needles from EtOH. M.p. 93–4°.Amide: C₈H₉O₅N. MW, 167. Needles. M.p. 196–200° (208°). Sublimes.

Anilide: needles. M.p. 115°. Sol. EtOH, Et₂O.

Oxime: needles. M.p. 153–4° (rapid heat.).

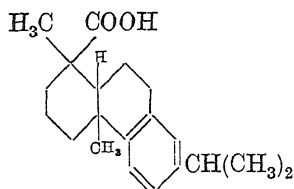
Semicarbazone: needles. M.p. 197–8°.

Arndt, Eistert, Scholz, Aron, *Ber.*, 1936, 69, 2373.

Rassweiler, Adams, *J. Am. Chem. Soc.*, 1924, 46, 2758.

Arndt, Nachtwey, *Ber.*, 1924, 57, 1489.

Dehydroabietic Acid



C₂₀H₂₈O₂

MW, 300

Cryst. from EtOH.Aq. M.p. 172–3°. Very sol. EtOH, Et₂O. Mod. sol. hexane. $[\alpha]_D^{20} + 62^\circ$ in EtOH.

Me ester: C₂₁H₃₀O₂. MW, 314. Needles. M.p. 62–3°. D₄²⁰ 1.0013. n_D^{20} 1.5081. $[\alpha]_D^{20} + 60^\circ$ in EtOH.

Fieser, Campbell, *J. Am. Chem. Soc.*, 1938, 60, 168, 2633; 1939, 61, 2530.

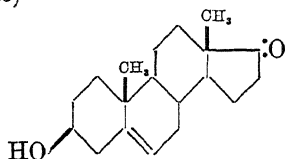
Fleck, Palkin, *J. Am. Chem. Soc.*, 1939, 61, 248.

Littmann, *J. Am. Chem. Soc.*, 1938, 60, 1420.

Dehydroandrosterone.

See Δ^5 -Androstene-3 α -ol-17-one.

Dehydroepiandrosterone (Δ^5 -Androstene-3 β -ol-17-one)



C₁₉H₂₈O₂

MW, 288

Male sex hormone. Isolated from male urine. Dimorphous cryst. forms from C₆H₆-pet. ether. (i) M.p. 140–1° corr. (ii) M.p. 152–3° corr. Mixed m.p. 146–8° corr. Spar. sol. CCl₄, pet. ether. $[\alpha]_D^{18} + 10.9^\circ$ in EtOH. 200 γ = 1 I.U. of androgenic activity.

Me ether: cryst. from pet. ether. M.p. 140–2°.

Acetyl: needles from Me₂CO.Aq. M.p. 171–2° corr. $[\alpha]_D^{18} + 3.9^\circ$. *Semicarbazone*: leaflets from C₆H₆-EtOH. M.p. 273–5° corr.

Benzoyl: needles from CHCl₃-EtOH. M.p. 248–51°.

p-Toluenesulphonyl: cryst. from C₆H₆-pet. ether. M.p. 157–8°. $[\alpha]_D^{20} - 12.1^\circ$.

Oxime: prisms from EtOH.Aq. M.p. 188–91°.

Semicarbazone: cryst. from Py-MeOH. M.p. 267° corr. decomp.

Butenandt, Dannenbaum, *Z. physiol. Chem.*, 1934, 229, 192.

Butenandt, Dannenbaum, Hanisch, Kudzus, *Z. physiol. Chem.*, 1935, 237, 57.

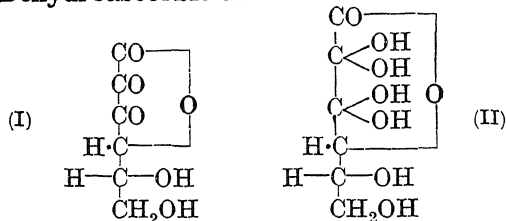
Wallis, Fernholz, *J. Am. Chem. Soc.*, 1935, 57, 1379, 1504.

Oppenauer, *Nature*, 1935, 135, 1039.

Ruzicka, Fischer, Meyer, *Helv. Chim. Acta*, 1935, 18, 1483.

Goldberg, *Ergebnisse der Vitamin- und Hormonforschung*, (Akademische Verlag, Leipzig), 1938, 1, 371.

Dehydroascorbic Acid



C₆H₆O₆

MW, 174

Primary reversible oxidation product of l-ascorbic acid. At moment of formation almost certainly has structure (I). Probably exists in hydrated form (II) in aqueous sol. Reduced by H₂S or HI to l-ascorbic acid. Very unstable in neutral or alk. sol.

Na salt: $[\alpha]_{5780} - 26^\circ$ in H₂O.

Osazone: red needles from AcOEt. M.p. 218°. Isomeric pyrazolone modification: yellow needles. M.p. 210°.

Herbert, Hirst, Percival, Reynolds, Smith, *J. Chem. Soc.*, 1933, 1270.

Ghosh, Rakshit, *Biochem. Z.*, 1938, 299, 394.

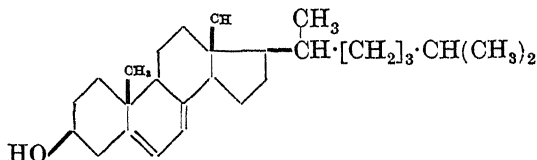
Dehydrocamphenilic Acid.

See Tricyclenic Acid.

Dehydro- β -carotene.

See Isocarotene.

7-Dehydrocholesterol



C₂₇H₄₄O

MW, 384

Precursor of natural vitamin D. Plates + H₂O from MeOH-Et₂O. M.p. 142–3° (150°). $[\alpha]_D^{20} - 113.6$ (124°) in CHCl₃. Oxidises in air. Irradiation \rightarrow vitamin D₃. SbCl₃ in CHCl₃ \rightarrow red \rightarrow blue col.

Acetyl: cryst. from MeOH. M.p. 129–30°. $[\alpha]_D^{20} - 85.3^\circ$ in CHCl₃.

Benzoyl: plates from CHCl₃-Me₂CO. M.p. 139–40°. $[\alpha]_D^{20} - 53.2^\circ$ in CHCl₃.

3:5-Dinitrobenzoyl: yellow needles from $\text{CHCl}_3\text{-Me}_2\text{CO}$. M.p. 207° . $[\alpha]_D^{20} - 45.7^\circ$ in CHCl_3 .

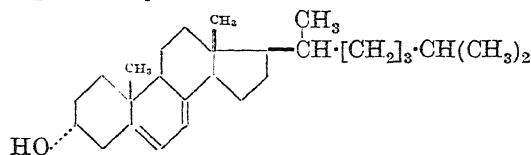
Windaus, Lettré, Schenck, *Ann.*, 1935, 520, 104.

Winthrop, U.S.P. 2,098,984 (*Chem. Zentr.*, 1938, I, 3659).

Brockman, *Ergebnisse der Vitamin- und Hormonforschung* (Akademische Verlag, Leipzig), 1939, 2, 70.

Henbest *et al.*, *Nature*, 1946, 158, 169.

epi-7-Dehydrocholesterol



$\text{C}_{27}\text{H}_{44}\text{O}$

MW, 384

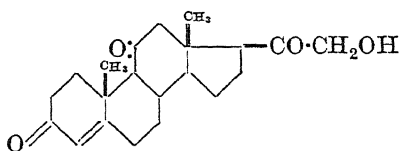
Needles. M.p. $125-6^\circ$ (not sharp). $[\alpha]_D^{20} - 70.5^\circ$ in CHCl_3 . After irradiation possesses about one-tenth the anti-rachitic potency of 7-dehydrocholesterol similarly treated.

Acetyl: needles from MeOH. M.p. 114.5° . $[\alpha]_D^{20} - 35^\circ$ in CHCl_3 .

Benzoyl: m.p. $118-9^\circ$. $[\alpha]_D^{20} + 48.5^\circ$ in CHCl_3 .

Windaus, Nagatz, *Ann.*, 1939, 542, 204.

Dehydrocorticosterone (Kendall's Compound A)



$\text{C}_{21}\text{H}_{28}\text{O}_4$

MW, 344

One of constituents of adrenal cortex. Prisms from $\text{Me}_2\text{CO-Aq}$. M.p. $177-9^\circ$. $[\alpha]_D^{25} + 347^\circ$ in C_6H_6 . Reduces $\text{NH}_3\cdot\text{AgNO}_3$. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ green fluor. Physiological activity rather less than that of corticosterone.

Acetyl: needles from Et_2O . M.p. $178-80^\circ$ corr.

Kendall, Mason, Hoehn, McKenzie, *Proceedings Staff Meetings Mayo Clinic*, 1937, 12, 136; *J. Biol. Chem.*, 1937, 119, 31.

Mason, Myers, Kendall, *J. Biol. Chem.*, 1936, 114, 613.

Reichstein, *Helv. Chim. Acta*, 1937, 20, 960.

Reichstein, Euw, *Helv. Chim. Acta*, 1938, 21, 1183.

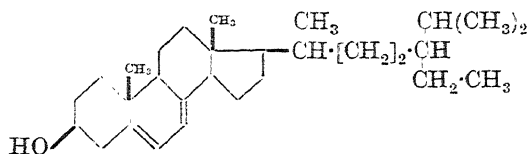
Reichstein, *Ergebnisse der Vitamin- und Hormonforschung* (Akademische Verlag, Leipzig), 1938, 1, 334.

von Euw, Reichstein, *Helv. Chim. Acta*, 1946, 29, 1913.

Dehydromucic Acid.

See Furan-2:5-dicarboxylic Acid.

7-Dehydrositosterol



$\text{C}_{29}\text{H}_{48}\text{O}$

MW, 412

Plates from EtOH. M.p. $148-50^\circ$. $[\alpha]_D^{21} - 116^\circ$ in CHCl_3 . Irradiation \rightarrow product with strong anti-rachitic potency.

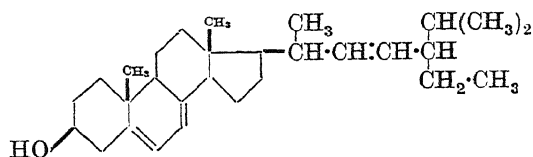
Acetyl: needles from CHCl_3 . M.p. $151-2^\circ$. $[\alpha]_D^{21} - 71^\circ$ in CHCl_3 .

Benzoyl: needles from $\text{CHCl}_3\text{-Me}_2\text{CO}$. M.p. 149° . $[\alpha]_D^{21} - 54^\circ$ in CHCl_3 .

Wunderlich, *Z. physiol. Chem.*, 1936, 241, 116.

Winthrop, U.S.P. 2,098,984 (*Chem. Zentr.*, 1938, I, 3659).

7-Dehydrostigmasterol



$\text{C}_{29}\text{H}_{46}\text{O}$

MW, 410

Plates from $\text{Et}_2\text{O-MeOH}$. M.p. 154° . $[\alpha]_D^{20} - 113^\circ$ in CHCl_3 . Irradiation \rightarrow biologically inactive product.

Acetyl: plates. M.p. 172° .

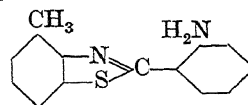
Benzoyl: needles from Et_2O or $\text{MeOH-C}_6\text{H}_6$. M.p. 180° .

Linsert, *Z. physiol. Chem.*, 1936, 241, 125.

Haslewood, *Biochem. J.*, 1939, 33, 454.

Winthrop, U.S.P. 2,098,984 (*Chem. Zentr.*, 1938, I, 3659).

Dehydrothio-o-toluidine (4-Methyl-2-[o-aminophenyl]-benzthiazole)



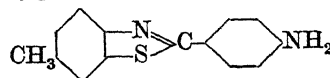
$\text{C}_{14}\text{H}_{12}\text{N}_2\text{S}$

MW, 240

Yellow plates from EtOH. M.p. 120° .

Gattermann, *Ber.*, 1889, 22, 425.

Dehydrothio-p-toluidine (6-Methyl-2-[p-aminophenyl]-benzthiazole)



$\text{C}_{14}\text{H}_{12}\text{N}_2\text{S}$

MW, 240

Pale yellow iridescent prisms from EtOH. M.p. 194-8°. B.p. 434°. Sol. AcOH. Mod. sol. Et₂O, C₆H₆, hot EtOH, hot amyl alc. Prac. insol. H₂O. Sols. show violet-blue fluor. Zn dust dist. → *p*-toluidine. The base and its sulphonic acid are used as first components for azo dyes.

N-Acetyl: m.p. 227°.

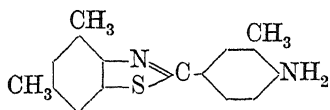
N-Benzoyl: m.p. 244.4° corr.

N-Benzylidene: leaflets from EtOH. M.p. 193°.

Bogert, Meyer, *J. Am. Chem. Soc.*, 1922, **44**, 1571.

Hunter, *J. Soc. Chem. Ind.*, 1923, **42**, 302r.

Dehydrothio-*m*-xylylidine (4 : 6-Dimethyl-2-[*p*-amino-*m*-tolyl]-benzthiazole)



C₁₆H₁₆N₂S

MW, 268

Prisms from EtOH. M.p. 107°. B.p. 282-4°/14 mm. Sol. hot EtOH. Insol. H₂O. Intermediate for azo dyes.

N-Acetyl: m.p. 227°.

Anschütz, Schultz, *Ber.*, 1925, **58**, 64.

Delatine

C₁₉H₂₅O₃N

MW, 315

Alkaloid found in seeds of *Delphinium elatum*, Linn. Prisms + 1H₂O from H₂O. M.p. 148°. [α]_D²³ +13.5° in 2N HCl. Anhyd.: m.p. 261-4°.

B, HCl: cryst. from H₂O. M.p. 274-7°. [α]_D¹⁸ +13.4° in H₂O.

Goodson, *J. Chem. Soc.*, 1943, 139.

Delcosine

C₂₂H₃₇O₆N

MW, 411

Alkaloid of *Delphinium consolida*, Linn. Cryst. from MeOH. M.p. 203-4°. [α]_D²⁵ +56.8° in CHCl₃.

B, HCl: cryst. + 2MeOH. M.p. 89°.

B, HBr: cryst. + 2MeOH. M.p. 103°.

B, HClO₄: cryst. M.p. 217-18°. [α]_D +32.0° in MeOH.

Diacetyl deriv.: cryst. from MeOH. M.p. 157-61°.

Triacetyl deriv.: cryst. from MeOH. M.p. 203° decomp.

Marion, Edwards, *J. Am. Chem. Soc.*, 1947, **69**, 2010.

Delphamine

C₂₀H₂₃(OH)₄(OCH₃)₃NC₂H₅

C₂₅H₄₁O₇N

MW, 467

Alkaloid from *Delphinium* species. Cryst. from EtOH. Spar. sol. Et₂O, Me₂CO, AcOEt, H₂O. Sol. EtOH, CHCl₃. [α]_D +66.6°.

Nitrate: cryst. from EtOH-AcOEt. M.p. 160° decomp.

Methiodide: cryst. from EtOH-Et₂O. M.p. 180° decomp.

Bitartrate: cryst. from EtOH. M.p. 160° decomp.

Rabinovich, Kononova, *J. Gen. Chem. U.S.S.R.*, 1942, **12**, 321, (*Chem. Abstracts*, 1943, **37**, 3097).

Delpheline

C₂₅H₃₉O₆N

MW, 449

Alkaloid found in seeds of *Delphinium elatum*, Linn. Prisms from EtOH.Aq. M.p. 227°. [α]_D¹⁵ -25.8° in CHCl₃.

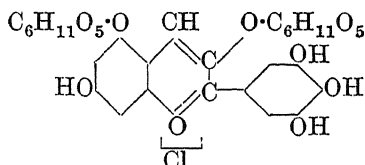
B, HCl: needles + 1H₂O from Me₂CO.Aq. M.p. 219°. [α]_D²⁰ -42.8° in H₂O.

B, HNO₃: prisms from Me₂CO.Aq. M.p. 191-3°. [α]_D²⁰ -41.2° in H₂O.

Acetyl deriv.: prisms from EtOH.Aq. M.p. 125°. [α]_D²⁰ -34.5° in EtOH.

Goodson, *J. Chem. Soc.*, 1943, 139; 1944, 665.

Delphin chloride (*Delphinidin chloride* 3 : 5-glucoside)



C₂₇H₃₁O₁₇Cl

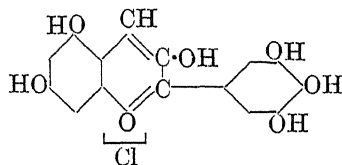
MW, 662.5

Colouring matter of *Salvia patens*, larkspur, etc. Leaf-like cryst. with bronze reflex. M.p. 202-3° decomp. Insol. most org. solvents. FeCl₃ → violet-blue col. Reduces hot Fehling's.

Reynolds, Robinson, Scott-Moncrieff, *J. Chem. Soc.*, 1934, 1237.

Willstätter, Meig, *Ann.*, 1915, **408**, 61.

Delphinidin chloride



C₁₅H₁₁O₇Cl

MW, 338.5

Dark brownish-red cryst. with greenish lustre. Does not melt below 350°. Sol. MeOH, EtOH, AcOEt. Reduces cold Fehling's. Forms hydrates containing 1, 2 and 4 H₂O.

Diglucoside: see Delphin chloride.

Willstätter, Weil, *Ann.*, 1916, **412**, 189.

Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 174.

Bradley, Robinson, Schwarzenbach, *J. Chem. Soc.*, 1930, 799.

Reynolds, Robinson, Scott-Moncrieff, *J. Chem. Soc.*, 1934, 1235.

Delphinine

$C_{33}H_{45}O_9N$ MW, 599

Alkaloid from seeds of *Delphinium staphisagria*, Linn. Cryst. M.p. 198–200°. $[\alpha]_D^{25} + 25^\circ$ in EtOH.

$B_2(COOH)_2$: m.p. anhyd. 168°.

Hydrochloride: m.p. 208–10°.

Keller, *Chem. Abstracts*, 1925, **19**, 2500.

Jacobs, Craig, *J. Biol. Chem.*, 1939, **127**, 361; 1939, **128**, 431; 1940, **136**, 303.

Delsoline

$C_{25}H_{43}O_7N$ MW, 469

Alkaloid of *Delphinium consolida*, Linn. Cryst. M.p. 213–216.5°. $[\alpha]_D^{25} + 51.7^\circ$ in $CHCl_3$.

B_2HBr : cryst. + $\frac{1}{2}Me_2CO$. M.p. 83°.

B_2HClO_4 : cryst. M.p. 192.5–193.5°. $[\alpha]_D^{25} + 28.1^\circ$ in MeOH.

Marion, Edwards, *J. Am. Chem. Soc.*, 1947, **69**, 2010.

Delsonine

$C_{24}H_{41}O_6N$ MW, 439

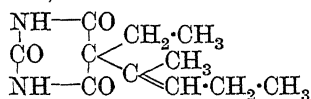
Alkaloid of *Delphinium consolida*, Linn. KOH \rightarrow isodelsonine, m.p. 108–11°.

B_2HI : cryst. M.p. 202°.

B_2HClO_4 : cryst. M.p. 216°. $[\alpha]_D^{25} + 23^\circ$ in MeOH.

Marion, Edwards, *J. Am. Chem. Soc.*, 1947, **69**, 2010.

Delvinal (5-Ethyl-5-(1-methyl- α -butenyl)-barbituric acid)



$C_{11}H_{16}O_3N_2$ MW, 224

M.p. 162–3°. Na salt used as narcotic.

N-Me: m.p. 53–5°.

p-Chlorobenzyl: m.p. 72.5°.

p-Bromobenzyl: m.p. 77°.

p-Nitrobenzyl: m.p. 132.5°.

Cope, Hancock, *J. Am. Chem. Soc.*, 1939, **61**, 776.

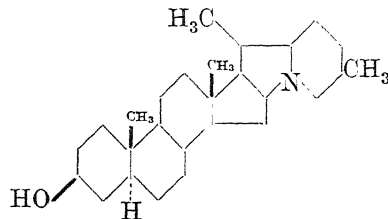
Marvin, *Anesthesia and Analgesia*, 1942, **21**, 229, (*Chem. Abstracts*, 1943, **37**, 465). *Review*.

Cope, U.S.P. 2,187,703, (*Chem. Abstracts*, 1940, **34**, 3449).

Demerol.

See Pethidine.

Demissidine (*Solanine-D*, *dihydrosolanidine-T*)



$C_{27}H_{45}ON$ MW, 399

Aglycone of demessine. Needles from MeOH or Me_2CO . M.p. 216–18°. $[\alpha]_D^{25} + 21^\circ$ in MeOH

Kuhn, Löw, *Ber.*, 1947, **80**, 406.

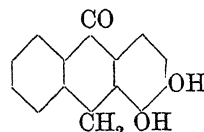
Demissine

$C_{50}H_{83}O_{20}N$ MW, 1017

Insecticidal alkaloid from leaves of *Solanum demissum*. Needles from MeOH or EtOH. Decomp. at 305–8°. $[\alpha]_D^{25} - 20^\circ$ in Py. Hyd. \rightarrow demissidine + glucose + galactose + xylose.

Kuhn, Löw, *Ber.*, 1947, **80**, 406.

Deoxyalizarin (3 : 4-Dihydroxyanthrone (-anthranol), anthrarobin)



$C_{14}H_{10}O_3$ MW, 226

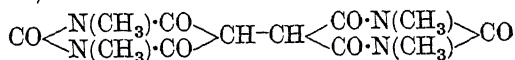
Yellow cryst. from EtOH.Aq. M.p. 208°. Does not sublime. Sol. EtOH, Et_2O , AcOH, Me_2CO . Sol. alkalis to greenish-yellow sols. Sol. conc. H_2SO_4 to golden yellow sol. Oxidises easily to alizarin.

Di-Me ether: $C_{16}H_{14}O_3$. MW, 254. Yellow needles. M.p. 150°. Sol. Et_2O , C_6H_6 , AcOH, hot EtOH. Conc. $H_2SO_4 \rightarrow$ yellow sol.

Di-Et ether: $C_{18}H_{18}O_3$. MW, 282. Yellow needles. M.p. 128°. Conc. $H_2SO_4 \rightarrow$ yellow sol.

Graebe, Thode, *Ann.*, 1906, **349**, 207.

Deoxyamalic Acid (*Tetramethylhydruilic acid*)



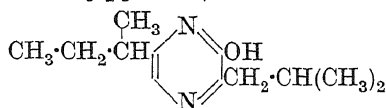
$C_{12}H_{14}O_6N_4$ MW, 310

Cryst. M.p. 260°. Sol. $CHCl_3$, AcOH. Spar. sol. H_2O , cold EtOH, Et_2O . Reduces hot $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ green col.

Fischer, Ach, *Ber.*, 1895, **28**, 2476.

Biltz, Heyn, *Ber.*, 1919, **52**, 1313.

Deoxyaspergillic Acid (3-Hydroxy-2-iso-butyl-5-sec-butylpyrazine)



$C_{12}H_{20}ON_2$

MW, 208

Cryst. M.p. 102°. B.p. 305–10°/760 mm., 197–9°/10 mm. $[\alpha]_D^{25} + 15.3^\circ$ in EtOH, $+ 18.8^\circ$ in MeOH. Has no antibiotic activity.

B, HCl: m.p. 207°.

B, HBr: m.p. 250–2° decomp.

B, 3:5-Dinitrobenzoic acid: m.p. 137–8°.

Dutcher, *J. Biol. Chem.*, 1947, **171**, 321.

Newbold, Sharp, Spring, *J. Chem. Soc.*, 1951, 2679.

Deoxybenzoin (Desoxybenzoin, phenyl benzyl ketone)



$C_{14}H_{12}O$

MW, 196

Plates. M.p. 60° (55–6°). B.p. 320°, 177°/12 mm. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Zn dust + H → stilbene. Conc. HI at 180° → stilbene and dibenzyl. HNO₃ → benzil and other products.

Oxime: needles from EtOH. M.p. 98°.

Semicarbazone: m.p. 148°.

Dinitrophenylsemicarbazone: m.p. 228°.

Phenylhydrazone: m.p. 116°.

o-Nitrophenylhydrazone: m.p. 143°.

m-Nitrophenylhydrazone: m.p. 157–8°.

p-Nitrophenylhydrazone: m.p. 160°.

Enol form: see α-Stilbenol.

Daniloff, Venus-Danilova, *Ber.*, 1926, **59**, 1032.

Stobbe, *Ber.*, 1902, **35**, 912.

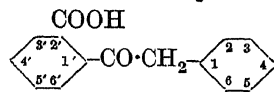
Allen, Barker, *Organic Syntheses*, 1932, XII, 16 (Bibl.).

Balland, Dehn, *J. Am. Chem. Soc.*, 1932, **54**, 3969.

Deoxybenzoin-2-carboxylic Acid.

See o-Phenacylbenzoic Acid.

Deoxybenzoin-2'-carboxylic Acid



$C_{15}H_{12}O_3$

MW, 240

Prisms + H₂O from H₂O. M.p. 74–5°. Very sol. EtOH.

Amide: $C_{15}H_{13}O_2N$. MW, 239. M.p. 165–6°. Ethylamide: cryst. from C₆H₆-ligroin. M.p. 139–40°.

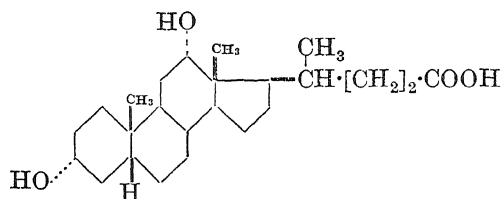
Gabriel, Michael, *Ber.*, 1878, **11**, 1018.

Allo-form:

Needles from H₂O. M.p. 165°.

Weiss, Sauermann, *Ber.*, 1925, **58**, 2736.

Deoxycholic Acid (Choleic acid, 3:12-dihydroxycholanolic acid)



$C_{24}H_{40}O_4$

MW, 392

Occurs in bile of man, ox, goat, and sheep. Cryst. from EtOH or 60% AcOH. M.p. 176–7°. $[\alpha]_D^{25} + 47.7^\circ$ (1.716% sol. in dioxan). Forms remarkably stable molecular compounds known as choleic acids with a wide range of compounds including higher fatty acids, simple acids, esters, alcohols, ethers, and hydrocarbons.

Me ester: $C_{25}H_{42}O_4$. MW, 406. Cryst. from methyl ethyl ketone. M.p. 105–6°. $[\alpha]_D^{25} + 48^\circ$ in methyl ethyl ketone. 3-Acetyl: cryst. from MeOH. M.p. 128°. $[\alpha]_D^{25} + 66^\circ$ (1.640% sol. in Me₂CO). 3:12-Diacetyl: cryst. from MeOH. M.p. 118–19°. Monomethanolate: sinters at 82°. M.p. 92° (from MeOH). $[\alpha]_D^{25} + 56^\circ$ (2.888% sol. in Me₂CO).

Et ester: $C_{26}H_{44}O_4$. MW, 420. Needles. M.p. 81°.

Amide: $C_{24}H_{41}O_3N$. MW, 391. Needles. Sinters at 162°. M.p. 186°.

Shimizu, *Chemie und Physiologie der Gallensäuren*, (Muramoto, Okayama.) 1935.

Lettré, Inhoffen, *Über Sterine, Gallensäuren und verwandte Naturstoffe*. (Enke. Stuttgart.) 1936.

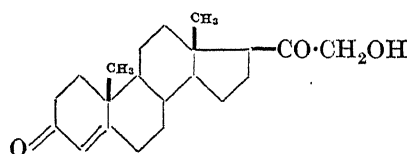
Wieland, Vocke, *Z. physiol. Chem.*, 1930, **191**, 69.

Borsche, Todd, *Z. physiol. Chem.*, 1931, **197**, 173.

Wieland, Deulofeu, *Z. physiol. Chem.*, 1931, **198**, 127.

Reichstein, Sorkin, *Helv. Chim. Acta*, 1942, **25**, 797.

Deoxycorticosterone (21-Hydroxyprogesterone, Reichstein's substance Q)



$C_{21}H_{30}O_3$

MW, 330

One of the constituents of the adrenal cortex. Plates from Et₂O. M.p. 141–2° corr. Sol. EtOH, Me₂CO. Spar. sol. H₂O. $[\alpha]_D^{25} + 178^\circ$ in EtOH. Reduces NH₃·AgNO₃. Exhibits cortical hormone activity. (See Corticosterone).

Acetyl: needles from Me₂CO. M.p. 157–9°

corr. Sublimes at $190^{\circ}/0.02$ mm. $[\alpha]_D^{25} + 177^{\circ}$ in EtOH. Physiologically as active as corticosterone.

p-Toluenesulphonyl: leaflets from Et₂O-pentane. M.p. $170-1^{\circ}$ corr.

Steiger, Reichstein, *Helv. Chim. Acta*, 1937, 20, 1164.

Reichstein, Euw, *Helv. Chim. Acta*, 1938, 21, 1183, 1197.

Serini, Logemann, Hildebrand, *Ber.*, 1939, 72, 391.

Deoxygluconic Acid.

See Glucodesonic Acid.

6-Deoxy-*l*-glucose.

See *l*-Epirhamnose.

2-Deoxy-3-methyl-*d*-fucose.

See Diginose.

2-Deoxyribose.

See 2-Ribodeseose.

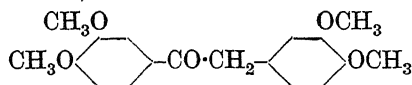
Deoxytagatose.

See Tagatomethylose.

Deoxy-*p*-toluoin.

See 4 : 4'-Dimethyldeoxybenzoin.

Deoxyveratroin (3 : 4 : 3' : 4'-Tetramethoxydeoxybenzoin)



C₁₈H₂₀O₅ MW, 316

M.p. 106° . B.p. $190-210^{\circ}/0.01$ mm.

Oxime : m.p. 128° .

Kubiczek, *Monatsh.*, 1946, 76, 54.

Dermatol (Basic bismuth gallate)

C₇H₇O₇Bi MW, 412

Yellow cryst. Loses 2H₂O at 100° . Insol. H₂O, EtOH, Et₂O. Used medicinally.

Causse, *Bull. soc. chim.*, 1893, [3], 9, 704.

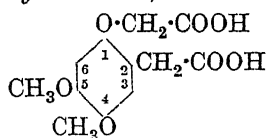
Thibault, *Ann. chim.*, 1902, [7], 25, 274.

Teletov, *Chem. Abstracts*, 1929, 23, 1718.

Takagi, Nagase, *J. Pharm. Soc. Japan*, 1936, 56, 82, (*Chem. Abstracts*, 1939, 33, 171).

Bobranski, Jankowski, Wierzchowski, *Pharm. Acta Helv.*, 1947, 22, 217.

Derric Acid (4 : 5-Dimethoxy-2-carboxymethyl-phenoxyacetic acid)



C₁₂H₁₄O₇ MW, 270

Cryst. from di-*n*-butyl ether. M.p. $168-9^{\circ}$.

Sol. H₂O, MeOH, AcOH, AcOEt, butyl alcohol.

Insol. CHCl₃, C₆H₆, CS₂, toluene, CCl₄.

Ox. \rightarrow risic acid.

Di-Me ester : C₁₄H₁₈O₇. MW, 298. Cryst. from ligroin. M.p. 66° .

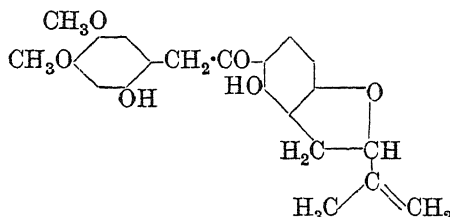
Di-Et ester : C₁₆H₂₂O₇. MW, 326. Needles from pet. ether. M.p. 64° .

Clark, *J. Am. Chem. Soc.*, 1931, 53, 2370; 1932, 54, 2547.

La Forge, Smith, *J. Am. Chem. Soc.*, 1930, 52, 1096.

Robertson, *J. Chem. Soc.*, 1932, 1380.

Derritol



C₂₁H₂₂O₆

MW, 370

Yellow needles from MeOH. M.p. 161° .

FeCl₃ \rightarrow red col.

Oxime : m.p. $191-2^{\circ}$.

Butenandt, *Ann.*, 1928, 464, 275.

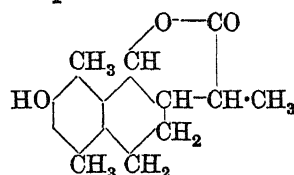
Smith, La Forge, *J. Am. Chem. Soc.*, 1932, 54, 2996, 3377.

La Forge, *ibid.*, 3380.

Descrocetin.

See Hexadecaheptaenedioic Acid.

Desmotroposantonin



C₁₅H₁₈O₃

MW, 246

dl.

Prisms from EtOH. M.p. $200-1^{\circ}$. Sol. AcOEt. Insol. Et₂O.

Et ether : C₁₇H₂₂O₃. MW, 274. Prisms. M.p. 106° .

Acetyl : prisms. M.p. 146° .

d.

Prisms from EtOH. M.p. 260° .

Et ether : prisms from pet. ether. M.p. 82° .

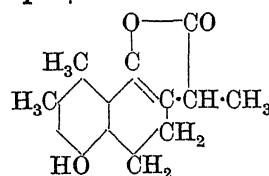
Acetyl : prisms from EtOH. M.p. 154° .

Clemo, Haworth, Walton, *J. Chem. Soc.*, 1930, 1110.

I.G., B.P. 341,402, (*Brit. Chem. Abstracts*, 1931, B, 463).

Andreocci, Bertolo, *Ber.*, 1898, 31, 3131.

Desmotropo- ψ -santonin



C₁₅H₁₆O₃

MW, 244

Needles from EtOH.Aq. M.p. 185–6°. $[\alpha]_D^{20} +67.9^\circ$ in CHCl_3 .

Acetyl: m.p. 233°.

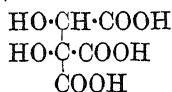
Benzoyl: m.p. 164°.

Me ether: m.p. 159–60°. $[\alpha]_D^{18} +61.3^\circ$ in AcOH.

Clemons, Cocker, *J. Chem. Soc.*, 1946, 30.

Cocker, Lipman, *J. Chem. Soc.*, 1947, 533.

Desoxalic Acid (1:2-Dihydroxyethane-1:2:2-tricarboxylic acid)



$\text{C}_5\text{H}_6\text{O}_8$

MW, 194

Cryst. + $1\text{H}_2\text{O}$. Decomp. in H_2O at $45^\circ \rightarrow$ tartaric acid. Sol. H_2O , EtOH. Na_3 and K_3 salts sol. H_2O and decomp. at 130° .

Tri-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_8$. MW, 278. M.p. 78° (85°). B.p. $157^\circ/2$ mm. Sol. EtOH, Et₂O. Mod. sol. H_2O . Decomp. by boiling H_2O .

Traube, *Ber.*, 1907, 40, 4951.

Klein, *J. prakt. Chem.*, 1879, 20, 146.

Steyrer, Seng, *Monatsh.*, 1896, 17, 613.

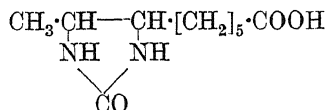
Desoxy-

See Deoxy-

Desthiobenzylpenicillin.

See Desthiopenicillin-G.

Desthiobiotin



$\text{C}_{10}\text{H}_{18}\text{O}_3\text{N}$

MW, 200

M.p. $69-70^\circ$. $[\alpha]_D^{25} +2.6^\circ$ in CHCl_3 .

dl-.

M.p. $165-6^\circ$.

Me ester: m.p. 72° . B.p. $170^\circ/0.5$ mm.

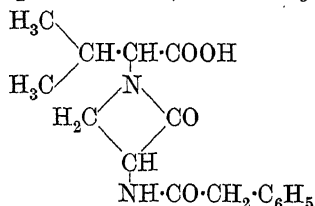
du Vigneaud et al., *J. Biol. Chem.*, 1942, 146, 475.

Melville, *J. Am. Chem. Soc.*, 1944, 66, 1422.

Harris et al., *J. Am. Chem. Soc.*, 1944, 66, 1800.

Duschinsky, Dolan, *J. Am. Chem. Soc.*, 1945, 67, 2079.

Desthiopenicillin-G (*Desthiobenzylpenicillin*)



$\text{C}_{16}\text{H}_{20}\text{O}_4\text{N}_2$

MW, 304

Plates from CHCl_3 or EtOH.Aq. M.p. $109-11^\circ$. pK 3.5 in 8% EtOH.Aq. Hot HCl.Aq.

\rightarrow phenylacetic acid. Anhyd. HCl in dioxan \rightarrow d-valine hydrochloride.

Me ester: $\text{C}_{17}\text{H}_{20}\text{O}_4\text{N}_2$. MW, 318. Plates from CHCl_3 -pet. ether. M.p. $108-10^\circ$.

Benzylamine salt: plates from MeOH-Et₂O. M.p. $149-51^\circ$ decomp. $[\alpha]_D^{25} +9^\circ$ in H_2O .

N-Benzyl: needles from Me₂CO.Aq. M.p. $77-9^\circ$. $[\alpha]_D^{25} +9.6^\circ$ in 0.5N EtOH-HCl (initial)

$\rightarrow -12.8^\circ$ (final) in 135 mins. pK (acid) 3.8. Benzylamine salt: m.p. $124-7^\circ$ decomp.

Clarke, Johnson, Robinson, *The Chemistry of Penicillin*, Princeton University Press, 1949.

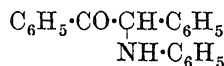
Desylacetic Acid.

See 2-Phenyl-2-benzoylpropionic Acid.

Desylamine.

See α -Aminodeoxybenzoin.

Desyl-anilide (α -Anilinodeoxybenzoin, anil-benzoin, desylaniline)



$\text{C}_{20}\text{H}_{17}\text{ON}$

MW, 287

Yellow needles from EtOH. M.p. 99° . Sol. CHCl_3 , C_6H_6 . Spar. sol. Et₂O, cold EtOH.

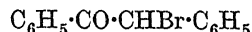
B.HCl: m.p. $200-2^\circ$.

N-Acetyl: needles. M.p. 153° .

Wren, *J. Chem. Soc.*, 1909, 95, 1601.

Bischler, Fireman, *Ber.*, 1893, 26, 1337.

Desyl bromide (α -Bromodeoxybenzoin, phenyl ω -bromobenzyl ketone)



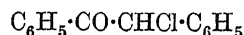
$\text{C}_{14}\text{H}_{11}\text{OBr}$

MW, 275

Needles. M.p. $54-5^\circ$. Sol. Et₂O, hot EtOH.

Knoevenagel, *Ber.*, 1888, 21, 1355.

Desyl chloride (α -Chlorodeoxybenzoin, phenyl ω -chlorobenzyl ketone)



$\text{C}_{14}\text{H}_{11}\text{OCl}$

MW, 230.5

Needles from EtOH. M.p. 68.5° . Insol. alkalis. $\text{HNO}_3 \rightarrow$ benzil.

Ward, *J. Chem. Soc.*, 1929, 1544: *Organic Syntheses*, 1932, XII, 20.

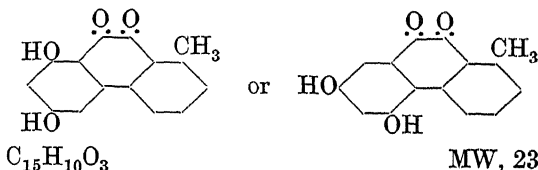
1-Desylpropionic Acid.

See 2-Phenyl-2-benzoylisobutyric Acid.

2-Desylpropionic Acid.

See 3-Phenyl-3-benzoylbutyric Acid.

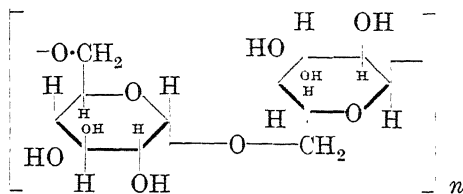
Deuticulatol (5:7(or 6:8) - Dihydroxy - 1 - methylphenanthraquinone)



Constituent of To-Tan-Hwang (*Rumex deuticulata*). Cryst. M.p. 162.5°. Zn dust dist. \rightarrow 1-methylphenanthrene. Ox. \rightarrow 3-methylphthalic acid.

Chi, Hsu, Hu, Wang, *J. Chinese Chem. Soc.*, 1947, 15, 21.

Dextran



(C₆H₁₀O₅)_n

A polyglucose containing α-glucopyranose units, obtained by the action of *Leuconostoc mesenteroides* and similar organisms on sucrose. Used in the preparation of a substitute for blood plasma. White granular powder. $[\alpha]_D^{20} +180^\circ$ in H₂O.

Tribenzoate: $[\alpha]_D^{21} +193.7^\circ$ in C₂H₂Cl₄.

Tri-Me ether: $[\alpha]_D^{21} +202.2^\circ$ in C₂H₂Cl₄.

Fowler *et al.*, *Can. J. Research*, 1937, 15B, 486.

Stacey, Youd, *Biochem. J.*, 1938, 32, 1943.

Peat, Schluchterer, Stacey, *J. Chem. Soc.*, 1939, 581.

Dextrin (Amylin)

(C₆H₁₀O₅)_n

MW, (162)_n

A mixture of polymerised glucosans formed (a) by partial hydrolysis of polysaccharides, (b) by heating glucosans. The product differs according to the source and conditions of preparation.

Starch dextrin.

Colourless, amorphous solid. Chars on heating. Sol. H₂O to a gummy sol. (British gum). Insol. EtOH. Gives reddish-brown col. with I. Dextrorotatory, $[\alpha]_D$ generally above 200°. Dil. acids \rightarrow maltose and finally glucose. HNO₃ \rightarrow oxalic acid. Does not reduce Fehling's. Gives no ppt. with tannin.

Acetyl deriv.: sol. Me₂CO-CHCl₃. Spar. sol. EtOH, Et₂O. $[\alpha]_D^{17.80} +158^\circ$ in CHCl₃.

Commercial dextrin is less pure and usually contains soluble starch and glucose.

Irvine, Oldham, *J. Chem. Soc.*, 1925, 127, 2903.

Krause, D.R.P. 519,711, (*Chem. Abstracts*, 1931, 25, 3510).

Klages, *Ann.*, 1932, 497, 234 (*Bibl.*).

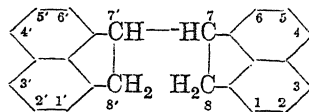
Ling, Nanji, *J. Chem. Soc.*, 1925, 127, 636.

Haworth, Hirst, Plant, *J. Chem. Soc.*, 1935, 1214.

Dextrose.

See Glucose.

7 : 7'-Diacenaphthyl (Dinaphthylenebutane)



C₂₄H₁₈

MW, 306

Leaflets or plates from EtOH. M.p. 120°. Sol. C₆H₆, hot EtOH. Ox. \rightarrow 1 : 8-naphthalic anhydride.

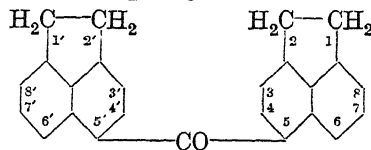
Dipicrate: m.p. 222-3°.

Dziewoński, Paschalski, *Ber.*, 1914, 47, 2685.

peri-Diacenaphthylene-rhodacene.

See Leucacene.

5 : 5'-Diacenaphthyl Ketone



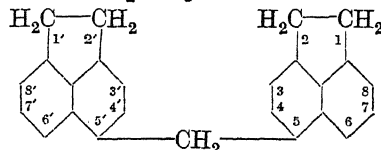
C₂₅H₁₈O

MW, 334

Yellow cryst. from AcOH. M.p. 234-5°. Conc. H₂SO₄ \rightarrow red col.

Dziewoński, *Chem. Zentr.*, 1933, I, 3566.

5 : 5'-Diacenaphthylmethane



C₂₅H₂₀

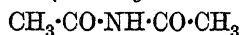
MW, 320

Cryst. from EtOH. M.p. 140-1°. H₂SO₄ \rightarrow green col.

Picrate: red cryst. M.p. 151°.

Dziewoński, *Chem. Zentr.*, 1933, I, 3566.

Diacetamide (N-Acetylacetamide)



C₄H₇O₂N

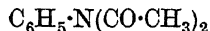
MW, 101

Needles from Et₂O or C₆H₆-pet. ether. M.p. 79°. B.p. 216-8°, 113°/13 mm. Sol. H₂O, EtOH, Et₂O, ligroin. Decomp. at 250°. Heat of comb. 519 Cal. Hyd. by hot alkalis or boiling H₂O to CH₃COOH and NH₃.

Titherley, *J. Chem. Soc.*, 1901, 79, 396, 411.

Hentschel, *Ber.*, 1890, 23, 2395.

Diacetanilide (N-Diacetylaniline, N-phenyldiacetamide)



C₁₀H₁₁O₂N

MW, 177

Plates from ligroin. M.p. 38°. B.p. 200°/100 mm., 142°/11 mm. Sol. C₆H₆, ligroin,

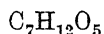
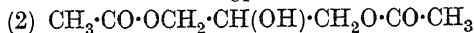
toluene. Hyd. to acetanilide by NH_3 , HCl , AcOH , etc.

Sudborough, *J. Chem. Soc.*, 1901, 79, 536.
Bistrzycki, *Ulfers, Ber.*, 1894, 27, 92.

Diacetin (*Diacetyl glycerol, glycerol diacetate*)



or



MW, 176

As prepared probably a mixture. B.p. 280° ($250-3^\circ$), $175-6^\circ/40$ mm., $155-6^\circ/15$ mm. Sol. H_2O , EtOH . D_{15}^{25} 1.1779 (D_{15}^{18} 1.184, D_{15}^{20} 1.148).

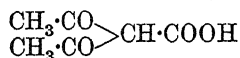
The pure compound (1) has b.p. $140-2^\circ/12$ mm., and (2) has b.p. $259-61^\circ$, $172-4^\circ/40$ mm., $149^\circ/12$ mm.

I.G., F.P. 664,770, (*Chem. Abstracts*, 1930, 24, 862).

Wahl, *Bull. soc. chim.*, 1925, 37, 713 (*Bibl.*).

Wegscheider, Zmerzlikar, *Monatsh.*, 1913, 34, 1067, 1081.

Diacetoacetic Acid (*Diacetylacetic acid*)



MW, 144

Me ester: $\text{C}_7\text{H}_{10}\text{O}_4$. MW, 158. M.p. 23° . B.p. $197-8^\circ$, $102^\circ/20$ mm. D_{15}^{25} 1.151. *Cu deriv.*: blue needles. M.p. $226-7^\circ$.

Et ester: diacetoacetic ester. $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. $209-11^\circ$ part. decomp., $124^\circ/50$ mm., $104^\circ/16$ mm. Sol. EtOH , Et_2O , C_6H_6 . Spar. sol. H_2O . D_{15}^{25} 1.0967. n_D^{25} 1.466017. Heat of comb. C_p 972.4 Cal., C_v 971.9 Cal. Hot H_2O or $\text{NaOH} \rightarrow$ ethyl acetoacetate. *Cu deriv.*: blue cryst. M.p. $148-51^\circ$. *Al deriv.*: m.p. $129-30^\circ$. *Hg deriv.*: m.p. 105° .

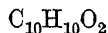
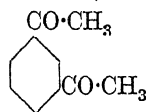
Nitrile: 3-cyanoacetylacetone. $\text{C}_6\text{H}_7\text{O}_2\text{N}$. MW, 125. Leaflets. M.p. 50° .

Claisen, *Zedel, Ann.*, 1893, 277, 171.

Packendorff, *Ber.*, 1931, 64, 948.

Spasov, *Organic Syntheses*, 1941, XXI, 48.

1 : 3-Diacetobenzene (*m-Acetylacetophenone*)



MW, 162

Needles from EtOH . Aq. or Et_2O . M.p. 32° . Sol. CHCl_3 , C_6H_6 , AcOH , AcOEt . Mod. sol. pet. ether, hot H_2O .

Dioxime: needles from EtOH . M.p. 204° .

Disemicarbazone: m.p. $238-40^\circ$.

Di-phenylhydrazone: yellow needles from EtOH . M.p. 115° .

Ruggli, Staub, *Helv. Chim. Acta*, 1936, 19, 972.

1 : 4-Diacetobenzene (*p-Acetylacetophenone*). Prisms from EtOH or Et_2O . M.p. 114° . Sol. hot EtOH . Sublimes at 100° .

Dioxime: m.p. 240° decomp.

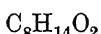
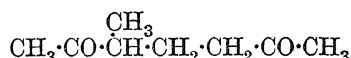
$\text{C}_{10}\text{H}_{10}\text{O}_2 \cdot 2\text{H}_3\text{PO}_4$: m.p. 156° .

Ingle, *Ber.*, 1894, 27, 2527.

Diacetobutadiene.

See Octadienedione.

1 : 3-Diacetobutane (*3-Methylheptandione* 2 : 6, 2 : 6-diketo-3-methylheptane)



MW, 142

dl.

B.p. $203-4^\circ$, $70-80^\circ/0.5-1$ mm.

Disemicarbazone: m.p. 192° , solidifying and remelting at 225° .

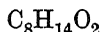
l.

B.p. $204^\circ/750$ mm., $60^\circ/0.5-1$ mm. D_{15}^{25} 0.9888.

Disemicarbazone: m.p. 194° .

Noyes, Derick, *J. Am. Chem. Soc.*, 1909, 31, 672.

1 : 4-Diacetobutane (*Octandione-2 : 7, 2 : 7-diketo-octane*)



MW, 142

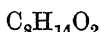
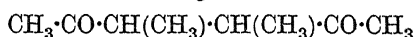
Leaflets. M.p. 44° . B.p. $114^\circ/10$ mm. Sol. EtOH . Spar. sol. H_2O .

Dioxime: m.p. 158° .

Disemicarbazone: two forms. (1) M.p. $224-5^\circ$. (2) M.p. 260° .

Meerwein, *Ann.*, 1914, 405, 159.

2 : 3-Diacetobutane (*3 : 4-Dimethylhexandione-2 : 5, 3 : 4-dimethyl-2 : 5-diketo-hexane*)



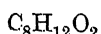
MW, 142

B.p. 210° , $82^\circ/11$ mm.

Dioxime: m.p. 195° (202°).

Ciamician, Silber, *Ber.*, 1912, 45, 1542.

4 : 4 - Diaceto - 1 - butylene (*Allyldiacetyl-methane, allylacetylacetone*)



MW, 140

B.p. $198-200^\circ$, $92^\circ/16$ mm. D_{15}^{25} 0.975. n_D^{25} 1.46986. *Cu deriv.*: m.p. $201-2^\circ$.

Perkin, *J. Chem. Soc.*, 1894, 65, 825.

Auwers, Dersch, *Ann.*, 1928, 462, 129.

Claisen, *Ber.*, 1912, 45, 3157.

1 : 4-Diaceto-2-butylene.

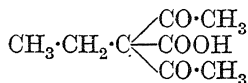
See 4-Octene-2 : 7-dione.

1 : 1-Diacetobutyric Acid

17

2 : 2-Diacetoisobutyric Acid

1 : 1-Diacetobutyric Acid



$\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

Et ester : $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 224–35° decomp., 144–30°/50 mm. Insol. EtOH. D_4^{15} 1.034. No col. with FeCl_3 .

Elion, *Rec. trav. chim.*, 1884, 3, 265.

1 : 2-Diacetobutyric Acid



$\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

Et ester : b.p. 150°/28 mm., 121–4°/11 mm.

Goldberg, Müller, *Helv. Chim. Acta*, 1938, 21, 1703.

3 : 3-Diacetobutyric Acid



$\text{C}_8\text{H}_{12}\text{O}_4$

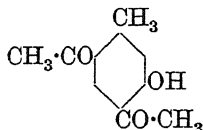
MW, 172

Me ester : $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 184. B.p. 160–1°/24 mm., 153–5°/19 mm. Sol. EtOH, Et_2O . Insol. H_2O . D_0^{15} 1.116. Alc. $\text{FeCl}_3 \rightarrow$ intense red col. *Cu salt* : m.p. 220°.

Et ester : b.p. 154–5°/15 mm. D_0^{15} 1.086. *Cu salt* : m.p. 209°. *Dioxime* : prisms. M.p. 108–10°.

March, *Ann. chim. phys.*, 1902, 26, 331, 341.

4 : 6-Diaceto-*m*-cresol



$\text{C}_{11}\text{H}_{12}\text{O}_3$

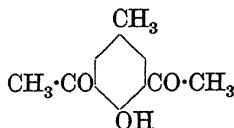
MW, 192

Needles. M.p. 112°. B.p. 310°. Sol. AcOH, CHCl_3 , alkalis. Mod. sol. EtOH, Et_2O , hot H_2O . Acid to litmus. FeCl_3 on aq. sol. \rightarrow violet-brown col.

Dioxime : m.p. 191°.

Claisen, *Ann.*, 1897, 297, 72.

3 : 5-Diaceto-*p*-cresol



$\text{C}_{11}\text{H}_{12}\text{O}_3$

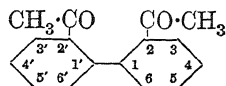
MW, 192

Needles from ligroin. M.p. 82–3°. Sol. Et_2O , AcOH, CHCl_3 , C_6H_6 , alkalis. Mod. sol. EtOH. Spar. sol. ligroin. Volatile in steam.

Auwers, *Ann.*, 1909, 364, 167.

Diet. of Org. Comp.—II.

2 : 2'-Diacetodiphenyl



$\text{C}_{16}\text{H}_{14}\text{O}_2$

MW, 238

Prisms or leaflets from EtOH or AcOH. M.p. 84°.

Dioxime : needles from AcOH. M.p. 212° decomp.

Di-phenylhydrazone : yellow cryst. from C_6H_6 -pet. ether. M.p. 178°.

Zincke, Tropp, *Ann.*, 1908, 363, 305.

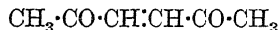
4 : 4'-Diacetodiphenyl.

Leaflets from CCl_4 or C_6H_6 . M.p. 192°.

Ferris, Turner, *J. Chem. Soc.*, 1920, 117, 1147.

Busch *et al.*, *J. prakt. Chem.*, 1936, 146, 1.

1 : 2-Diacetoethylene (3-Hexendione-2 : 5, 2 : 5-diketohexene-3)



$\text{C}_6\text{H}_8\text{O}_2$

MW, 112

Pale yellow cryst. from pet. ether. M.p. 75–5–76·5°. B.p. 90°/15 mm. Sol. conc. H_2SO_4 with orange-brown col. \rightarrow cherry-red with alkali.

Di-2 : 4-dinitrophenylhydrazone : red needles from Py. M.p. 291–2°.

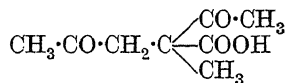
Armstrong, Robinson, *J. Chem. Soc.*, 1934, 1650.

Goldberg, Müller, *Helv. Chim. Acta*, 1938, 21, 1700.

1 : 3-Diacetoindolizine.

See Picolide.

1 : 2-Diacetoisobutyric Acid (2 : 5-Diketo-3-methylhexane-3-carboxylic acid)



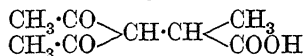
$\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

Et ester : $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 120–1°/10 mm.

Goldberg, Müller, *Helv. Chim. Acta*, 1938, 21, 1702.

2 : 2-Diacetoisobutyric Acid



$\text{C}_8\text{H}_{12}\text{O}_4$

MW, 172

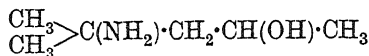
Et ester : b.p. 149–51°/33 mm. 128–30°/10 mm. D^{15} 1.067. $\text{FeCl}_3 \rightarrow$ dark red col.

Dioxime : needles from EtOH. M.p. 133°.

Disemicarbazone : cryst. from AcOEt. M.p. 207–8°.

March, *Ann. chim. phys.*, 1902, 26, 320, 325, 329.

Diacetonalkamine (*Methyl-2-aminoisobutylcarbinol, 2-amino-2-methylpentanol-4, 4-hydroxy-2-amino-2-methyl-n-pentane*)



$\text{C}_6\text{H}_{15}\text{ON}$

MW, 117

B.p. $174-5^\circ$, $74.5-5.5^\circ/15$ mm., $61-1.5^\circ/7$ mm. Misc. with H_2O , EtOH , Et_2O . Absorbs CO_2 .

N-Me: b.p. $184-5^\circ$, $73-5^\circ/20$ mm. B.HAuCl_4 : cryst. M.p. $101-3^\circ$.

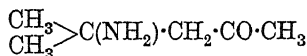
N-Di-Me: b.p. $188-9^\circ$, $75-83^\circ/21$ mm. B.HAuCl_4 : Cryst. from H_2O . M.p. 185° decomp.

N-Carbethoxyl: b.p. $142^\circ/23$ mm.

Harries, Jablonski, *Ber.*, 1898, 31, 1378.

Smith, Adkins, *J. Am. Chem. Soc.*, 1938, 60, 409.

Diacetonamine (*Methyl 2-aminoisobutyl ketone, 2-amino-2-methylpentanone-4*)



$\text{C}_6\text{H}_{13}\text{ON}$

MW, 115

B.p. $25^\circ/0.2$ mm. Misc. with EtOH , Et_2O . Mod. sol. H_2O . Decomp. on heating alone or in sol. to mesityl oxide and NH_3 . $\text{HNO}_2 \longrightarrow$ diacetone alcohol.

Oxime: needles. M.p. 58° (55°). B.p. $130^\circ/14$ mm.

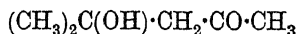
$\text{B.}(\text{COOH})_2, 1\text{H}_2\text{O}$: m.p. $126-7^\circ$.

N-Di-Me: picrate: m.p. $154-5^\circ$.

Haeseler, *J. Am. Chem. Soc.*, 1925, 47, 1195; *Organic Syntheses*, Collective Vol. I, 191.

Smith, Adkins, *J. Am. Chem. Soc.*, 1938, 60, 408.

Diacetone Alcohol (*2-Methyl-2-pentanol-one-4, 4-hydroxy-4-methylpentanone-2, 2-hydroxy 2-methyl-4-keto-n-pentane, dimethylacetonylcarbinol*)



$\text{C}_6\text{H}_{12}\text{O}_2$

MW, 116

B.p. 164° , $63-4^\circ/11$ mm. Misc. in all proportions with H_2O , EtOH , Et_2O . D^{25} 0.9306, D^0 0.9560. n_D^{20} 1.4300. $\text{H}_2\text{SO}_4 \longrightarrow$ mesityl oxide. $\text{NaOBr} \longrightarrow$ 2-hydroxyisovaleric acid. Decomp. by alkalis.

Oxime: m.p. $104-5^\circ$ (58.5°).

2 : 4-Dinitrophenylhydrazone: m.p. $198-9^\circ$.

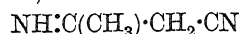
Société anonyme des distilleries des Deux-Sèvres, F.P. 703,889, (*Chem. Abstracts*, 1931, 25, 4556).

Conant, Tuttle, *Organic Syntheses*, Collective Vol. I, 193.

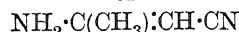
Jacquemain, *Compt. rend.* 1933, 196, 1622.

Bourdiol, Calcagni, Ducasse, *Bull. soc. chim.*, 1941, 8, 375.

Diacetonitrile (*2-Iminobutyronitrile or 2-aminocrotonitrile*)



or



$\text{C}_4\text{H}_6\text{N}_2$

MW, 82

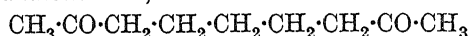
Two forms.

(1) *Labile*. M.p. $80-4^\circ$. Hot $\text{C}_6\text{H}_6 \longrightarrow$ stable form.

(2) *Stable*. Needles. M.p. $52-3^\circ$. Sol. H_2O , EtOH , CHCl_3 , C_6H_6 . Probably the imino compound.

Meyer, *J. prakt. Chem.*, 1895, 52, 83.

1 : 5-Diacetopentane (*2 : 8-Diketnonane, nonandione-2 : 8*)



$\text{C}_9\text{H}_{16}\text{O}_2$

MW, 156

Plates from pet. ether. M.p. $48-9^\circ$. B.p. $212-15^\circ/300$ mm., $124-6^\circ/13$ mm.

Dioxime: cryst. from H_2O . Cryst. powder from C_6H_6 -pet ether. M.p. $84-5^\circ$.

Disemicarbazone: cryst. from EtOH.Aq . M.p. $197-8^\circ$.

Bis-2 : 4-dinitrophenylhydrazone: orange. M.p. 156° .

Meerwein, Schäfer, *J. prakt. Chem.*, 1922, 104, 289.

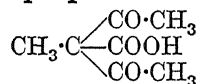
Kay, Perkin, *J. Chem. Soc.*, 1905, 87, 1077.

Kipping, Perkin, *J. Chem. Soc.*, 1889, 55, 335.

Diacetopropane.

See 3-Methylacetylacetone and Heptandione-2 : 6.

1 : 1-Diacetopropionic Acid



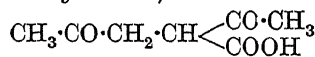
$\text{C}_7\text{H}_{10}\text{O}_4$

MW, 158

Et ester: $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. B.p. $205-20^\circ$. $\text{FeCl}_3 \longrightarrow$ red col.

James, *Ann.*, 1884, 226, 219.

1 : 2-Diacetopropionic Acid (*2 : 5-Diketohexane-3-carboxylic acid*)



$\text{C}_7\text{H}_{10}\text{O}_4$

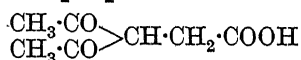
MW, 158

Et ester: b.p. $161-3^\circ/50-51$ mm., $145-6^\circ/21$ mm. $\text{D}^{15.5}$ 1.0623.

Ossipow, Korschun, *Chem. Zentr.*, 1903, II, 1281.

Weltner, *Ber.*, 1884, 17, 67.

2 : 2-Diacetopropionic Acid



$\text{C}_7\text{H}_{10}\text{O}_4$

MW, 158

Me ester: $C_8H_{12}O_4$. MW, 172. B.p. 130–2°/21 mm.

Et ester: b.p. 165°/55 mm., 144–6°/24 mm. D_{15}^{25} 1.093. $NaOH \rightarrow$ levulinic acid. *Cu salt*: m.p. 179° decomp. *Monoxime*: cryst. from C_6H_6 or $EtOH$. M.p. 120°. *Disemicarbazone*: m.p. 224–5°.

March, *Ann. chim. phys.*, 1902, **26**, 300.

Garner, Reddick, Fink, *J. Am. Chem. Soc.*, 1909, **31**, 668.

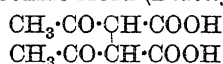
Diacetoresorcinol.

See Resodiacetophenone.

Diacetostyrene.

See Benzylidene-acetylacetone.

Diacetosuccinic Acid (*Diacetylsuccinic acid*)



$C_8H_{10}O_6$ MW, 202

Exists in tautomeric forms.

(1) Cryst. from H_2O . M.p. 185–6° decomp. Less sol. than form (2).

(2) Needles. M.p. 160° decomp. Sol. H_2O , $EtOH$. Spar. sol. Et_2O . Hot conc. $H_2SO_4 \rightarrow$ (1).

Di-Me ester: $C_{10}H_{14}O_6$. MW, 230. Cryst. from $EtOH.Aq$. M.p. 138–40° (113.5°). B.p. 120°/20 mm.

Et ester: $C_{10}H_{14}O_6$. MW, 230. Leaflets from $Et_2O-EtOH$. M.p. 150–2° decomp.

Di-Et ester: $C_{12}H_{18}O_6$. MW, 258. Several forms. (a) Cryst. from ligroin. M.p. 20–2°. n_D^{20} 1.4545. Sol. ord. org. solvents. $FeCl_3 \rightarrow$ violet col. (b) Prisms from ligroin. M.p. 31–2°. n_D^{20} 1.4392. Sol. ord. org. solvents. Insol. H_2O . No. col. with $FeCl_3$. (c) Plates. M.p. 89–90°. Spar. sol. ord. org. solvents. (d) Needles. M.p. 74°. Sol. $EtOH$.

Scheiber, Herold, *Ann.*, 1914, **405**, 340.

Kaufmann, *Ann.*, 1922, **429**, 247.

Knorr, Schmidt, *Ann.*, 1896, **293**, 101.

1 : 1-Diacetoxyethane.

See Ethylidene diacetate.

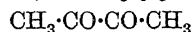
Diacetoxymethane.

See Methylene diacetate.

Diacetyl-.

See also Diaceto-.

Diacetyl (*Dimethyl diketone*, 2 : 3-diketo-butane, butandione, dimethylglyoxal)



$C_4H_6O_2$ MW, 86

Constituent of Bay and other oils. Greenish-yellow liq. B.p. 88°. Sol. H_2O . Misc. with $EtOH$, Et_2O , in all proportions. D_{15}^{25} 0.9904. n_D^{25} 1.39331. Heat of comb. C_6 503.7 Cal. Conc. HCl at 0° \rightarrow trimeride. Hydroxylamine \rightarrow dimethylglyoxime. Forms bisulphite comp.

Monoxime: methyl isonitrosoethyl ketone. M.p. 76°. B.p. 185–6°. Sol. $EtOH$, Et_2O , alkalis.

Dioxime: see Dimethylglyoxime.

Di-phenylhydrazone (*osazone*): needles. M.p. 243–4° decomp.

m-Nitrobenzoylhydrazone: m.p. 320–1°.

Dianil: $CH_3 \cdot C(N \cdot C_6H_5) \cdot C(N \cdot C_6H_5) \cdot CH_3$. Yellow leaflets. M.p. 139°. Sol. Et_2O .

Dimer: $(C_4H_6O_2)_2$. MW, 172. M.p. 44–6° (58°, rapid heat.). B.p. 100°/0.5 mm. D_4^{25} 1.1560. n_D^{25} 1.4552.

Trimer: $(C_4H_6O_2)_3$. MW, 258. Prisms. M.p. 105°. B.p. 280°. Sol. $EtOH$, Et_2O , hot H_2O .

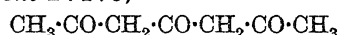
Oliver, *Bull. soc. chim.*, 1932, **51**, 99

(*Bibl.*): *Chem. Zentr.*, 1933, **I**, 2080.

Konovalova, Kraft, Serga, *Chem. Abstracts*, 1933, **27**, 3450.

Plisov, *Chem. Abstracts*, 1934, **28**, 4038.

Diacetylacetone (2 : 4 : 6-Triketo-*n*-heptane, heptantrione-2 : 4 : 6)



$C_7H_{10}O_3$ MW, 142

Colourless leaflets. M.p. 49°. B.p. 121°/10 mm. Sol. Et_2O , $EtOH$, alkalis. D_{10}^{20} 1.0681. n_D^{20} 1.4930. Hot H_2O , PCl_5 , etc. \rightarrow dimethylpyrone. Forms Na and Cu derivs. $FeCl_3 \rightarrow$ dark red col.

2 : 6-Dioxime: needles. M.p. 68–5°.

Monosemicarbazone: m.p. 203°.

Di-phenylhydrazone: m.p. 142°.

Feist, *Ann.*, 1890, **257**, 276.

Collie, Reilly, *J. Chem. Soc.*, 1922, **121**, 1984.

ω -Diacetylacetophenone.

See Diacetylbenzoylmethane.

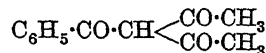
Diacetylaniline.

See Diacetanilide.

Diacetylanthranilic Acid.

See under Acetylanthranilic Acid.

Diacetylbenzoylmethane (ω -Diacetylacetophenone)



$C_{12}H_{12}O_3$ MW, 204

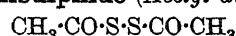
Plates. M.p. 35°. B.p. 167°/22 mm. Sol. $EtOH$, Et_2O , C_6H_6 , pet. ether, alkalis. Insol. H_2O , cold ligroin. D_{15}^{25} 1.1393. n_D^{25} 1.56164. Exists in tautomeric forms.

Cu deriv.: blue cryst. M.p. 224–5° (228°).

$C_{12}H_{12}O_3 \cdot (C_2H_5)_3N$: yellow cryst. M.p. 55–8°.

Claisen, *Ann.*, 1896, **291**, 63.

Diacetyl disulphide (*Acetyl disulphide*)

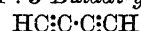


$C_4H_6O_2S_2$ MW, 150

Cryst. M.p. 20°. Sol. $EtOH$, Et_2O , CS_2 . Insol. H_2O . Rapidly decomp. by alkalis.

Kekulé, Linnemann, *Ann.*, 1862, **123**, 278.

Diacetylene (1 : 3-Butadi-yne)



C_4H_2

MW, 50

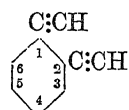
M.p. — 36 to — 35°. B.p. 9.5–10°. D_4^{20} 0.7364. n_D^{25} 1.43862. Polymerises readily. Forms lemon-yellow Ag salt, colourless Hg salt and violet-red Cu salt.

Straus, Kollek, *Ber.*, 1926, 59, 1664.

Lespieau, Prevost, *Ann. chim.*, 1925, 37, 704.

Armitage, Jones, Whiting, *J. Chem. Soc.*, 1951, 44.

1 : 2-Diacetylenylbenzene



$C_{10}H_6$

MW, 126

B.p. 82°/14 mm. $D^{17.5}$ 0.9788. $n_D^{17.5}$ 1.5915.

Deluchat, *Compt. rend.*, 1931, 192, 1387.

1 : 3-Diacetylenylbenzene.

M.p. 2.5°. B.p. 78°/15 mm. D^{18} 0.9669. n_D^{18} 1.5841.

Deluchat, *Compt. rend.*, 1931, 192, 1387.

1 : 4-Diacetylenylbenzene.

Pale yellow cryst. from AcOH. M.p. 95°. Sensitive to light. Gives yellow ppt. with ammoniacal Cu_2Cl_2 or $NH_3 \cdot AgNO_3$.

Lespieau, Deluchat, *Compt. rend.*, 1930, 190, 683.

Diacetylenylisopropyl Alcohol.

See 2 : 5-Heptadi-ynol-4.

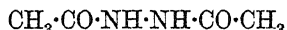
1 : 3-Diacetylenylpropane.

See 1 : 6-Heptadi-yne.

Diacetylene.

See Methylacetylacetone and Acetonylacetone.

sym.-Diacetylhydrazine (Hydrazodiacetyl)



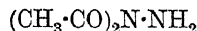
$C_4H_8O_2N_2$

MW, 116

Leaflets + $1H_2O$. M.p. anhyd. 140°. B.p. 209°/15 mm. Sol. H_2O , EtOH.

Pellazzari, *Gazz. chim. ital.*, 1909, 39, i, 536.

unsym.-Diacetylhydrazine



$C_4H_8O_2N_2$

MW, 116

Leaflets. M.p. 132°. Sol. H_2O , EtOH. Spar. sol. Et_2O .

Hofmann, Marburg, *Ann.*, 1899, 305, 218.

Diacetylmethane.

See Acetylacetone.

Diacetylmethylenediamine (Methylenedi-acetamide)



$C_5H_{10}O_2N_2$

MW, 130

Cryst. from EtOH. M.p. 196°. B.p. 288°. Sol. H_2O , EtOH. Spar. sol. $CHCl_3$, C_6H_6 . Insol. Et_2O . Decomp. by hot HCl.

Pulvermacher, *Ber.*, 1892, 25, 310.

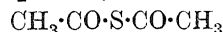
Diacetylmorphine.

See Heroin.

Diacetyl peroxide.

See Acetyl peroxide.

Diacetyl sulphide (Thioacetic anhydride)



$C_4H_6O_2S$

MW, 118

B.p. 155–8° decomp., 63°/20 mm. D_{20}^{20} 1.124. n_D^{20} 1.4810. Raney Ni \rightarrow acetaldehyde.

Bonner, *J. Am. Chem. Soc.*, 1950, 72, 4270.

Davies, *Ber.*, 1891, 24, 3551.

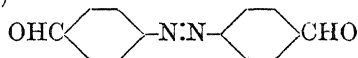
Diacetyltartaric Acid.

See under Tartaric Acid.

Dial.

See 5 : 5-Diallylbarbituric Acid.

4 : 4' - Dialdehydoazobenzene (Azobenz - aldehyde)



$C_{14}H_{10}O_2N_2$

MW, 238

Glistening red leaflets from AcOH. M.p. 238°. Spar. sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Sol. hot amyl alcohol, hot $PhNO_2$. Sublimes in prisms.

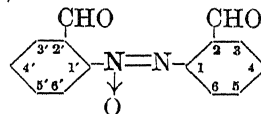
Di-phenylhydrazone: m.p. 278–9° decomp. Deep blue in conc. H_2SO_4 .

Di-Me acetal: orange cryst. M.p. 118°. Sol. hot EtOH.

Alway, Bonner, *J. Am. Chem. Soc.*, 1905, 27, 1107.

Vorländer, Wielke, Haberland, Ost, *Ber.*, 1937, 70, 2106.

2 : 2'-Dialdehydoazoxybenzene (o-Azoxylbenzaldehyde)



$C_{14}H_{10}O_3N_2$

MW, 254

Yellow cryst. from EtOH. M.p. 118–9°.

Tetra-Me acetal: plates. M.p. 58–9°.

Tetra-Et acetal: prisms. M.p. 76–7°. Sol. Et_2O , C_6H_6 , hot EtOH.

Bamberger, *Ber.*, 1911, 44, 1966.

3 : 3' - Dialdehydoazoxybenzene (m-Azoxylbenzaldehyde).

Needles. M.p. 129°. Sol. C_6H_6 , hot EtOH. Spar. sol. Et_2O . Insol. H_2O .

Dioxime: m.p. 191°.

Di-phenylhydrazone: m.p. 198°.

Human, Weil, *Ber.*, 1903, 36, 3469.

4 : 4'-Dialdehydeazoxybenzene (*p*-Azoxybenzaldehyde).

Yellow needles. M.p. 195° (190°). Sol. AcOH, C₆H₆. Spar. sol. H₂O, EtOH. Sol. H₂SO₄ to orange sol. CrO₃ → *p*-azoxybenzoic acid.

Di-phenylhydrazone: m.p. 228–30° (rapid heat).

Human, Weil, *Ber.*, 1903, 36, 3469.

Dialdehydobenzene.

See Phthalaldehyde, Isophthalaldehyde, and Terephthalaldehyde.

Dialdehydeethane.

See Succindialdehyde.

3 : 5-Dialdehydoguaiacol.

See 4-Hydroxy-5-methoxyisophthalaldehyde.

1 : 3-Dialdehydeisobutane.

See 2-Methylglutaraldehyde.

Dialdehydomethane.

See Malondialdehyde.

1 : 8-Dialdehydonaphthalene.

See Naphthalaldehyde.

Dialdehydophenol.

See Hydroxyisophthalaldehyde.

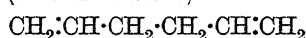
Dialdehydopropylene.

See Glutacondialdehyde.

3 : 5-Dialdehydoveratrol.

See under 4-Hydroxy-5-methoxyisophthalaldehyde.

Diallyl (1 : 5-Hexadiene)



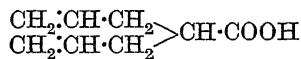
C₆H₁₀ MW, 82

M.p. -141°. B.p. 59.6°, D₄²⁰ 0.7106. D₄²⁰ 0.6880. n_D^{20} 1.4044. HNO₃.Aq. → succinic acid. CrO₃ → acetic acid. Decomp. by conc. H₂SO₄.

Tetrabromide: see 1 : 2 : 5 : 6-Tetrabromohexane.

Cortese, *J. Am. Chem. Soc.*, 1929, 51, 2266 (*Bibl.*).

Diallylacetic Acid



C₈H₁₂O₂ MW, 140

B.p. 222° (226–7°), 125°/14 mm. Insol. H₂O. D₁₅¹⁵ 0.95547. n_D^{20} 1.45084. Volatile in steam. KMnO₄ → oxalic acid + CO₂.

Et ester: C₁₀H₁₆O₂. MW, 168. B.p. 189–91°. D₄¹⁹ 0.8978. n_D^{19} 1.43638.

Amide: C₈H₁₃ON. MW, 139. Needles. M.p. 82–3°. B.p. 265°.

Nitrile: C₈H₁₁N. MW, 121. B.p. 186–8°.

Conrad, Bischoff, *Ann.*, 1880, 204, 173.

Diallylamine

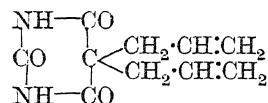


C₆H₁₁N MW, 97

B.p. 111–12°.

Vliet, *J. Am. Chem. Soc.*, 1924, 46, 1307; *Organic Syntheses*, Collective Vol. I, 195.

5 : 5-Diallylbarbituric Acid (*Dial*, *Allo*-barbitone)



C₁₀H₁₂O₃N₂ MW, 208

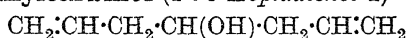
Plates from H₂O or 50% EtOH. M.p. 173°. Mod. sol. C₆H₆. Heat. with 50% KOH → diallylmalonic acid. Powerful hypnotic.

Johnson, Hill, *Am. Chem. J.*, 1911, 46, 542.

Abbott Laboratories, B.P. 404,038 (*Chem. Zentr.*, 1934, I, 2621).

S.C.I., D.R.P. 268,158 (*Chem. Zentr.*, 1914, I, 201).

Diallylcarbinol (1 : 6-Heptadienol-4)



C₇H₁₂O MW, 112

B.p. 151°. D₁₂¹² 0.8644. Prac. insol. H₂O. Heat of comb. C_p 1038.7 Cal. CrO₃ → formic acid + CO₂.

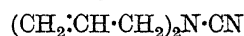
Me ether: C₈H₁₄O. MW, 126. B.p. 135–6°. D₂₀²⁰ 0.8096.

Et ether: C₉H₁₆O. MW, 140. B.p. 143–4°. D₂₀²⁰ 0.8023.

Kanonnikow, Saizew, *Ann.*, 1877, 185, 148.

Riabinin, *J. prakt. Chem.*, 1881, 23, 270.

Diallylcyanamide

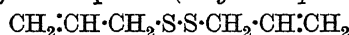


C₇H₁₀N₂ MW, 122

B.p. 140–5°/90 mm., 128–33°/57 mm., 105–10°/18 mm. Sol. ord. org. solvents. Insol. H₂O.

Vliet, *J. Am. Chem. Soc.*, 1924, 46, 1307.

Diallyl disulphide (*Allyl disulphide*)



C₆H₁₀S₂ MW, 146

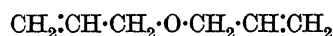
Principal constituent of oil of garlic. B.p. 100°/48 mm., 78–80°/16 mm. D₁₅¹⁵ 1.0237 (1.010). Zn dust → diallyl sulphide.

Twiss, *J. Chem. Soc.*, 1914, 105, 39.

Blanksma, *Rec. trav. chim.*, 1901, 20, 134.

Banerjee, *Z. anorg. allgem. Chem.*, 1913, 83, 113.

Diallyl Ether



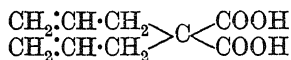
C₆H₁₀O MW, 98

B.p. 94°. D_0^{18} 0.8046. Heat of comb. C_p 911.1 Cal.

Cahours, Hofmann, *Ann.*, 1857, 102, 290.
Gebauer-Fuelnegg, Moffett, *J. Am. Chem. Soc.*, 1934, 56, 2009.

Senderens, *Compt. rend.*, 1925, 181, 698.

Diallylmalonic Acid



$C_9H_{12}O_4$ MW, 184

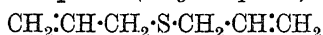
Cryst. from H_2O or C_6H_6 . M.p. 135–7°. Sol. H_2O , EtOH, Et_2O , hot C_6H_6 . Mod. sol. AcOH, $CHCl_3$, pet. ether. $k = 7.6 \times 10^{-3}$ at 25°.

Di-Me ester: $C_{11}H_{16}O_4$. MW, 212. B.p. 235°.

Di-Et ester: $C_{13}H_{20}O_4$. MW, 240. B.p. 243–4°, 208°/260 mm. $D_4^{18.4}$ 0.9952. $n_D^{15.3}$ 1.44771.

Diamide: $C_9H_{14}O_2N_2$. MW, 182. M.p. 202°.

Leuchs, Lemcke, *Ber.*, 1914, 47, 2584.

Diallyl sulphide (*Allyl sulphide*)

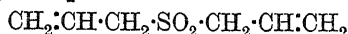
$C_6H_{10}S$ MW, 114

Formed by hyd. decomp. of cabbage and of seeds of certain *Cruciferae*. Oil with garlic odour. B.p. 139°/758 mm. D_4^{17} 0.88765. n_D^{17} 1.4877. Heat of comb. C_p 1068.1 Cal.

Cahours, Hofmann, *Ann.*, 1857, 102, 291.

Banerjee, *Z. anorg. allgem. Chem.*, 1913, 83, 113.

Diallyl sulphone

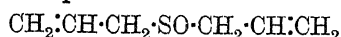


$C_6H_{10}O_2S$ MW, 146

B.p. 109°/3 mm. D_4^{20} 1.1215. n_D^{20} 1.4893.

Lewin, *J. prakt. Chem.*, 1930, 127, 77.

Diallyl sulphoxide

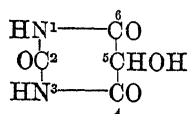


$C_6H_{10}OS$ MW, 130

B.p. 107–9°/7–8 mm., 89–90°/2.6 mm. D_4^{20} 1.0261. n_D^{20} 1.5115.

Lewin, *J. prakt. Chem.*, 1930, 127, 77.

Dialuric Acid (*5-Hydroxybarbituric acid*, *tartronylurea*,



$C_4H_4O_4N_2$ MW, 144

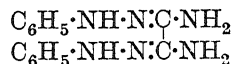
Colourless prisms. Turns red at 180°. M.p. 214–15° decomp. Sol. hot H_2O . Reacts strongly acid and decomposes alk. carbonates. Slowly ox. to alloxantin in air. $NH_3 \rightarrow$ uramil. NH_4 salt sol. hot H_2O . Na and K salts spar. sol. hot H_2O .

Acetyl deriv.: prisms or leaflets. M.p. 210–12°. Sol. H_2O , EtOH.

Benzoyl deriv.: m.p. 209–10°.

Biltz, Damm, *Ber.*, 1913, 46, 3664.

Diamidrazone

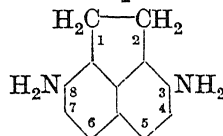


$C_{14}H_{16}N_6$ MW, 268

Leaflets from EtOH. M.p. 225–6°. Spar. sol. hot EtOH, hot $CHCl_3$. Insol. H_2O . Reduces Fehling's. Conc. $H_2SO_4 \rightarrow$ deep blue sol. *B,2HCl*: leaflets. M.p. 188°. Sol. EtOH.

Fischer, Müller, *Ber.*, 1894, 27, 186.

3 : 8-Diaminoacenaphthene



$C_{12}H_{12}N_2$ MW, 184

Yellow cryst. from MeOH. M.p. 167–8°.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 416t.

4 : 5-Diaminoacenaphthene.

Needles from MeOH. M.p. 140–42°.

Sachs, Mosebach, *Ber.*, 1911, 44, 2858.

5 : 6-Diaminoacenaphthene.

Brown cryst. from ligroin. M.p. 160°.

Sachs, Mosebach, *Ber.*, 1911, 44, 2860.

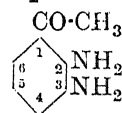
Diaminoacetanilide.

See under Triaminobenzene.

Diaminoacetnaphthalide.

See under Triaminonaphthalene.

2 : 3-Diaminoacetophenone



$C_8H_{10}ON_2$ MW, 150

Deep yellow cryst. M.p. 122°.

Phenazine: pale yellow cryst. M.p. 225°.

Simpson, Atkinson, Schofield, Stephenson, *J. Chem. Soc.*, 1945, 646.

2 : 4-Diaminoacetophenone.

Fine needles. M.p. 136–7°.

Leonard, Boyd, *J. Org. Chem.*, 1946, 11, 405.

3 : 4-Diaminoacetophenone.

M.p. 132–3° from C_6H_6 .

Borsche, Barthenheier, *Ann.*, 1942, 553, 250.

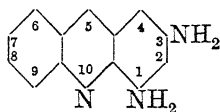
3 : 5-Diaminoacetophenone.

Yellow leaflets from EtOH. M.p. 133–4°. Sol. H_2O , EtOH. Spar. sol. Et_2O .

3 : 5-N-Diacetyl : needles. M.p. 210°.

Berend, Heymann, *J. prakt. Chem.*, 1901, 65, 293; 1904, 69, 472.

1 : 3-Diaminoacridine



$C_{13}H_{11}N_3$

MW, 209

Orange cryst. from EtOH. M.p. 225° corr. decomp. (sealed tube). Stable in air. Spar. sol. $CHCl_3$, hot H_2O .

Albert, Linnell, *J. Chem. Soc.*, 1938, 25.

1 : 5-Diaminoacridine.

Orange-brown cryst. M.p. 194-6°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

1 : 7-Diaminoacridine.

Orange needles from H_2O . M.p. 254-6° (322°). Sol. EtOH, Py. Spar. sol. $CHCl_3$, C_6H_6 .

Albert, Linnell, *J. Chem. Soc.*, 1938, 26.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 102.

2 : 5-Diaminoacridine.

M.p. 146° (141°). Sol. EtOH. Mod. sol. H_2O . Prac. insol. Et_2O , $CHCl_3$, C_6H_6 .

Albert, Linnell, *J. Chem. Soc.*, 1936, 1618.

2 : 6-Diaminoacridine.

Brownish-orange needles from H_2O . M.p. 213-16° decomp. Sol. EtOH, Py. Spar. sol. cold H_2O . Darkens in air.

Albert, Linnell, *J. Chem. Soc.*, 1936, 92.

2 : 7-Diaminoacridine.

Yellow needles from H_2O . M.p. 355° corr. Spar. sol. MeOH, Me_2CO . Prac. insol. Et_2O , C_6H_6 , $CHCl_3$, $PhNO_2$. EtOH sol. shows yellowish-green fluor.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1619.

2 : 8-Diaminoacridine.

Yellow needles. M.p. 283° (245°). Sol. EtOH (green fluor.). Sol. in H_2O is yellow and shows green fluor. Sol. conc. H_2SO_4 with bluish-green fluor. Spar. sol. Et_2O , C_6H_6 .

B, H_2SO_4 : Proflavine. Red or reddish-brown cryst. Sol. 100 parts cold H_2O . Antiseptic.

Methochloride : see Acriflavine.

Thompson, B.P. 137,214, (*Chem. Abstracts*, 1920, 14, 1445).

Ishifuku, Ito, *Chem. Abstracts*, 1930, 24, 118.

Scherlin *et al.*, *Ann.*, 1935, 516, 228.

Albert, Linnell, *J. Chem. Soc.*, 1936, 93.

2 : 9-Diaminoacridine.

Yellow cryst. from EtOH. M.p. 249° (229-30°). Mod. sol. $CHCl_3$, C_6H_6 . Spar. sol. pet. ether, hot H_2O .

Albert, Linnell, *J. Chem. Soc.*, 1936, 1619.

3 : 6-Diaminoacridine.

Yellowish-brown needles from EtOH. M.p. 322° (sealed tube; not sharp). Sol. Py. Spar. sol. C_6H_6 , hot H_2O .

Albert, Linnell, *J. Chem. Soc.*, 1938, 26.

3 : 7-Diaminoacridine.

Yellow needles from H_2O . M.p. 318°.

2 : 7-N-Diacetyl : pale yellow needles. M.p. 344°.

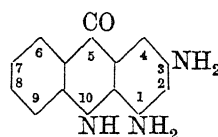
Bogert, Hirschfelder, Lauffer, *Chem. Zentr.*, 1930, II, 1702.

4 : 5-Diaminoacridine.

Orange-brown cryst. M.p. 182°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

1 : 3-Diaminoacridone



$C_{13}H_{11}ON_3$

MW, 225

Needles or prisms from EtOH. M.p. 222-3° decomp. Sol. boiling H_2O , EtOH. Prac. insol. Et_2O , C_6H_6 , ligroin.

Jourdan, *Ber.*, 1885, 18, 1450.

Albert, Linnell, *J. Chem. Soc.*, 1938, 25.

1 : 5-Diaminoacridone.

Yellow cryst. M.p. 320-2°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

1 : 6-Diaminoacridone.

M.p. 302-4°.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 102.

1 : 7-Diaminoacridone.

Lemon-yellow needles from H_2O . Decomp. at 330°. Very sol. alc. KOH. Spar. sol. EtOH.

Albert, Linnell, *J. Chem. Soc.*, 1938, 22.

1 : 9-Diaminoacridone.

Yellow needles from Py.Aq. M.p. 266-8°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

2 : 6-Diaminoacridone.

Greenish-yellow needles from H_2O . M.p. 306°. Sols. show yellowish-green fluor. Insol. 20% NaOH.

Albert, Linnell, *J. Chem. Soc.*, 1936, 92.

2 : 7-Diaminoacridone.

Brownish-yellow cryst. from H_2O . M.p. 352° decomp. Sols. show yellowish-green fluor. destroyed by trace of acid.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1614.

2 : 8-Diaminoacridone.

Needles. Does not melt below 350°. Sol. EtOH with bluish-violet fluor. Sol. phenol to yellow sol. with green fluor. Sol. acids with green fluor. Prac. insol. AcOEt, C_6H_6 , $CHCl_3$.

ligroin. $\text{Na} + \text{EtOH} \rightarrow$ 2 : 8-diaminoacridine.

- 2 : 8-N-Diacetyl : does not melt below 350°.
 2 : 8-N-Dibenzoyl : does not melt below 250°.
 2 : 8-N-Dibenzylidene : m.p. 370° decomp.
 Schöppf, *Ber.*, 1894, 27, 2318.
 Albert, Linnell, *J. Chem. Soc.*, 1936, 92.

2 : 9-Diaminoacridone.

Lemon-yellow cryst. from H_2O . Does not melt below 360°. Yellowish-green fluor. in EtOH.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1618.

3 : 6-Diaminoacridone.

Yellow cryst. M.p. 368–70°.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 102.

3 : 7-Diaminoacridone.

Brown-yellow needles from H_2O . M.p. 325°.
 NaHg in 2% $\text{NaOH} \rightarrow$ 3 : 7-diaminoacridine.

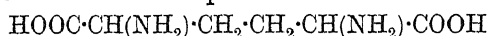
Bogert, Hirschfelder, Lauffer, *Chem. Zentr.*, 1930, II, 1702.

4 : 5-Diaminoacridone.

Olive-green cryst. M.p. 340–2°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

1 : 4-Diaminoadipic Acid



$\text{C}_6\text{H}_{12}\text{O}_4\text{N}_2$ MW, 176

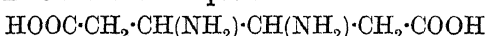
Prisms. M.p. 280°. Insol. common neutral solvents. Forms blue Cu salt insol. H_2O .

Sörensen, Andersen, *Z. physiol. Chem.*, 1908, 56, 269.

Stephen, Weizmann, *J. Chem. Soc.*, 1913, 103, 274.

Bertho, Maier, *Ann.*, 1932, 498, 56.

2 : 3-Diaminoadipic Acid



$\text{C}_6\text{H}_{12}\text{O}_4\text{N}_2$ MW, 176

Cryst. + $2\text{H}_2\text{O}$ from H_2O . Anhyd. decomp. at 265–80°. Spar. sol. cold H_2O .

Köhl, *Ber.*, 1903, 36, 173.

Diaminoanilinobenzoic Acid.

See under Triaminobenzoic Acid.

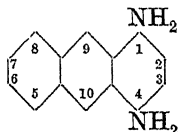
Diaminoanilinonaphthalene.

See under Triaminonaphthalene.

Diaminoanisoie.

See under Diaminophenol.

1 : 4-Diaminoanthracene (1 : 4-Anthradiamine)



$\text{C}_{14}\text{H}_{12}\text{N}_2$ MW, 208

Free base is unstable.

1 : 4-N-Diacetyl : greenish needles. M.p. 322°.

Insol. EtOH, AcOEt. Sol. hot AcOH with blue fluor.

Pisovschi, *Ber.*, 1908, 41, 1435.

9 : 10-Diaminoanthracene (ms-Diaminoanthracene, 9 : 10-anthradianiline).

Red cryst. M.p. 196° (140–2°). Very readily oxidised.

Monoformyl : orange cryst. M.p. 292°.

Dichloroformyl : m.p. 280–300° decomp.

Tetra-acetyl : yellowish-green. M.p. 273°.

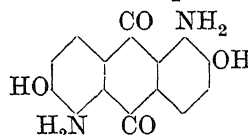
Dibenzyl : m.p. 255°.

Urea deriv. : $\text{C}_{28}\text{H}_{12}\text{O}_3\text{N}_2$. Yellow cryst. M.p. 212°.

Schiedt, *J. prakt. Chem.*, 1941, 157, 203.

Vorozkov, Shkitin, *Chem. Abstracts*, 1941, 35, 4375.

1 : 5-Diaminoanthraflavic Acid (2 : 6-Dihydroxy-1 : 5-diaminoanthraquinone)

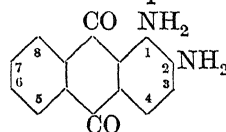


$\text{C}_{14}\text{H}_{10}\text{O}_4\text{N}_2$ MW, 270

M.p. above 350°. Spar. sol. EtOH, AcOH.

Heller, Müller, Mertz, *Z. angew. Chem.*, 1929, 42, 170.

1 : 2-Diaminoanthraquinone



$\text{C}_{14}\text{H}_{10}\text{O}_2\text{N}_2$ MW, 238

Violet cryst. with green metallic cast. M.p. 303° (242–4°). Sol. Py, quinoline, aniline, hot PhNO_2 . Spar. sol. CHCl_3 , xylene. Olive-brown sol. in conc. H_2SO_4 .

1 : 2-N-Dibenzoyl : m.p. 355°.

Gubelmann, Tinker, U.S.P. 1,803,503, (*Chem. Abstracts*, 1931, 25, 3672).

I.G., D.R.P. 523,523, (*Chem. Abstracts*, 1931, 25, 3672).

Groggins, Newton, *Ind. Eng. Chem.*, 1933, 25, 1030.

1 : 3-Diaminoanthraquinone.

Brick-red cryst. from PhNO_2 . M.p. 290°. Green sol. in conc. H_2SO_4 .

1 : 3-N-Dibenzoyl : does not melt below 300°.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1029, (*Chem. Abstracts*, 1922, 16, 2142).

1 : 4-Diaminoanthraquinone.

Dark violet cryst. (from EtOH) with metallic cast. M.p. 268°. Sol. C_6H_6 , Py, PhNO_2 , aniline. Mod. sol. hot AcOH, EtOH. Prac. colourless sol. in conc. H_2SO_4 , bluish-red with addn. of boric acid.

1 : 4-*N*-Diacetyl : reddish-yellow needles. M.p. 271°.

N-Monobenzoyl : violet cryst. M.p. 280°. Violet sol. in conc. H_2SO_4 . Sol. hot PhNO_2 .

1 : 4-*N*-Dibenzoyl : dark red cryst. M.p. 284°. Crimson sol. in conc. H_2SO_4 .

1 : 4-*N*-Diphenyl : see 1 : 4-Dianilinoanthraquinone.

I.G., B.P. 298,279, (*Chem. Abstracts*, 1929, 23, 2725); B.P., 368,829.

Noelting, Wortmann, *Ber.*, 1906, 39, 643.

I.G., Swiss P. 157,660, (*Chem. Zentr.*, 1933, II, 2057).

1 : 5-Diaminoanthraquinone.

Red cryst. from EtOH or AcOH. M.p. 319°. Prac. colourless sol. in conc. H_2SO_4 . Sol. hot PhNO_2 . Spar. sol. EtOH, Et_2O , C_6H_6 , CHCl_3 , Me_2CO .

1 : 5-*N*-Diacetyl : m.p. 317°.

1 : 5-*N*-Dibenzoyl : m.p. above 350°.

1 : 5-*N*-Diphenyl : see 1 : 5-Dianilinoanthraquinone.

Bayer, D.R.P. 181,722, (*Chem. Zentr.*, 1907, I, 1652).

Noelting, Wortmann, *Ber.*, 1906, 39, 638.

Lauer, *J. prakt. Chem.*, 1932, 135, 7, 204.

Segui, *Chem. Abstracts*, 1934, 28, 7257.

1 : 6-Diaminoanthraquinone.

Red cryst. M.p. 292°. Sol. hot PhNO_2 . Green sol. in conc. H_2SO_4 .

1 : 6-*N*-Diacetyl : m.p. 295°.

1 : 6-*N*-Dibenzoyl : m.p. 275°.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1030, (*Chem. Abstracts*, 1922, 16, 2142).

1 : 7-Diaminoanthraquinone.

Red cryst. M.p. 290°. Sol. hot PhNO_2 . Greenish-yellow sol. in conc. H_2SO_4 .

1 : 7-*N*-Diacetyl : m.p. 283°.

1 : 7-*N*-Dibenzoyl : m.p. 325°.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1030, (*Chem. Abstracts*, 1922, 16, 2142).

1 : 8-Diaminoanthraquinone.

Red cryst. from EtOH, AcOH, PhNO_2 , or Py. M.p. 262°. Sol. EtOH, AcOH, PhNO_2 , Py. Spar. sol. Et_2O . Pale yellow sol. in conc. H_2SO_4 .

1 : 8-*N*-Diacetyl : m.p. 284°.

1 : 8-*N*-Dibenzoyl : m.p. 324°.

Noelting, Wortmann, *Ber.*, 1906, 39, 638.

Bayer, D.R.P. 181,722, (*Chem. Zentr.*, 1907, I, 1652).

Lauer, *J. prakt. Chem.*, 1932, 135, 204.

2 : 3-Diaminoanthraquinone.

Red cryst. M.p. 353°. Sol. PhNO_2 , Py, quinoline. Spar. sol. CHCl_3 , xylene. Yellowish-green sol. in conc. H_2SO_4 .

2 : 3-*N*-Dibenzoyl : m.p. 315°.

Gubelmann, Tinker, U.S.P. 1,803,503, (*Chem. Abstracts*, 1931, 25, 3672).

I.G., D.R.P. 607,539, (*Chem. Zentr.*, 1935, I, 2896).

Groggins, Newton, *Ind. Eng. Chem.*, 1933, 26, 1030.

2 : 6-Diaminoanthraquinone.

Reddish-brown prisms from hot Py.Aq. M.p. 310-20°. Sol. hot EtOH. Insol. CHCl_3 , xylene. Olive sol. in conc. H_2SO_4 .

2 : 6-*N*-Dibenzoyl : m.p. 300°.

Lauer, *J. prakt. Chem.*, 1932, 135, 7, 204.

du Pont, B.P. 421,828, (*Chem. Abstracts*, 1935, 29, 3689).

2 : 7-Diaminoanthraquinone.

Orange cryst. from EtOH or PhNO_2 . M.p. above 330°. Spar. sol. EtOH. Olive sol. in conc. H_2SO_4 .

2 : 7-*N*-Diacetyl : does not melt below 350°.

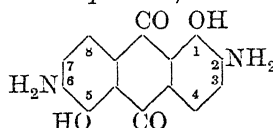
2 : 7-*N*-Dibenzoyl : m.p. 300°.

Noelting, Wortmann, *Ber.*, 1906, 39, 640.

Gubelmann, Weiland, Stallmann, B.P. 327,130, (*Chem. Abstracts*, 1930, 24, 5166).

du Pont, B.P. 421,828, (*Chem. Abstracts*, 1935, 29, 3689).

2 : 6-Diaminoanthrarufin (1 : 5-Dihydroxy-2 : 6-diaminoanthraquinone)



$\text{C}_{14}\text{H}_{10}\text{O}_4\text{N}_2$

MW, 270

Dark red needles from EtOH. Spar. sol. C_6H_6 , xylene. Sol. conc. H_2SO_4 with yellow col. Sol. alkalis with red col.

Brass, Albrecht, *Ber.*, 1928, 61, 993.

4 : 8-Diaminoanthrarufin (1 : 5-Dihydroxy-4 : 8-diaminoanthraquinone).

Steel-blue needles from PhNO_2 . Spar. sol. most org. solvents except Py and PhNO_2 . Prac. insol. dil. caustic alkalis. Deep yellow sol. in conc. H_2SO_4 . Blue col. in cold conc. alkalis.

4 : 8-*N*-Di-Me : dark blue needles from Py or chlorobenzene. Prisms from PhNO_2 . M.p. above 300°.

4 : 8-*N*-Di-Et : brown needles from Py or chlorobenzene. M.p. 292°.

4 : 8-*N*-Diacetyl : brown needles from CHCl_3 . M.p. above 270°.

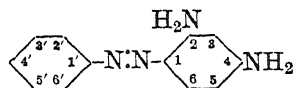
Brass, Albrecht, *Ber.*, 1928, 61, 989.

Marschalk, *Bull. soc. chim.*, 1927, 41, 945.

I.G., D.R.P. 554,647, (*Chem. Zentr.*, 1932, II, 2372).

du Pont, U.S.P. 1,957,936 (*Chem. Zentr.*, 1934, II, 3184).

2 : 4-Diaminoazobenzene (*Benzeneazo-m-phenylenediamine, Chrysoidine*)



$C_{12}H_{12}N_4$ MW, 212

Pale yellow cryst. from H_2O . M.p. 117.5° . Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O .

2 : 4-N-Diacetyl : m.p. 250.5° .

Hofmann, *Ber.*, 1877, 10, 213.

2 : 2'-Diaminoazobenzene (*o-Azoaniline*).

Reddish plates from EtOH or C_6H_6 . M.p. 134° .

2 : 2'-N-Diacetyl : *o*-azoacetanilide. Orange prisms. M.p. 271° .

Willstätter, Pfannenstiel, *Ber.*, 1905, 38, 2350.

3 : 3'-Diaminoazobenzene (*m-Azoaniline*).

Orange-yellow needles. M.p. 156° ($138-40^\circ$). Mod. sol. EtOH. Spar. sol. Et_2O , $CHCl_3$.

3 : 3'-N-Diacetyl : *m*-azoacetanilide. Orange needles from $PhNO_2$. M.p. 272° .

3 : 3'-N-Dibenzoyl : *m*-azobenzanilide. Cryst. from $PhNO_2$. M.p. 286° .

Poirrier, D.R.P. 62,352, (*Ber.*, 1892, 25R, 657).

Löb, *Z. Elektrochem.*, 1898, 5, 459.

Ruggli, Hinovker, *Helv. Chim. Acta*, 1934, 17, 396.

4 : 4'-Diaminoazobenzene (*p-Azoaniline*).

Golden-yellow needles. M.p. $250-1^\circ$. Sol. EtOH. Spar. sol. H_2O , C_6H_6 , ligroin. Red. \rightarrow *p*-phenylenediamine.

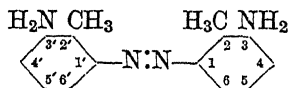
N-Monoacetyl : m.p. 212° .

Noelting, Binder, *Ber.*, 1887, 20, 3016.

M.L.B., D.R.P. 88,013, (*Ber.*, 1896, 29R, 748).

Witt, Kopetschni, *Ber.*, 1912, 45, 1136.

3 : 3'-Diamino-o-azotoluene (3 : 3'-Diamino-2 : 2'-dimethylazobenzene)



$C_{14}H_{16}N_4$ MW, 240

Orange plates from toluene. M.p. 175° . Sol. EtOH, toluene.

3 : 3'-N-Diacetyl : m.p. above 340° .

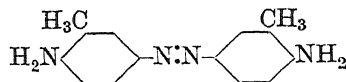
Green, Lawson, *J. Chem. Soc.*, 1891, 59, 1016.

5 : 5'-Diamino-o-azotoluene (5 : 5'-Diamino-2 : 2'-dimethylazobenzene).

Red needles from EtOH. M.p. 159° . Sol. C_6H_6 , Me_2CO , CCl_4 , hot EtOH. Spar. sol. H_2O .

Elbs, Schwarz, *J. prakt. Chem.*, 1901, 63, 564.

4 : 4'-Diamino-m-azotoluene (4 : 4'-Diamino-3 : 3'-dimethylazobenzene)



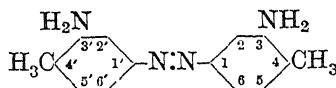
$C_{14}H_{16}N_4$ MW, 240

Dark red needles from EtOH.Aq. M.p. $218-20^\circ$. Sol. MeOH, EtOH. Less sol. Et_2O , $CHCl_3$, toluene.

4 : 4'-N-Diacetyl : orange cryst. from AcOH. M.p. above 310° . Prac. insol. EtOH.

Rosenstiehl, *Compt. rend.*, 1900, 132, 987.

3 : 3'-Diamino-p-azotoluene (3 : 3'-Diamino-4 : 4'-dimethylazobenzene)



$C_{14}H_{16}N_4$ MW, 240

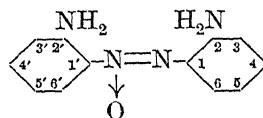
Red needles. M.p. 214° ($195-7^\circ$). Sol. EtOH, Et_2O . Spar. sol. H_2O .

3 : 3'-N-Diacetyl : m.p. 300° .

Biilmann, Blom, *J. Chem. Soc.*, 1924, 125, 1729.

Gazopoulou, *Chem. Abstracts*, 1933, 27, 1622.

2 : 2'-Diaminoazoxybenzene (*o-Azoxyaniline*)



$C_{12}H_{12}ON_4$ MW, 228

Red needles from EtOH. M.p. 115° .

2 : 2'-N-Diacetyl : *o*-azoxyacetanilide. Orange-yellow leaflets from EtOH. M.p. 185° .

du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

3 : 3'-Diaminoazoxybenzene (*m-Azoxyaniline*).

Yellow needles from EtOH or toluene. M.p. 150° .

3 : 3'-N-Diacetyl : *m*-azoxyacetanilide. M.p. 254° .

Poirrier, Rosenstiehl, D.R.P. 44,045, (*Ber.*, 1888, 21R, 766).

Meldola, Andrews, *J. Chem. Soc.*, 1896, 69, 7.

du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

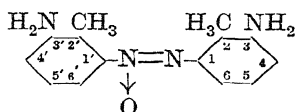
4 : 4'-Diaminoazoxybenzene (*p-Azoxyaniline*).

Yellow needles. M.p. 190° . $Sn + HCl \rightarrow$ *p*-phenylenediamine.

4 : 4'-N-Diacetyl : *p*-azoxyacetanilide. M.p. 275°.

Sonneborn, *Z. Elektrochem.*, 1900, 6, 509.
du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

3 : 3'-Diamino-o-azoxytoluene (3 : 3'-Diamino-2 : 2'-dimethylazoxybenzene, 6 : 6'-azoxy-o-toluidine)



$C_{14}H_{16}ON_4$

MW, 256

Pale yellow plates from toluene. M.p. 149°.
3 : 3'-N-Diacetyl : needles. M.p. 307°.

Green, Lawson, *J. Chem. Soc.*, 1891, 59, 1016.

4 : 4'-Diamino-o-azoxytoluene (4 : 4'-Diamino-2 : 2'-dimethylazoxybenzene, 6 : 6'-azoxy-m-toluidine).

Golden-yellow needles from H_2O . M.p. 148-5°. Sol. hot EtOH. Mod. sol. hot H_2O .

4 : 4'-N-Diacetyl : yellow cryst. M.p. 281° decomp.

4 : 4'-N-Dibenzoyl : m.p. 290°.

Elbs, Schwarz, *J. prakt. Chem.*, 1901, 63, 563.

Poirrier, Rosenstiehl, D.R.P. 44,554, (*Ber.*, 1888, 21R, 817).

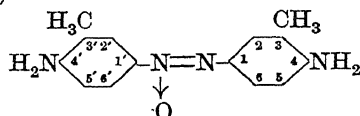
5 : 5'-Diamino-o-azoxytoluene (5 : 5'-Diamino-2 : 2'-dimethylazoxybenzene, 2 : 2'-azoxy-p-toluidine).

Yellow needles from H_2O . M.p. 148°. Sol. Me_2CO , CCl_4 , C_6H_6 , hot EtOH. Spar. sol. H_2O .

5 : 5'-N-Diacetyl : yellow cryst. M.p. 280-1°. Spar. sol. org. solvents.

Elbs, Schwarz, *J. prakt. Chem.*, 1901, 63, 563.

4 : 4'-Diamino-m-azoxytoluene (4 : 4'-Diamino-3 : 3'-dimethylazoxybenzene, 5 : 5'-azoxy-o-toluidine)



$C_{14}H_{16}ON_4$

MW, 256

Brown needles from EtOH. M.p. 188-9°. Sol. EtOH. Less sol. Et_2O , $CHCl_3$.

Rosenstiehl, Svais, *Compt. rend.*, 1902, 134, 554.

du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

6 : 6'-Diamino-m-azoxytoluene (6 : 6'-Diamino-3 : 3'-dimethylazoxybenzene, 3 : 3'-azoxy-p-toluidine).

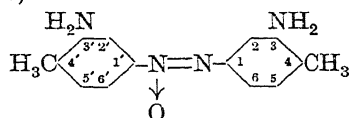
Reddish-brown needles from EtOH. M.p. 188°. Sol. EtOH. Spar. sol. Et_2O , $CHCl_3$.

6 : 6'-N-Diacetyl : yellow needles from EtOH.Aq. M.p. 196°.

Elbs, *J. prakt. Chem.*, 1911, 83, 15.

du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

3 : 3'-Diamino-p-azoxytoluene (3 : 3'-Diamino-4 : 4'-dimethylazoxybenzene, 4 : 4'-azoxy-o-toluidine)



$C_{14}H_{16}ON_4$

MW, 256

Yellowish-red needles from EtOH.Aq. M.p. 168°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

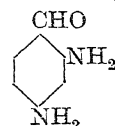
3 : 3'-N-Diacetyl : m.p. 290°.

Poirrier, Rosenstiehl, D.R.P. 44,045, (*Ber.*, 1888, 21R, 817).

Graeff, *Ann.*, 1885, 229, 344.

du Pont, U.S.P. 2,014,522, (*Chem. Zentr.*, 1936, I, 1311).

2 : 4-Diaminobenzaldehyde



$C_7H_8ON_2$

MW, 136

Oxime : pale yellow cryst. from EtOH. M.p. 199-200°.

2 : 4-N-Tetra-Me : $C_{11}H_{16}ON_2$. MW, 192.

Yellowish cryst. M.p. 8°. B.p. 203°/14 mm. Very sol. EtOH, Et_2O , acids. Very spar. sol. H_2O . Becomes dark and resinous in air.

Picrate : cryst. from H_2O . M.p. 161-2°.

B, HgCl_2 : needles from H_2O . M.p. 197° decomp. Semicarbazone : cryst. from MeOH.

M.p. 215°. Hydrazone : yellow cryst. from EtOH.Aq. M.p. 212°.

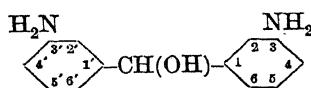
Sachs, Kempf, *Ber.*, 1902, 35, 1235.

Sachs, Appenzeller, *Ber.*, 1908, 41, 97.

Diaminobenzene.

See Phenylenediamine.

3 : 3'-Diaminobenzhydrol (3 : 3'-Diaminodiphenylcarbinol)



$C_{13}H_{14}ON_2$

MW, 214

Cryst. from C_6H_6 . M.p. 128-5°.

Acetyl deriv. : m.p. 220°.

Montagne, *Ber.*, 1915, 48, 1037; *Ber.*, 1916, 49, 2267.

Staedel, *Ann.*, 1883, 218, 351.

3 : 4'-Diaminobenzhydrol (3 : 4'-Diaminodiphenylcarbinol).

Cryst. from dil. EtOH. M.p. 123-8°.

Montagne, *Ber.*, 1916, 49, 2271.

4 : 4'-Diaminobenzhydrol (4 : 4'-Diaminodiphenylcarbinol).

M.p. 98°. Sol. EtOH, MeOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, ligroin.

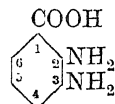
Watson, Meek, *J. Chem. Soc.*, 1915, 107, 1576.

Kalle, D.R.P. 119,461, (*Chem. Zentr.*, 1901, I, 866).

Diaminobenzidine.

See Tetra-aminodiphenyl.

2 : 3-Diaminobenzoic Acid



$C_7H_8O_2N_2$ MW, 152

Needles. M.p. 190-1° decomp. Dist. \rightarrow *o*-phenylenediamine.

Schilling, *Ber.*, 1901, 34, 904.

2 : 4-Diaminobenzoic Acid.

M.p. about 140°. Unstable. Sol. EtOH, hot H_2O .

n-Butyl ester : $C_{11}H_{16}O_3N_2$. MW, 208. M.p. 90°. *B.HCl* : needles. Decomp. at 270°.

2 : 4-N-Diacetyl : needles. M.p. 261°.

Ullmann, Uzbachian, *Ber.*, 1903, 36, 1803.

2 : 5-Diaminobenzoic Acid.

Prisms from H_2O . Darkens at 200°. Spar. sol. H_2O , EtOH, Et_2O . Dist. \rightarrow *p*-phenylenediamine.

Et ester : $C_9H_{12}O_2N_2$. MW, 180. M.p. 51°.

5-N-Acetyl : m.p. 240° decomp.

2 : 5-N-Diacetyl : m.p. 262° decomp.

Merz, Weith, *Ber.*, 1882, 15, 2729.

3 : 4-Diaminobenzoic Acid.

Leaflets. M.p. 210-11° decomp. Sol. hot H_2O . Dist. \rightarrow *o*-phenylenediamine.

Me ester : $C_8H_{10}O_2N_2$. MW, 166. Needles from H_2O . M.p. 108-9°.

Et ester : needles from H_2O . M.p. 112-13°.

3 : 4-N-Diacetyl : m.p. 218° decomp.

Ullmann, Mauthner, *Ber.*, 1903, 36, 4032.

3 : 5-Diaminobenzoic Acid.

Needles + $1H_2O$. M.p. 228° (slow heat.), 240° (rapid heat.). Sol. EtOH, Et_2O , hot H_2O . *k* (acid) = 5×10^{-6} at 25°.

Et ester : m.p. 84°. *B.HCl* : m.p. 248°.

3 : 5-N-Diacetyl : m.p. 184°.

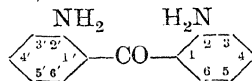
n-Butyl ester : $C_{11}H_{16}O_3N_2$. MW, 208. B.p. 255°. *B.HCl* : m.p. 253°.

Kailan, Irresberger, *Monatsh.*, 1930, 56, 407.

Merz, Weith, *Ber.*, 1882, 15, 2728.

Griess, *Ann.*, 1870, 154, 326.

2 : 2'-Diaminobenzophenone (oo'-Diaminodiphenyl ketone)



$C_{13}H_{12}ON_2$ MW, 212

Pale yellow leaflets from dil. EtOH. M.p. 132-3° (134-5°). Sol. EtOH.

2 : 2'-N-Diacetyl : m.p. 168° (154°).

Picrate : decomp. at 164°.

Staedel, *Ann.*, 1883, 218, 349.

2 : 3'-Diaminobenzophenone.

Yellow cryst. from dil. EtOH. M.p. 80°. Sol. EtOH.

2 : 3'-N-Diacetyl : m.p. 167°.

Staedel, *Ann.*, 1894, 283, 173.

2 : 4-Diaminobenzophenone.

Yellow cryst. from EtOH.Aq. M.p. 132°.

2 : 4-N-Dibenzoyl : powder from EtOH. M.p. 201°.

Tanasescu, Ramontiano, *Bull. soc. chim.*, 1933, 53, 918.

2 : 4'-Diaminobenzophenone.

Pale yellow needles from H_2O . M.p. 128-9°. Sol. EtOH.

2 : 4'-N-Diacetyl : m.p. 170°.

Benöhr, *J. prakt. Chem.*, 1902, 65, 310.

Staedel, *Ann.*, 1894, 283, 171.

3 : 3'-Diaminobenzophenone.

Yellow needles from EtOH. M.p. 173-4° (171°). B.p. 285°/11 mm. Sol. EtOH, Et_2O , hot H_2O . $NaHg \rightarrow$ 3 : 3'-diaminobenzhydrol.

3 : 3'-N-Diacetyl : m.p. 226-7°.

Oxime : m.p. 177-8°.

Baeyer, *Ann.*, 1907, 354, 193.

3 : 4'-Diaminobenzophenone.

Needles + $1H_2O$, m.p. 98-100° (rapid heat.). M.p. anhyd. 131-2° (125-6°). Sol. EtOH.

3 : 4'-N-Diacetyl : m.p. 218°.

Montagne, *Ber.*, 1916, 49, 2271.

Gattermann, Rüdts, *Ber.*, 1894, 27, 2294.

4 : 4'-Diaminobenzophenone.

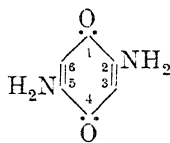
Needles from dil. EtOH. M.p. 244°. Sol. EtOH. Decomp. by boiling H_2O .

4 : 4'-N-Diacetyl : m.p. 237°.

Phenylhydrazone : m.p. 240-1°.

Rivier, Farine, *Helv. Chim. Acta*, 1929, 12, 867.

Dow, U.S.P. 1,946,058, (*Chem. Zentr.*, 1934, I, 3396).

2 : 5-Diamino-*p*-benzoquinone (2 : 5-*Di-aminoquinone*) $C_6H_6O_2N_2$

MW, 138

Cryst. with violet cast. Decomp. at 325–30°. Spar. sol. ord. org. solvents. Yellowish-red sol. in conc. H_2SO_4 .

2 : 5-*N*-*Diacetyl*: yellowish cryst. Darkens at 300° and part. sublimes without melting. Sol. hot AcOH.

Kehrmann, Betsch, *Ber.*, 1897, 30, 2100.

2 : 6 - Diamino - *p* - benzoquinone (2 : 6-*Diaminoquinone*).

2 : 6-*N*-*Diacetyl*: golden leaflets. M.p. 270° decomp. Insol. most ord. org. solvents. Sol. alkalis. Reddish-violet sol. in conc. H_2SO_4 .

2 : 6-*N*-*Dibenzoyl*: dark yellow needles. M.p. 232–3°.

Heller, *J. prakt. Chem.*, 1931, 129, 237.

Hepp, *Ann.*, 1882, 215, 352.

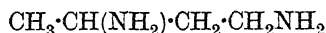
Diaminobiuret $C_2H_7O_2N_5$

MW, 133

Needles or prisms. M.p. 200° decomp. Sol. H_2O , hot AcOH. Spar. sol. EtOH, Et_2O . Reduces $NH_3 \cdot AgNO_3$.

Diels, *Ber.*, 1903, 36, 744.

Allen, Bell, *Organic Syntheses*, 1944, XXIV, 58.

1 : 3-Diaminobutane $C_4H_{12}N_2$

MW, 88

B.p. 141–2°. Sol. H_2O . Spar. sol. EtOH.

B,2*HCl*: needles. M.p. 171–2°.

Picrate: m.p. 240–5° decomp.

Johnson, Joyce, *J. Am. Chem. Soc.*, 1916, 38, 1858, 1860.

1 : 4-Diaminobutane.

See Putrescine.

1 : 2-Diaminobutyric Acid $C_4H_{10}O_2N_2$

MW, 118

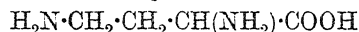
Very hygroscopic solid with glue-like odour.

Picrate: yellow, hygroscopic needles. Decomp. about 90°.

Phenylurethane: cryst. from EtOH.Aq. M.p. 238°.

Kolbe, *J. prakt. Chem.*, 1882, 25, 396.

Neuberg, *Chem. Zentr.*, 1906, II, 765.

1 : 3-Diaminobutyric Acid $C_4H_{10}O_2N_2$

MW, 118

dl.

Very hygroscopic cryst. Sol. H_2O . Spar. sol. MeOH, EtOH. Prac. insol. Et_2O , ligroin.

B,2*HCl*: cryst. from AcOH-*HCl*. M.p. 206° decomp.

Oxalate: $2C_4H_{10}O_2N_2, C_2H_2O_4, 2H_2O$. Plates. M.p. anhyd. about 219° decomp.

1 : 3-*N*-*Dibenzoyl*: needles from EtOH. M.p. 200–1° corr. Spar. sol. H_2O , Et_2O .

Et ester: *B*,2*HCl*: cryst. from EtOH- C_6H_6 . M.p. 173–5° decomp.

d.

1 : 3-*N*-*Dibenzoyl*: needles from EtOH. M.p. 149°. Spar. sol. H_2O . Insol. ligroin. $[\alpha]_D^{15} - 16.36^\circ$ in MeOH.

Oxalate: $2C_4H_{10}O_2N_2, C_2H_2O_4$. Plates from H_2O . Decomp. at 205°.

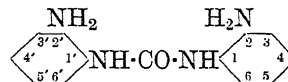
Karrer, Escher, Widmer, *Helv. Chim. Acta*, 1926, 9, 310.

Fischer, *Ber.*, 1901, 34, 2904.

Akabori, Mumano, *Bull. Chem. Soc. Japan*, 1936, 11, 214.

Diaminocaproic Acid.

See Lysine.

2 : 2'-Diaminocarbanilide (oo'-*Diamino-sym.-diphenylurea*) $C_{13}H_{14}ON_4$

MW, 242

Needles. M.p. 243–5° with sublimation.

Vittenet, *Bull. soc. chim.*, 1899, 21, 157.

3 : 3'-Diaminocarbanilide.

Needles. M.p. 208–9°.

Vittenet, *Bull. soc. chim.*, 1899, 21, 157.

4 : 4'-Diaminocarbanilide.

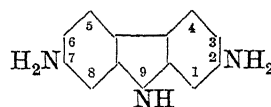
Silky needles or leaflets. Sublimes without melting. Sol. EtOH, hot H_2O .

4 : 4'-*N*-*Diacetyl*: m.p. 344°.

I.G., B.P. 254,667, (*Chem. Abstracts*, 1927, 21, 2478).

Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 793.

Patel, Guha, *J. Indian Chem. Soc.*, 1934, 11, 87.

2 : 7-Diaminocarbazole $C_{12}H_{11}N_3$

MW, 197

Plates from xylene. M.p. 260°.

2 : 7-*N*-*Diacetyl*: m.p. 320° decomp.

2 : 7-N-Dibenzylidene : m.p. 290°.

Täuber, *Ber.*, 1890, 23, 3267.

Manjunath, *Quart. J. Indian Chem. Soc.*, 1927, 4, 271, (*Chem. Zentr.*, 1927, II, 1699).

3 : 4-(or 2 : 3)-Diaminocarbazole.

Cryst. Decomp. on heating. Oxidises rapidly in air. With benzil gives a quinoxaline, m.p. 273°.

Kehrmann, Zweifel, *Helv. Chim. Acta*, 1928, 11, 1213.

3 : 6-Diaminocarbazole.

Leaflets from EtOH. Darkens at 260°. Sol. EtOH, C₆H₆, toluene. Spar. sol. hot H₂O. Insol. Et₂O.

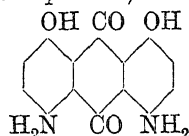
Täuber, *Ber.*, 1892, 25, 131.

Cassella, D.R.P. 291,894, (*Chem. Zentr.*, 1916, I, 1288).

Diaminocatechol.

See Dihydroxyphenylenediamine.

4 : 5-Diaminochrysazin (1 : 8-Dihydroxy-4 : 5-diaminoanthraquinone)



C₁₄H₁₀O₄N₂ MW, 270

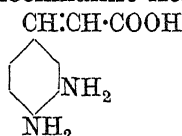
Blue needles from fluor. sol. in xylene. Spar. sol. alkalis with blue col. Orange-yellow sol. in H₂SO₄.

4 : 5-N-Diacetyl : green needles from toluene.

Brass, Albrecht, *Ber.*, 1928, 61, 991.

du Pont, U.S.P. 1,957,936 (*Chem. Zentr.*, 1934, II, 3184).

3 : 4-Diaminocinnamic Acid

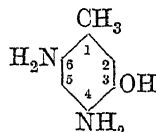


C₉H₁₀O₂N₂ MW, 178

Brownish-yellow needles. M.p. 167-8° decomp. Sol. EtOH, hot H₂O. Insol. Et₂O, C₆H₆, ligroin.

Gabriel, Herzberg, *Ber.*, 1883, 16, 2042.

4 : 6-Diamino-m-cresol (5-Hydroxy-2 : 4-tolylenediamine)



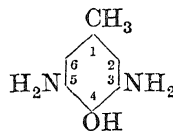
C₇H₁₀ON₂ MW, 138

Needles. M.p. 170° decomp. Unstable.

Gattermann, *Ber.*, 1893, 26, 1849.

Bayer, D.R.P. 75,260, (*Ber.*, 1894, 27R, 821).

3 : 5-Diamino-p-cresol (4-Hydroxy-3 : 5-tolylenediamine)



C₇H₁₀ON₂ MW, 138

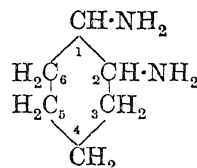
M.p. 146°.

3 : 5-N-Diacetyl : cryst. from dil. EtOH. M.p. 225-7°.

3 : 4 : 5-Triacetyl : needles from EtOH. M.p. 228°.

Fromm, Ebert, *J. prakt. Chem.*, 1924, 108, 83.

1 : 2-Diaminocyclohexane (Hexahydro-o-phenylenediamine)



C₆H₁₄N₂ MW, 114

B.p. 183-5°/720 mm. Misc. with H₂O. Absorbs CO₂.

B₂HCl : m.p. above 280°.

B₂HBr : m.p. 209-14°.

1 : 2-N-Diacetyl : m.p. 260-1°. Sublimes.

Dipicrate : yellow needles from H₂O. Blackens at 210-15°.

Einhorn, Bull, *Ann.*, 1897, 295, 211.

1 : 3-Diaminocyclohexane (Hexahydro-m-phenylenediamine).

Cis-

B.p. 198°. Misc. with H₂O.

Picrate : cryst. from EtOH.Aq. M.p. 265°.

Trans-

B.p. 202-4°.

Picrate : cryst. from EtOH.Aq. M.p. 254° decomp.

Skita, Rössler, *Ber.*, 1939, 72, 461.

Merling, *Ann.*, 1894, 278, 36.

1 : 4-Diaminocyclohexane (Hexahydro-p-phenylenediamine).

Mixture of cis- and trans-.

B.p. 181°.

Trans-

M.p. 72-3°. B.p. 87-8°/18 mm.

Skita, Berendt, *Ber.*, 1919, 52, 1534.

Curtius, *J. prakt. Chem.*, 1915, 91, 34.

Baeyer, Noyes, *Ber.*, 1889, 22, 2171.

1 : 10-Diaminodecane (Decamethylenediamine)



C₁₀H₂₄

MW, 144

M.p. 61.5° (60°). B.p. 140°/12 mm.

Picrate : m.p. 134°.

Slotta, Tschesche, *Ber.*, 1929, 62, 1405.

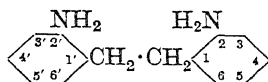
Phookan, Krafft, *Ber.*, 1892, 25, 2253.

Brown, Jones, *J. Chem. Soc.*, 1946, 781.

α : β -Diaminodibenzyl.

See Stilbenediamine.

2 : 2'-Diaminodibenzyl (oo'-Diamino-sym.-diphenylethane)



$C_{14}H_{16}N_2$ MW, 212

Needles from H_2O . M.p. 68°. Sol. ord. org. solvents. Spar. sol. H_2O .

2 : 2'-N-Diacetyl : needles. M.p. 249-50°.

2 : 2'-N-Dibenzoyl : m.p. 255°.

Picrate : m.p. 225-30° decomp.

Busch, Weiss, *Ber.*, 1900, 33, 2709.

3 : 4'-Diaminodibenzyl.

Plates from EtOH.Aq. M.p. 73-5°. Sol. EtOH, Et₂O, C₆H₆, Me₂CO.

3 : 4'-N-Diacetyl : m.p. 177°.

Harrison, *J. Chem. Soc.*, 1926, 1236.

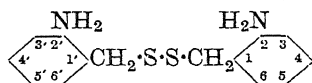
4 : 4'-Diaminodibenzyl.

M.p. 135-6° (132°). Sol. EtOH. Mod. sol. hot H_2O . Sublimes.

Kaufer, Borel, *Ber.*, 1907, 40, 3255.

Stelling, Fittig, *Ann.*, 1866, 137, 262.

2 : 2'-Diaminodibenzyl disulphide



$C_{14}H_{16}N_2S_2$ MW, 276

Cryst. from ligroin-AcOEt. M.p. 90-1°.

2 : 2'-N-Diacetyl : m.p. 202-5°.

2 : 2'-N-Dipropionyl : m.p. 190-1°.

Gabriel, Posner, *Ber.*, 1895, 28, 1026.

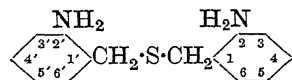
4 : 4'-Diaminodibenzyl disulphide.

Cryst. from EtOH. M.p. 96-8°.

Acetyl : m.p. 173-4°.

Thiele, Dimroth, *Ann.*, 1899, 305, 119.

2 : 2'-Diaminodibenzyl sulphide



$C_{14}H_{16}N_2S$ MW, 244

Needles or leaflets. M.p. 81°. Sol. EtOH, Et₂O.

2 : 2'-N-Diformyl : m.p. 163°.

2 : 2'-N-Diacetyl : needles. M.p. 209°.

Picrate : m.p. 203-4° decomp.

Dimroth, Thiele, *Ber.*, 1895, 28, 915.

Gabriel, *Ber.*, 1894, 27, 3521.

4 : 4'-Diaminodibenzyl sulphide.

Leaflets. M.p. 104-5°.

4 : 4'-N-Diacetyl : needles. M.p. 188°.

4 : 4'-N-Dibenzoyl : m.p. 224°.

Dimroth, Thiele, *Ber.*, 1895, 28, 915.

Fischer, Fischer, *ibid.*, 880.

Diaminodicarboxydiethyl sulphide.

See Lanthionine.

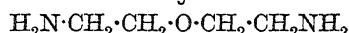
4 : 4'-Diaminodicyclohexyl.

See Perhydrobenzidine.

Diaminodiethylamine.

See Diethylenetriamine.

2 : 2'-Diaminodiethyl Ether



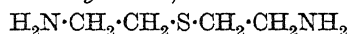
$C_4H_{12}ON_2$ MW, 104

B.p. 184°. Sol. H_2O . Strong base.

B,2HCl : m.p. 226-7°.

Gabriel, *Ber.*, 1905, 38, 3413.

2 : 2'-Diaminodiethyl sulphide (Thioethylamine, thiodiethylamine)



$C_4H_{12}N_2S$ MW, 120

B.p. 231-3°. Misc. with H_2O . Strong base.

B,2HCl : m.p. 131°.

Picrate : m.p. 212°.

Gabriel, *Ber.*, 1891, 24, 1114.

Diaminodimethylacetylene.

See 2-Butyne-1 : 4-diamine.

Diamino-N-dimethylaniline.

See under Triaminobenzene.

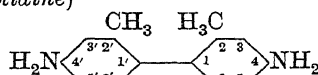
Diaminodimethylazobenzene.

See Diaminoazotoluene.

Diaminodimethylazoxybenzene.

See Diaminoazoxytoluene.

4 : 4'-Diamino-2 : 2'-dimethyldiphenyl (4 : 4'-Diamino-2 : 2'-ditolyl, pp'-diamino-oo'-ditolyl, m-tolidine)



$C_{14}H_{16}N_2$ MW, 212

Prisms from hot H_2O . M.p. 108-9°. Sol. EtOH, Et₂O.

4 : 4'-N-Diacetyl : m.p. 281° (274-5°).

4 : 4'-N-Dibenzylidene : m.p. 172-3°.

Picrate : m.p. 225°.

Schultz, Rohde, *Chem. Zentr.*, 1902, II, 1447.

Buchka, Schachtebeck, *Ber.*, 1889, 22, 838.

Dey, Govindachari, Rajagofalon, *Chem. Abstracts*, 1946, 40, 6347.

5 : 5'-Diamino-2 : 2'-dimethyldiphenyl (5 : 5'-Diamino-2 : 2'-ditolyl).

M.p. 96-8°. B.p. 225-8°/13 mm.

Pummerer, Puttfarcken, Schopfloch, *Ber.*, 1925, 58, 1816.

6 : 6'-Diamino-2 : 2'-dimethyldiphenyl
(6 : 6'-Diamino-2 : 2'-ditolyl).

dl.

Needles from EtOH. M.p. 136°. B.p. 184°/7 mm.

6 : 6'-N-Diacetyl: needles. M.p. 205°.

6 : 6'-N-Dibenzoyl: m.p. 182.5°.

6 : 6'-N-Di-p-toluenesulphonyl: leaflets from AcOH. M.p. 162-3°.

l.

M.p. 156°.

6-N-Acetyl: b.p. 194°/4 mm.

6 : 6'-N-Diacetyl: m.p. 205°.

6 : 6'-N-Dibenzoyl: m.p. 172-3°. [α]_D -264.4° in EtOH.

d.

M.p. 148-50°.

Sako, *Chem. Abstracts*, 1932, 26, 3246.

Kenner, Stubbings, *J. Chem. Soc.*, 1921, 119, 600.

4 : 4'-Diamino-2 : 3'-dimethyldiphenyl
(4 : 4'-Diamino-2 : 3'-ditolyl, pp'-diamino-om'-ditolyl).

B.p. 243-6°/12 mm.

4 : 4'-N-Diacetyl: plates. M.p. 253-4°.

N-Tetra-acetyl: leaflets. M.p. 191-2°.

4 : 4'-N-Dibenzoyl: m.p. 245-6°.

Schultz, *Ber.*, 1884, 17, 471.

Mayer, Freitag, *Ber.*, 1921, 54, 351.

4 : 4'-Diamino-3 : 3'-dimethyldiphenyl
(4 : 4'-Diamino-3 : 3'-ditolyl, pp'-diamino-mm'-ditolyl, o-tolidine).

Pearly leaflets. M.p. 129° (126.5°). Sol. EtOH, Et₂O. Spar. sol. H₂O. 1 part of gold in 10 million parts of H₂O can be detected by a sol. of o-tolidine in 10% HCl (yellow coloration).

4 : 4'-N-Diformyl: m.p. 254°.

Mono-N-acetyl: cryst. + 1H₂O. M.p. 103°.

4 : 4'-N-Diacetyl: m.p. 315°.

N-Tetra-acetyl: m.p. 211°.

Mono-N-benzoyl: m.p. 198-200°.

4 : 4'-N-Dibenzoyl: m.p. 265°.

Schultz, Rohde, Vicari, *Ber.*, 1904, 37, 1401.

Schultz, *Ber.*, 1884, 17, 467.

2 : 2'-Diamino-4 : 4'-dimethyldiphenyl
(2 : 2'-Diamino-4 : 4'-ditolyl, oo'-diamino-pp'-ditolyl).

Needles from EtOH. M.p. 120°. Sol. EtOH, Et₂O, C₆H₆. Very spar. sol. H₂O. Insol. ligroin.

2 : 2'-N-Diformyl: m.p. 185°.

2 : 2'-N-Diacetyl: m.p. 189°.

2 : 2'-N-Dibenzoyl: m.p. 170°.

Niemietowski, *Ber.*, 1901, 34, 3332.

Mascarelli, Pirani, *Gazz. chim. ital.*, 1911, 41, i, 71.

4 : 4'-Diamino-2 : 6-dimethyldiphenyl.
Needles from C₆H₆-pet. ether. M.p. 124°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether. Insol. H₂O.

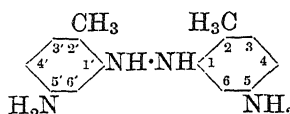
4 : 4'-N-Dibenzylidene: yellow needles. M.p. 199-200°.

Jacobson, *Ann.*, 1922, 427, 212.

Diaminodimethyldiphenyl sulphide.

See Diaminoditolyl sulphide.

5 : 5'-Diamino-2 : 2'-dimethylhydrazobenzene (Hydrazotoluidine, 5 : 5'-diamino-o-hydrazotoluene)



C₁₄H₁₈N₄

MW, 242

Plates. M.p. 180° (178°). Spar. sol. hot EtOH. Insol. H₂O. Mild ox. → 5 : 5'-diamino-o-azotoluene.

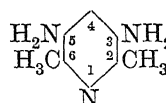
Elbs, Schwarz, *J. prakt. Chem.*, 1901, 63, 567.

3 : 3'-Diamino-4 : 4'-dimethylhydrazobenzene.

Pale yellow needles from H₂O. Decomp. on heating without melting. Spar. sol. H₂O, EtOH.

Graeff, *Ann.*, 1885, 229, 351.

3 : 5-Diamino-2 : 6-dimethylpyridine
(ββ'-Diamino-αα'-lutidine)



C₇H₁₁N₃

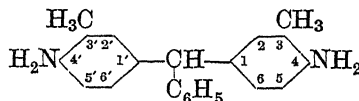
MW, 137

Prisms from C₆H₆. M.p. 170°. Sol. H₂O. Mod. sol. hot C₆H₆.

3 : 5-N-Dicarbethoxyl: m.p. 157°.

Mohr, *Ber.*, 1900, 33, 1118.

4 : 4'-Diamino-3 : 3'-dimethyltriphenylmethane (Phenyl-[4 : 4'-diamino-mm'-ditolyl]-methane)



C₂₁H₂₂N₂

MW, 302

M.p. 121-2°. Sol. EtOH, C₆H₆. Spar. sol. Et₂O, ligroin. Insol. H₂O.

4 : 4'-N-Diacetyl: m.p. 265-6°.

N-Tetra-acetyl: m.p. 165-6°.

Ullmann, *J. prakt. Chem.*, 1887, 36, 252.
Vongerichten, Weiling, *Chem. Zentr.*, 1904, II, 226.

6 : 6'-Diamino-3 : 3'-dimethyltriphenyl-methane (*Phenyl*-[6 : 6'-diamino-mm'-ditolyl]-methane).

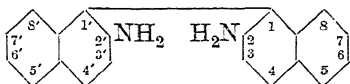
Needles from EtOH. M.p. 185-6°. B.p. 427-33° part. decomp. Cryst. + 1C₆H₆ from C₆H₆. Sol. CHCl₃, hot C₆H₆. Mod. sol. Et₂O, hot EtOH. Prac. insol. ligroin.

6 : 6'-N-Diacetyl : leaflets. M.p. 217-18°.

6 : 6'-N-Dibenzoyl : prisms. M.p. 196°.

Ullmann, *J. prakt. Chem.*, 1887, 36, 255.

2 : 2'-Diamino-1 : 1'-dinaphthyl



C₂₀H₁₆N₂ MW, 284

dl.

Cryst. from EtOH. M.p. 193°. Sol. C₆H₆, hot EtOH. Insol. pet. ether.

2 : 2'-N-Diacetyl : m.p. 235-6°.

2 : 2'-N-Dibenzoyl : m.p. 235°.

Picrate : m.p. 185°.

d.

M.p. 242.5-253° corr. [α]_D²⁰ + 149.5° in Py, [α]_D¹⁹ - 46° in 2N/HCl.

l.

M.p. 243°. [α]_D¹⁸ + 46.8° in 2N/HCl.

Kuhn, Goldfinger, *Ann.*, 1929, 470, 190.

Cumming, Howie, *J. Chem. Soc.*, 1932, 531.

3 : 3'-Diamino-1 : 1'-dinaphthyl.

Plates from C₆H₆. M.p. 270°. Sol. EtOH.

Cumming, Howie, *J. Chem. Soc.*, 1932, 530.

4 : 4'-Diamino-1 : 1'-dinaphthyl (*Naphthidine*).

Plates from EtOH. M.p. 202°. Sol. ord. org. solvents.

4 : 4'-N-Diacetyl : needles from PhNO₂. M.p. 363-4°.

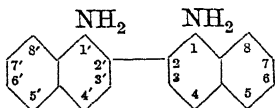
4 : 4'-N-Dibenzoyl : plates from PhNO₂. M.p. 319-20°.

Picrate : yellow plates from C₆H₆. M.p. 146-7°.

Cumming, Howie, *J. Chem. Soc.*, 1932, 530.

Cohen, Oesper, *Chem. Zentr.*, 1937, I, 665.

1 : 1'-Diamino-2 : 2'-dinaphthyl (*Dinaphthylene*)



C₂₀H₁₆N₂ MW, 284

Plates from C₆H₆. M.p. 281°. Sol. hot C₆H₆. Spar. sol. EtOH.

1 : 1'-N-Diacetyl : plates from EtOH. M.p. 229-30°.

Dict. of Org. Comp.—II.

1 : 1'-N-Dibenzoyl : plates from PhNO₂. M.p. 277-8°.

Cumming, Howie, *J. Chem. Soc.*, 1932, 531.

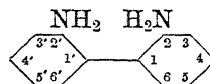
Diaminodinaphthyl disulphide.

See Dithiodinaphthylamine.

pp'-Diaminodiphenoxyethane.

See under Ethylene Glycol.

2 : 2'-Diaminodiphenyl



C₁₂H₁₂N₂ MW, 184

Needles from EtOH. M.p. 81°. B.p. 162°/4 mm. Heated with 15-20% HCl or 25% H₂SO₄ at 200° → carbazole. HNO₂ → diphenylene oxide.

2 : 2'-N-Diformyl : m.p. 137°.

2-N-Acetyl : m.p. 89-90°.

2 : 2'-N-Diacetyl : m.p. 161°.

2-N-Benzoyl : m.p. 158-60°.

2 : 2'-N-Dibenzoyl : m.p. 190-1°.

Sako, *Chem. Abstracts*, 1932, 26, 3246.

Täuber, *Ber.*, 1891, 24, 198.

Le Fèvre, *J. Chem. Soc.*, 1929, 735.

2 : 3'-Diaminodiphenyl.

B.p. above 360°. Sol. EtOH with blue fluor.

Strasser, Schultz, *Ann.*, 1881, 210, 194.

2 : 4'-Diaminodiphenyl (*Diphenylene*).

Needles from EtOH.Aq. M.p. 45°. B.p. 363°. Sol. EtOH, Et₂O. Prac. insol. H₂O. Heat of comb. C₁₂ 1561.6 Cal., C₁₀ 1562.7 Cal. Heat with lime → 2-aminocarbazole. The hydrochloride and sulphate are sol. H₂O.

2 : 4'-N-Diacetyl : m.p. 202°.

2 : 4'-N-Dibenzoyl : m.p. 276-8°.

Schultz, Schmidt, Strasser, *Ann.*, 1881, 207, 354.

3 : 3'-Diaminodiphenyl.

M.p. 93.5°. Sol. Et₂O. Spar. sol. H₂O.

3 : 3'-N-Diacetyl : m.p. 257-8°.

B₂H₂PtCl₆ : m.p. above 270°.

Emde, *Chem. Zentr.*, 1915, II, 278.

Brunner, Witt, *Ber.*, 1887, 20, 1028.

3 : 4-Diaminodiphenyl (4-Phenyl-o-phenylenediamine).

Cryst. from EtOH. M.p. 103°.

3-N-Acetyl : m.p. 211°.

4-N-Acetyl : m.p. 155°.

3 : 4-N-Diacetyl : m.p. 163°.

3-N-Benzoyl : m.p. 186°.

4-N-Benzoyl : m.p. 221°.

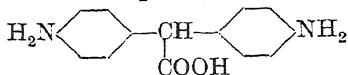
3 : 4-N-Dibenzoyl : m.p. 248°.

Banús, Tomás, *Chem. Abstracts*, 1922, 16, 2136.

Bell, Kenyon, *J. Chem. Soc.*, 1926, 2708.

4 : 4'-Diaminodiphenyl.

See Benzidine.

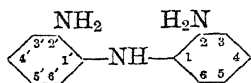
4 : 4'-Diaminodiphenylacetic Acid $C_{13}H_{14}O_2N_2$

MW, 242

Cryst. from toluene. M.p. 195°. Sol. EtOH, Me₂CO. Spar. sol. H₂O, CHCl₃, toluene.

4 : 4'-N-Diacetyl : m.p. 231°.

4 : 4'-N-Dibenzoyl : decomp. at 256°.

Heller, *Ann.*, 1910, 375, 282.**2 : 2'-Diaminodiphenylamine** $C_{12}H_{13}N_3$

MW, 199

Prisms from pet. ether. M.p. 101°. Darkens on exposure to air.

2 : 2'-N-Diacetyl : plates from AcOH.Aq. M.p. 199°.

Tomlinson, *J. Chem. Soc.*, 1939, 160.**2 : 3'-Diaminodiphenylamine.**

Oil which slowly solidifies. M.p. 73°. Becomes discoloured in air.

Hydrochloride : cryst. from EtOH-C₆H₆. Chars without melting at about 200°.Albert, Linnell, *J. Chem. Soc.*, 1936, 1616.**2 : 4-Diaminodiphenylamine.**

Needles. M.p. 130°.

2 : 4'-N-Diacetyl : m.p. 188°.

2-N-Benzoyl : m.p. 213-14°.

Nietzki, Almenrāda, *Ber.*, 1895, 28, 2970.**2 : 4'-Diaminodiphenylamine.**

2 : 4'-N-Diacetyl : m.p. 203°.

Kehrmann, Ott, *Ber.*, 1901, 34, 3093.**2 : 6-Diaminodiphenylamine.**

Prisms. M.p. 178°. Turns brown in air.

Borsche, Rantscheff, *Ann.*, 1911, 379, 170.**3 : 3'-Diaminodiphenylamine.**Needles from H₂O. M.p. 94.5-95°. Sol. EtOH. Turns pink on exposure to air. Violet fluor. in U.V.

3 : 3'-N-Diacetyl : needles from 35% EtOH. M.p. 211° corr.

Albert, Linnell, *J. Chem. Soc.*, 1936, 90.**3 : 4'-Diaminodiphenylamine.**

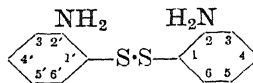
Cryst. of low m.p. Turns pink in air.

3 : 4'-N-Diacetyl : needles from 30% EtOH. M.p. 186° corr.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1616.**4 : 4'-Diaminodiphenylamine.**Leaflets from H₂O. M.p. 158°.4-N-Di-Me : needles. M.p. 116°. Sol. hot H₂O.

4-N-Acetyl : leaflets. M.p. 178°.

4 : 4'-N-Diacetyl : needles. M.p. 239°.

Nietzki, *Ber.*, 1883, 16, 474.**2 : 2'-Diaminodiphenyl disulphide (Intramaine)** $C_{12}H_{12}N_2S_2$

MW, 248

Leaflets or needles from EtOH.Aq. M.p. 93° (89-91°). Sol. hot EtOH. Insol. H₂O.

2 : 2'-N-Diacetyl : m.p. 156°.

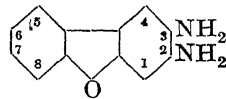
Dipicrate : m.p. 141°.Guha, Ghosh, *J. Indian Inst. Sci.*, 1929, 12A, 31, (*Chem. Abstracts*, 1929, 23, 3446).Sullivan, Hess, *Chem. Abstracts*, 1929, 23, 4445.Hodgson, *Chem. Abstracts*, 1925, 19, 401.Gardner, B.P. 558,887, (*Chem. Abstracts*, 1946, 40, 7237).**3 : 3'-Diaminodiphenyl disulphide.**Needles from EtOH.Aq. M.p. 59-60° (62°). Sol. EtOH, Et₂O, C₆H₆. Insol. ligroin.

3 : 3'-N-Diacetyl : needles from EtOH.Aq. M.p. 213°.

Zincke, Müller, *Ber.*, 1913, 46, 784.Fichter, Schonlan, *Ber.*, 1915, 48, 1151.**4 : 4'-Diaminodiphenyl disulphide (Dithioaniline).**Yellow needles or prisms from EtOH.Aq. M.p. 85° (106°). Sol. EtOH, Et₂O, CHCl₃.Spar. sol. C₆H₆, CS₂. Prac. insol. dil. H₂SO₄.

4 : 4'-N-Diacetyl : dithioacetanilide. M.p. 205°.

4 : 4'-N-Dicarbethoxyl : m.p. 136-7°.

Shukla, *J. Indian Inst. Sci.*, 1927, 10A, 38, (*Chem. Zentr.*, 1927, II, 2748).Lefevre, Degrez, *Compt. rend.*, 1934, 198, 1791.Berti, *Chem. Abstracts*, 1945, 39, 4062.**2 : 3-Diaminodiphenylene oxide (2 : 3-Diaminodibenzfuran)** $C_{12}H_{10}ON_2$

MW, 198

Leaflets from EtOH or C₆H₆. M.p. 166°. Turns brown in air.Borsche, Schacke, *Ber.*, 1923, 56, 2504.Gilman, Brown, Bywater, Kirkpatrick, *J. Am. Chem. Soc.*, 1934, 56, 2475.Martin, *Chem. Abstracts*, 1947, 41, 953.**2 : 6-Diaminodiphenylene oxide.**Plates from EtOH. M.p. 152°. Spar. sol. hot H₂O. FeCl₃ → deep blue col.

2 : 6-N-Diacetyl: plates from EtOH. Decomp. about 290°.

Cullinane, *J. Chem. Soc.*, 1932, 2366.

Gilman, Brown, Bywater, Kirkpatrick, *J. Am. Chem. Soc.*, 1934, 56, 2477.

2 : 7-Diaminodiphenylene oxide.

Needles from H₂O. M.p. 150-2°.

2 : 7-N-Diacetyl: plates from EtOH. M.p. 322°.

Bayer, B.P. 7802/1889; D.R.P. 48,709.

Cullinane, *J. Chem. Soc.*, 1932, 2367.

3 : 6-Diaminodiphenylene oxide.

M.p. 213°.

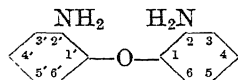
3 : 6-N-Diacetyl: m.p. 258°.

Borsche, Schacke, *Ber.*, 1923, 56, 2506.

Diaminodiphenylethane.

See Diaminodibenzyl and Stilbenediamine.

2 : 2'-Diaminodiphenyl Ether



C₁₂H₁₂O_{N₂} MW, 200

Needles from hot H₂O. M.p. 60°. Sol. EtOH, Et₂O, C₆H₆.

Haeussermann, Bauer, *Ber.*, 1897, 30, 738.

2 : 4'-Diaminodiphenyl Ether.

M.p. 78-80°.

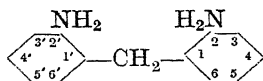
Haeussermann, Bauer, *Ber.*, 1896, 29, 2083.

4 : 4'-Diaminodiphenyl Ether.

Cryst. from EtOH. M.p. 186-7°.

Haeussermann, Teichmann, *Ber.*, 1896, 29, 1449.

2 : 2'-Diaminodiphenylmethane



C₁₃H₁₄N₂ MW, 198

Needles from EtOH.Aq. M.p. 160°. Sol. EtOH. Spar. sol. H₂O.

Bertram, *J. prakt. Chem.*, 1902, 65, 333.

2 : 4'-Diaminodiphenylmethane.

Leaflets from C₆H₆. M.p. 88-9°. B.p. 222°/9 mm. Sol. EtOH, Et₂O.

2 : 4'-N-Diacetyl: m.p. 224-5° (209-10°).

King, *J. Chem. Soc.*, 1920, 117, 991.

3 : 3'-Diaminodiphenylmethane.

M.p. 53-4°.

3 : 3'-N-Diacetyl: leaflets. M.p. 193°.

Schöpf, *Ber.*, 1894, 27, 2322.

Scholl, *Monatsh.*, 1918, 39, 236.

3 : 4'-Diaminodiphenylmethane.

Leaflets from EtOH.Aq. M.p. 89-90°.

Gattermann, Rüd, *Ber.*, 1894, 27, 2294.

4 : 4'-Diaminodiphenylmethane.

Pearly leaflets from C₆H₆. M.p. 93°. B.p. 232°/9 mm. Sol. EtOH, C₆H₆.

4 : 4'-N-Diacetyl: m.p. 236-7°.

4 : 4'-N-Dibenzylidene: leaflets. M.p. 130°.

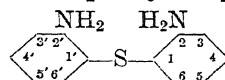
King, *J. Chem. Soc.*, 1920, 117, 992.

Scanlan, *J. Am. Chem. Soc.*, 1935, 57, 890.

Rivier, Farine, *Helv. Chim. Acta*, 1929, 12, 865.

Salellas, *Chem. Abstracts*, 1941, 35, 7389.

2 : 2'-Diaminodiphenyl sulphide



C₁₂H₁₂N₂S MW, 216

Needles. M.p. 85-6°. Sol. EtOH, Et₂O.

2 : 2'-N-Diacetyl: m.p. 160°.

2 : 2'-N-Dibenzoyl: m.p. 162-3°.

Hodgson, Rosenberg, *J. Soc. Dyers Colourists*, 1930, 46, 268.

Raffo, Balduzzi, *Gazz. chim. ital.*, 1917, 47, i, 71.

2 : 4'-Diaminodiphenyl sulphide.

Prisms from EtOH.Aq. M.p. 62.5°. Sol.

EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

2 : 4'-N-Diacetyl: m.p. 208°.

Hodgson, Rosenberg, *J. Soc. Dyers Colourists*, 1930, 46, 268.

4 : 4'-Diaminodiphenyl sulphide (Thioaniline).

Needles from hot H₂O. M.p. 108-9°. Sol. EtOH, Et₂O, hot C₆H₆. Spar. sol. H₂O.

4 : 4'-N-Diacetyl: needles. M.p. 216°.

Kehrmann, Bauer, *Ber.*, 1896, 29, 2364.

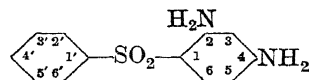
Shukla, *J. Indian. Inst. Sci.*, 1927, 10A, 35, (*Chem. Zentr.*, 1927, II, 2748).

Lefevre, Desgrez, *Compt. rend.*, 1934, 198, 1791.

van Arendonk, Kleiderer, *J. Am. Chem. Soc.*, 1940, 62, 3521.

Holt, U.S.P. 2,330,714, (*Chem. Abstracts*, 1944, 38, 1252).

2 : 4-Diaminodiphenyl sulphone



C₁₂H₁₂O₂N₂S MW, 248

Needles from EtOH. M.p. 188°. Spar. sol. C₆H₆. Insol. H₂O, Et₂O.

Ullmann, Pasdermajian, *Ber.*, 1901, 34, 1152.

2 : 4'-Diaminodiphenyl sulphone.

M.p. 117°.

Williams, U.S.P. 2,336,445, (*Chem. Abstracts*, 1944, 38, 2972).

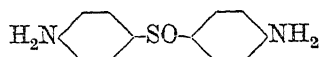
Roblin et al., *J. Am. Chem. Soc.*, 1941, 63, 1930.

3 : 3'-Diaminodiphenyl sulphone.Prisms. M.p. 168°. Sol. hot H₂O, hot EtOH.Lacroix, *Bull. soc. chim.*, 1924, 35, 1436.**4 : 4'-Diaminodiphenyl sulphone.**

Cryst. from MeOH. M.p. 175-6° (172-3°, 178°). Used in the treatment of leprosy and other bacterial infections.

Monoacetyl deriv.: m.p. 242-3° (232-3°).

4 : 4'-N-Diacetyl: m.p. 286° (275-8°, 281-3°).

Monopropionyl deriv.: m.p. 201-2°.*Monobutyl deriv.*: m.p. 192-3°.4 : 4'-N-Di-Me: C₁₄H₁₆O₂N₂S. MW, 276.Leaflets from *o*-dichlorobenzene. M.p. 179-80°.4 : 4'-N-Tetra-Me: C₁₆H₂₀O₂N₂S. MW, 304.Leaflets from *o*-dichlorobenzene. M.p. 259-60°.van Arendonk, Kleiderer, *J. Am. Chem. Soc.*, 1940, 62, 3521.Sugusawa, Sakurii, *J. Pharm. Soc. Japan*, 1940, 60, 22.Fromm, Wittmann, *Ber.*, 1908, 41, 2270.I.G., F.P. 829,926, (*Chem. Zentr.*, 1938, II, 3990).Zasosov, Galchenko, *J. Applied Chem. U.S.S.R.*, 1946, 19, 580, (*Chem. Abstracts*, 1947, 41, 2702).Burton, Davey, *J. Chem. Soc.*, 1946, 542.Heymann, Fieser, *J. Am. Chem. Soc.*, 1945, 67, 1979.Ferry *et al.*, *Organic Syntheses*, 1942, XXII, 31.Roblin *et al.*, *J. Am. Chem. Soc.*, 1941, 63, 1930.**4 : 4'-Diaminodiphenyl sulfoxide**C₁₂H₁₂ON₂S MW, 232Prisms from EtOH or H₂O. M.p. 175° decomp. Conc. H₂SO₄ → deep blue col.

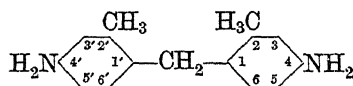
4 : 4'-N-Diacetyl: m.p. 278°.

Sugusawa, Sakurii, *J. Pharm. Soc. Japan*, 1940, 60, 22.Gazdar, Smiles, *J. Chem. Soc.*, 1908, 93, 1835.**Diaminodisulphidobutyric Acid.**

See Homocystine.

Diaminoditolyl.

See Diaminodimethyldiphenyl.

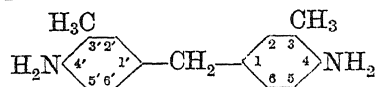
4 : 4'-Diaminodi-*o*-tolylmethane (*Di-p-amino-*o*-tolylmethane*, 4 : 4'-diamino-2 : 2'-dimethyldiphenylmethane)C₁₅H₁₈N₂ MW, 226Needles from H₂O. M.p. 123°.

4 : 4'-N-Diacetyl: cryst. from EtOH. M.p. 228°.

Picrate: cryst. from H₂O. M.p. 216.5° decomp.M.L.B., D.R.P. 252,916, (*Chem. Zentr.*, 1912, II, 1759).Wagner, *J. Am. Chem. Soc.*, 1934, 56, 1946.Salellas, *Chem. Abstracts*, 1941, 35, 7389.**5 : 5'-Diaminodi-*o*-tolylmethane** (5 : 5'-*Diamino-2 : 2'-dimethyldiphenylmethane*).

M.p. 98-100°.

5 : 5'-N-Diacetyl: m.p. 270°.

Weil, *Ber.*, 1894, 27, 3315.**4 : 4'-Diaminodi-*m*-tolylmethane** (*Di-p-amino-*m*-tolylmethane*, 4 : 4'-diamino-3 : 3'-dimethyldiphenylmethane)C₁₅H₁₈N₂ MW, 226Leaflets from H₂O or EtOH. M.p. 158-9° (153°).

4 : 4'-N-Diacetyl: m.p. 224°.

4 : 4'-N-Tetra-acetyl: m.p. 119°.

4 : 4'-N-Dibenzoyl: m.p. 214.5°.

Picrate: m.p. 192-3°.Eberhardt, Welter, *Ber.*, 1894, 27, 1811.Stebbins, *Ind. Eng. Chem.*, 1918, 10, 445.Scanlan, *J. Am. Chem. Soc.*, 1935, 57, 891.Salellas, *Chem. Abstracts*, 1941, 35, 7389.**4 : 6'-Diaminodi-*m*-tolylmethane** (4 : 6'-*Diamino-3 : 3'-dimethyldiphenylmethane*).

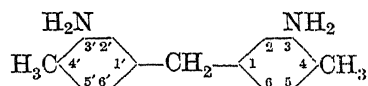
M.p. 89°.

M.L.B., D.R.P. 107,718, (*Chem. Zentr.*, 1900, I, 1111).**6 : 6'-Diaminodi-*m*-tolylmethane** (6 : 6'-*Diamino-3 : 3'-dimethyldiphenylmethane*).

Needles from EtOH. M.p. 96°.

6 : 6'-N-Diacetyl: cryst. from EtOH.Aq. M.p. 226-5°.

6 : 6'-N-Tetra-acetyl: cryst. from EtOH.Aq. M.p. 152°.

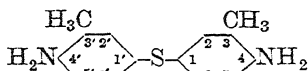
Picrate: needles from EtOH.Aq. M.p. 199°.Eberhardt, Welter, *Ber.*, 1894, 27, 1812.Wagner, *J. Am. Chem. Soc.*, 1934, 56, 1945.**3 : 3'-Diaminodi-*p*-tolylmethane** (3 : 3'-*Diamino-4 : 4'-dimethyldiphenylmethane*)C₁₅H₁₈N₂ MW, 226

M.p. 72-4°.

3 : 3'-N-Diacetyl: m.p. 264°.

Fischer, Gross, *J. prakt. Chem.*, 1910, 82, 236.S.C.I., D.R.P. 325,062, (*Chem. Zentr.*, 1920, IV, 506).

4 : 4'-Diaminodi-*m*-tolyl sulphide (4 : 4'-Diamino-3 : 3'-dimethyldiphenyl sulphide, thio-*o*-toluidine)



$C_{14}H_{16}N_2S$ MW, 244

Needles from 25% EtOH. M.p. 96°.

B,2HCl: plates from dil. HCl. M.p. 248-9°.

Diacetyl deriv.: micro-needles from EtOH. Aq. M.p. 220°.

Dibenzoyl deriv.: needles from MeOH. M.p. 233°.

Dipicrate: plates from H_2O . M.p. 186°.

Hodgson, France, *J. Chem. Soc.*, 1934, 1140.

6 : 6'-Diaminodi-*m*-tolyl sulphide (6 : 6'-Diamino-3 : 3'-dimethyldiphenyl sulphide, thio-*p*-toluidine).

Leaflets or needles from EtOH. M.p. 103-4°.

B,2HI: needles from EtOH. Decomp. at 100°.

Diacetyl deriv.: plates from EtOH. M.p. 165° corr.

Dibenzoyl deriv.: needles from EtOH. M.p. 185-6°.

Diurethane: cryst. from C_6H_6 -pet. ether. M.p. 113°.

Dipicrate: yellow needles from C_6H_6 . M.p. 179°.

Bogert, Mandelbaum, *J. Am. Chem. Soc.*, 1923, 45, 3045.

Truhlar, *Ber.*, 1887, 20, 664.

Shukla, *J. Indian Inst. Sci.*, 1927, 10, 33.

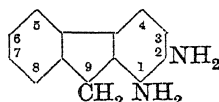
Diaminoethane.

See Ethylenediamine.

α : β -Diaminoethylbenzene.

See Phenylethylenediamine.

1 : 2-Diaminofluorene



$C_{13}H_{12}N_2$ MW, 196

M.p. 193°. Sol. EtOH, hot H_2O , hot C_6H_6 .

1 : 2-*N-Diacetyl*: m.p. 220° decomp.

Diels, Schill, Tolson, *Ber.*, 1902, 35, 3287.

1 : 9-Diaminofluorene.

Cryst. from Et_2O . M.p. about 120°. Turns brown in air. Sol. EtOH. Spar. sol. C_6H_6 ligroin.

1 : 9-*N-Diacetyl*: m.p. 293°.

1 : 9-*N-Dibenzoyl*: m.p. about 310°.

Picrate: m.p. 205° decomp.

Schmidt, Stützel, *Ann.*, 1909, 370, 36.

2 : 3-Diaminofluorene.

M.p. 198°.

Porai-Koshits, Nikiforova, *Chem. Abstracts*, 1941, 35, 625.

2 : 5-Diaminofluorene.

Pinkish needles from C_6H_6 . M.p. 175°. Sol. EtOH. $FeCl_3 \rightarrow$ olive-green col.

2 : 5-*N-Diacetyl*: prisms from MeOH. M.p. 289°.

Morgan, Thomason, *J. Chem. Soc.*, 1926, 2695.

2 : 7-Diaminofluorene.

Needles from H_2O . M.p. 164° (157°). Sol. EtOH. Mod. sol. hot H_2O .

2 : 7-*N-Diacetyl*: leaflets. Turns brown above 250°, decomp. at 274°.

Dziewoński, Schweiger, *Chem. Zentr.*, 1933, I, 2250.

Niño, Calvert, *Chem. Abstracts*, 1934, 28, 6651.

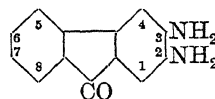
McClung et al., *Arch. Biochem.*, 1946, 9, 57, (*Chem. Abstracts*, 1946, 40, 3496).

2 : 9-Diaminofluorene.

M.p. 154-5°.

Cardini, *Chem. Abstracts*, 1944, 38, 1224.

2 : 3-Diaminofluorenone



$C_{13}H_{10}ON_2$ MW, 210

Reddish-brown needles. M.p. 185°.

Quinoxaline deriv.: reddish-yellow needles. M.p. 209°.

Eckert, Langecker, *J. prakt. Chem.*, 1928, 118, 263.

2 : 5-Diaminofluorenone.

Brownish-red needles. M.p. 260-1° (200°).

Courtot, *Ann. chim.*, 1930, 14, 80; *Compt. rend.*, 1943, 217, 453.

2 : 7-Diaminofluorenone.

Violet needles from EtOH. M.p. about 290°. Spar. sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 .

B,2HCl: m.p. above 360°.

2 : 7-*N-Diacetyl*: yellow needles from EtOH. M.p. 222°.

Oxime: reddish-brown cryst. from EtOH. M.p. 255°.

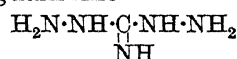
Phenylhydrazone: red needles from EtOH. M.p. 230° decomp.

p-Nitrophenylhydrazone: red needles from EtOH. M.p. 280°.

Dipicrate: bronze cryst. from H_2O . M.p. 230° decomp.

Schmidt, Retzlaff, Haid, *Ann.*, 1912, 390, 225.

Diaminoguanidine



CH_7N_5

MW, 89

Hydrochloride: cryst. M.p. 185° decomp. (174°). Sol. H₂O. Mod. sol. EtOH. Reduces NH₃·AgNO₃.

Hydrobromide: leaflets. M.p. 167° (163°) decomp. Sol. H₂O.

Nitrate: m.p. 143°.

B₂H₂PtCl₆: orange cryst. M.p. 173°.

Pellizzari, Gaiter, *Gazz. chim. ital.*, 1914, 44, ii, 75.

Scott, O'Sullivan, Reilly, *J. appl. Chem.*, 1952, 2, 184.

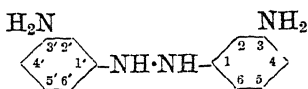
Diaminoheptane.

See Heptamethylenediamine.

Diaminohexane.

See Hexamethylenediamine.

3 : 3'-Diaminohydrazobenzene



C₁₂H₁₄N₄ MW, 214
M.p. 151°. Spar. sol. EtOH. Insol. H₂O, Et₂O.

Wülfing, D.R.P. 100,232, (*Chem. Zentr.*, 1899, I, 720).

4 : 4'-Diaminohydrazobenzene (*Diphenin*).

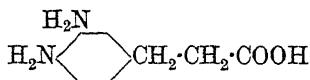
Yellow cryst. M.p. 145°. Sol. EtOH, Et₂O. Mod. sol. hot H₂O.

Gerhardt, Laurent, *Ann.*, 1850, 75, 74.

Diaminohydrazotoluene.

See Diaminodimethylhydrazobenzene.

3 : 4-Diaminohydrocinnamic Acid (β-[3 : 4-Diaminophenyl]-propionic acid)



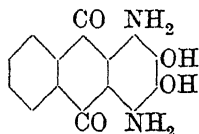
C₉H₁₂O₂N₂ MW, 180
Cryst. M.p. anhyd. 142-4°. Sol. hot EtOH. Spar. sol. Et₂O. Prac. insol. CHCl₃, CS₂, C₆H₆. Sol. alkalis and min. acids.

Gabriel, *Ber.*, 1882, 15, 2292.

Diaminohydroquinone.

See Dihydroxyphenylenediamine.

1 : 4-Diaminohystazarin (2 : 3-Dihydroxy-1 : 4-diaminoanthraquinone)



C₁₄H₁₀O₄N₂ MW, 270
Di-Me ether: C₁₆H₁₄O₄N₂. MW, 298. M.p. 183-5°. Red sol. in H₂SO₄.

Waldmann, Wider, *J. prakt. Chem.*, 1938, 150, 107.

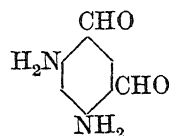
1 : 2-Diaminoisobutane.

See Isobutylenediamine.

1 : 4-Diaminoisopentane.

See 2-Methylputrescine.

4 : 6-Diaminoisophthalaldehyde



C₈H₈O₂N₂ MW, 164

Cryst. from H₂O. M.p. 208°. Sol. EtOH, CHCl₃, AcOH, AcOEt, Me₂CO, xylene. Mod. sol. Et₂O, CCl₄, C₆H₆, hot H₂O.

Dioxime: cryst. from H₂O. M.p. 219-20°.

Disemicarbazone: chars above 360°.

Mono-phenylhydrazone: yellow leaflets from EtOH. M.p. 275-6°.

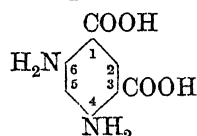
Di-phenylhydrazone: decomp. at 337°. Insol. EtOH.

N-Monoacetyl: cryst. from Py. M.p. 270-2°.

4 : 6-N-*Diacetyl*: needles from Py. M.p. 280-2° decomp. Spar. sol. EtOH, Me₂CO.

Ruggli, Hindermann, *Helv. Chim. Acta*, 1937, 20, 278.

4 : 6-Diaminoisophthalic Acid



C₈H₈O₄N₂ MW, 196

M.p. 235°. Alk. sols. fluoresce.

Hydrochloride: m.p. 229-30°.

Di-Me ester: C₁₀H₁₂O₄N₂. MW, 224. Red needles. M.p. 204-6°.

Hydrochloride: m.p. 235-5° decomp.

4 : 6-N-*Diacetyl*: m.p. 256°.

Mono-Et ester: C₁₀H₁₂O₄N₂. MW, 224.

Reddish-yellow prisms. M.p. 211-6°.

Di-Et ester: C₁₂H₁₆O₄N₂. MW, 252. Yellow needles. M.p. 171-5°.

Hydrochloride: m.p. 245-4°.

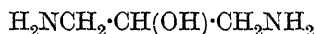
4 : 6-N-*Diacetyl*: m.p. 230-4°.

4 : 6-N-*Diformyl*: does not melt below 360°.

4 : 6-N-*Diacetyl*: m.p. 276° decomp.

Bogert, Knopff, *J. Am. Chem. Soc.*, 1909, 31, 844.

1 : 3-Diaminoisopropyl Alcohol (2-Hydroxytrimethylenediamine)



C₃H₁₀ON₂ MW, 90

M.p. 42°. B.p. 235°, 145-65°/20 mm.

B₂HCl: needles from EtOH.Aq. M.p. 184-5°. Sol. H₂O. Insol. EtOH, Et₂O.

B₂HBr: needles from EtOH.Aq. M.p. 200°.

B₂H₂PtCl₆: orange prisms. Decomp. at 240°.

Picrate : yellow needles from H_2O . M.p. 230° decomp.

Groggins, Sturton, *Ind. Eng. Chem.*, 1937, 29, 1354.

Girdler Corp., U.S.P. 2,065,113, (*Chem. Zentr.*, 1937, I, 3548); F.P. 746,206, (*Chem. Zentr.*, 1933, II, 2034).

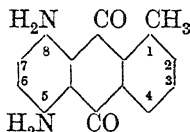
Gödeckemeyer, *Ber.*, 1888, 21, 2690.

Gabriel, *Ber.*, 1889, 22, 224.

Diaminolutidine.

See Diaminodimethylpyridine.

5 : 8-Diamino-1-methylantraquinone



$\text{C}_{15}\text{H}_{12}\text{O}_2\text{N}_2$ MW, 252

Violet needles. M.p. 205° . Sublimes.

5 : 8-N-Dibenzoyl : red needles from PhNO_2 . M.p. 243° .

Mayer, Stark, *Ber.*, 1931, 64, 2007.

1 : 3-Diamino-2-methylantraquinone.

Yellowish-red needles from AcOH . M.p. $273-6^\circ$.

Badische, D.R.P. 205,036, (*Chem. Zentr.*, 1909, I, 475).

1 : 4-Diamino-2-methylantraquinone.

Violet-black needles from *o*-dichlorobenzene or AcOH . M.p. $247-8^\circ$. Sol. conc. H_2SO_4 with brown col.

4-N-p-Toluenesulphonyl : violet-brown plates from *o*-dichlorobenzene. M.p. $271-2^\circ$.

1 : 4-N-Di-p-toluenesulphonyl : orange-yellow cryst. from amyl alcohol. M.p. $206-7^\circ$.

Locher, Fierz, *Helv. Chim. Acta*, 1927, 10, 652.

Ruggli, Merz, *Helv. Chim. Acta*, 1929, 12, 99.

1 : 5-Diamino-2-methylantraquinone.

Reddish-brown needles from amyl alcohol. M.p. $213-4^\circ$. Sol. conc. H_2SO_4 with yellow col.

1 : 5-N-Dibenzoyl : yellowish-orange leaflets from PhNO_2 . M.p. $286-7^\circ$.

Locher, Fierz, *Helv. Chim. Acta*, 1927, 10, 657.

Sibata, *J. Pharm. Soc. Japan*, 1940, 60, 510.

1 : 8-Diamino-2-methylantraquinone.

Brownish-red needles from toluene. M.p. $206-8^\circ$.

Schaarschmidt, Stahlschmidt, *Ber.*, 1912, 45, 3454.

Sibata, *J. Pharm. Soc. Japan*, 1940, 60, 510.

5 : 7-Diamino-2-methylantraquinone.

Red needles from Py . M.p. 265° .

Mitter, Goswami, *J. Indian Chem. Soc.*, 1931, 8, 685.

Diaminomethyldiphenyl.

See Methylbenzidine.

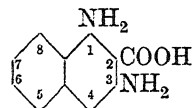
Diaminomethylnaphthalene.

See Methyl-naphthylenediamine.

Diaminonaphthalene.

See Naphthylenediamine.

1 : 3-Diamino-2-naphthoic Acid



$\text{C}_{11}\text{H}_{10}\text{O}_2\text{N}_2$ MW, 202

Needles from H_2O . M.p. 85° decomp. Heat above m.p. \rightarrow 1 : 3-naphthylenediamine.

Me ester : $\text{C}_{12}\text{H}_{12}\text{O}_2\text{N}_2$. MW, 216. Yellow plates from MeOH . M.p. 119° .

Et ester : $\text{C}_{13}\text{H}_{14}\text{O}_2\text{N}_2$. MW, 230. Yellow plates from Et_2O . M.p. 108° .

Best, Thorpe, *J. Chem. Soc.*, 1909, 95, 14.

Atkinson, Thorpe, *J. Chem. Soc.*, 1906, 89, 1921.

1 : 4-Diamino-2-naphthoic Acid.

Plates from H_2O . Decomp. at 185° . Heat to $200^\circ \rightarrow$ 1 : 4-naphthylenediamine.

Et ester : yellow needles from Et_2O . M.p. 119° .

Thorpe, *J. Chem. Soc.*, 1907, 91, 1009.

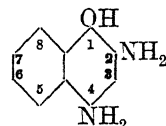
4 : 5-Diamino-2-naphthoic Acid.

Greenish-yellow needles. M.p. 202° .

B,2HCl : leaflets. M.p. above 285° .

Ekstrand, *J. prakt. Chem.*, 1890, 42, 291.

2 : 4-Diamino-1-naphthol (4-Hydroxy-1 : 3-naphthylenediamine)



$\text{C}_{10}\text{H}_{10}\text{ON}_2$ MW, 174

Both free base and salts oxidise rapidly in air to 2-amino-1 : 4-naphthoquinoneimine.

ONN'-Triacetyl : needles from AcOH . M.p. 280° decomp.

Graebe, Ludwig, *Ann.*, 1870, 154, 307.

Meerson, *Ber.*, 1888, 21, 1195.

Kehrmann, Kissine, *Ber.*, 1914, 47, 3098.

2 : 6-Diamino-1-naphthol (1-Hydroxy-2 : 6-naphthylenediamine).

ONN'-Triacetyl : needles from EtOH . M.p. 261° . Darkens at $242-5^\circ$.

Gaess, Ammelburg, *Ber.*, 1894, 27, 2213.

2 : 8-Diamino-1-naphthol (8-Hydroxy-1 : 7-naphthylenediamine).

ONN'-Triacetyl : needles from amyl alcohol. M.p. 234° .

Fichter, Gageur, *Ber.*, 1906, 39, 3338.

3 : 4-Diamino-1-naphthol (4-Hydroxy-1 : 2-naphthylenediamine).

Et ether : NN'-Diacetyl : cryst. from AcOH. M.p. 254°.

Fieser, Fieser, *J. Am. Chem. Soc.*, 1934, 56, 1574.

Henriques, *Ber.*, 1892, 25, 3067.

4 : 5-Diamino-1-naphthol (4-Hydroxy-1 : 8-naphthylenediamine).

Rapidly oxidised in air. $\text{FeCl}_3 \rightarrow$ 5-amino-1 : 4-naphthoquinone.

Graebe, Oser, *Ann.*, 1904, 335, 152.

Friedländer, Scherzer, *Chem. Zentr.*, 1900, I, 411.

4 : 8-Diamino-1-naphthol (4-Hydroxy-1 : 5-naphthylenediamine).

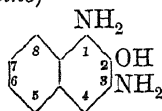
Oxidises rapidly in air.

NN'-Diacetyl : needles from EtOH.Aq. M.p. 247°.

ONN'-Triacetyl : needles from AcOH. M.p. 258°.

Fichter, Gageur, *Ber.*, 1906, 39, 3333.

1 : 3-Diamino-2-naphthol (2-Hydroxy-1 : 3-naphthylenediamine)



$\text{C}_{10}\text{H}_{10}\text{ON}_2$

MW, 174

ONN'-Triacetyl : cryst. from AcOH or EtOH. M.p. 239° corr.

Goldstein, Gardiol, *Helv. Chim. Acta*, 1937, 20, 518.

1 : 4-Diamino-2-naphthol (2-Hydroxy-1 : 4-naphthylenediamine).

Oxidises readily in air to 2-hydroxynaphthoquinone-di-imine.

NN'-Diacetyl : cryst. from AcOH. M.p. 250-60° decomp.

Kehrmann, Hertz, *Ber.*, 1896, 29, 1418.

1 : 6-Diamino-2-naphthol (2-Hydroxy-1 : 6-naphthylenediamine).

NN'-Diacetyl : needles from EtOH. M.p. 235°.

ONN'-Triacetyl : needles from AcOH. M.p. 203°.

ONN'-Tribenzoyl : plates from AcOH. M.p. 265°.

Loewe, *Ber.*, 1890, 23, 2543.

Kehrmann, Matis, *Ber.*, 1898, 31, 2413.

1 : 7-Diamino-2-naphthol (2-Hydroxy-1 : 7-naphthylenediamine).

Plates. M.p. 220°. Very sol. hot H_2O .

NN'-Diacetyl : needles. M.p. 226°.

Kehrmann, Wolff, *Ber.*, 1900, 33, 1540.

Cassella, D.R.P. 117,298, (*Chem. Zentr.*, 1901, I, 348).

3 : 4-Diamino-2-naphthol (3-Hydroxy-1 : 2-naphthylenediamine).

B,2HCl : needles.

Goldstein, Gardiol, *Helv. Chim. Acta*, 1937, 20, 519.

7 : 8-Diamino-2-naphthol (7-Hydroxy-1 : 2-naphthylenediamine).

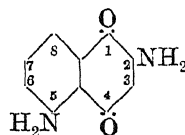
Me ether : $\text{C}_{11}\text{H}_{12}\text{ON}_2$. MW, 188. Needles from H_2O . M.p. 188°. *B,2HCl* : needles. M.p. 234-5°.

ONN'-Triacetyl : m.p. 244-5°.

Nietzki, Knapp, *Ber.*, 1897, 30, 1124.

Fischer, Kern, *J. prakt. Chem.*, 1916, 94, 42.

2 : 5-Diamino-1 : 4-naphthoquinone



$\text{C}_{10}\text{H}_8\text{O}_2\text{N}_2$

MW, 188

Dark red plates from EtOH. Decomp. above 200° without melting. Sol. EtOH, AcOH, dil. min. acids. Spar. sol. H_2O .

Kehrmann, Steiner, *Ber.*, 1900, 33, 3282.

2 : 7-Diamino-1 : 4-naphthoquinone.

Brownish-violet prisms. Sublimes about 230° part. decomp. Mod. sol. hot H_2O .

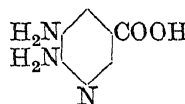
Kehrmann, Steiner, *Ber.*, 1900, 33, 3287.

2 : 8-Diamino-1 : 4-naphthoquinone.

2 : 8-N-Diacetyl : yellowish-brown leaflets. M.p. 225°.

Kehrmann, Misslin, *Ber.*, 1901, 34, 1227.

5 : 6-Diaminonicotinic Acid (5 : 6-Diaminopyridine-3-carboxylic acid)



$\text{C}_6\text{H}_7\text{O}_2\text{N}_3$

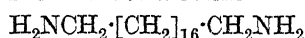
MW, 153

Grey microcryst. + $\text{1H}_2\text{O}$. M.p. above 100°.

Picrate : m.p. above 245°.

Räth, Prange, *Ann.*, 1928, 467, 8.

1 : 18-Diamino-octadecane



$\text{C}_{18}\text{H}_{40}\text{N}_2$

MW, 284

M.p. 93°.

B,2HCl : leaflets from isobutyl alcohol. Does not melt below 225°.

1 : 18-N-Dibenzoyl : leaflets from EtOH. M.p. 150°.

Pfeiffer, Lübke, *J. prakt. Chem.*, 1933, 136, 321.

Diamino-octane..

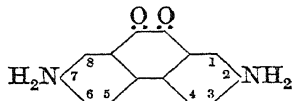
See Octamethylenediamine.

1 : 5-Diaminopentane.

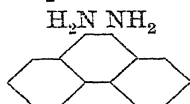
See Cadaverine.

2 : 4-Diaminopentane $\text{C}_5\text{H}_{14}\text{N}_2$ MW, 102 α -Form (Meso) :B.p. 120–40°, 46–7°/20 mm. Misc. with H_2O .Absorbs CO_2 from air. Labile form.

Dinitrate : m.p. 169°.

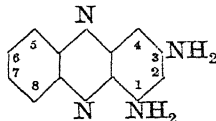
Diacetyl deriv. : prisms + H_2O from H_2O , sinters at 115°, m.p. 163°. Cryst. from Et_2O - EtOH , m.p. 168°.Dibenzoyl deriv. : leaflets from EtOH . Aq. M.p. 193–4°. β -Form (dl-) :B.p. 56–9°/22 mm., 43–4°/11–12 mm. Misc. with H_2O . Absorbs CO_2 from air. Stable form.Dinitrate : prisms from H_2O . M.p. 195°.Dibenzoyl deriv. : prisms from EtOH . Aq. M.p. 189°.Dippel, *Rec. trav. chim.*, 1931, 50, 525.**2 : 7-Diaminophenanthraquinone** $\text{C}_{14}\text{H}_{10}\text{O}_2\text{N}_2$ MW, 238

Violet cryst. from Py. M.p. 304°.

Ghatak, *Chem. Zentr.*, 1933, II, 2391.**4 : 5-Diaminophenanthraquinone.**Black flakes from EtOH . M.p. 287°.Ghatak, *Chem. Zentr.*, 1933, II, 2391.**9 : 10-Diaminophenanthrene** $\text{C}_{14}\text{H}_{12}\text{N}_2$ MW, 208

Pale yellow leaflets. M.p. 160–6°.

9:10-N-Diacetyl : cryst. M.p. 330° decomp.

Pschorr, *Ber.*, 1902, 35, 2738.Schmidt, Söll, *Ber.*, 1908, 41, 3684.**1 : 3-Diaminophenazine** $\text{C}_{12}\text{H}_{10}\text{N}_4$ MW, 210Red leaflets from C_6H_6 . M.p. 255° decomp. (274–5°). Sol. EtOH . Mod. sol. hot H_2O .Kehrmann, Prunier, *Helv. Chim. Acta*, 1924, 7, 988.Albert, Duewell, *J. Soc. Chem. Ind.*, 1947, 66, 11.**2 : 3-Diaminophenazine.**Brownish-yellow needles from aniline-xylene. M.p. 264°. Sublimes. Sols. in EtOH or C_6H_6 show greenish-yellow fluor.

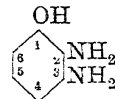
2:3-N-Diacetyl : pale yellow needles. Darkens at 200°. M.p. 270° (not sharp).

Crippa, Galimberti, *Gazz. chim. ital.*, 1931, 61, 95.Steigmann, *Chem. Abstracts*, 1946, 40, 5347.**2 : 6-Diaminophenazine.**Red needles or leaflets with bronze reflex. EtOH and Et_2O sols. fluoresce orange.Kalle, D.R.P. 148,113, (*Chem. Zentr.*, 1904, I, 414).**3 : 6-Diaminophenazine (p-Diaminophenazine).**Dark yellow needles from hot H_2O . M.p. 280°. Sol. EtOH , Et_2O . Spar. sol. H_2O . Green sol. in conc. H_2SO_4 . Sols. fluoresce.

3:6-N-Diacetyl : yellow needles. M.p. 330° (not sharp).

Nietzki, Ernst, *Ber.*, 1890, 23, 1854.**Diaminophenetole.**

See under Diaminophenol.

2 : 3-Diaminophenol (3-Hydroxy-o-phenylenediamine) $\text{C}_6\text{H}_8\text{ON}_2$ MW, 124Brown leaflets from EtOH . M.p. 166°.Hillemann, *Ber.*, 1938, 71, 50.**2 : 4-Diaminophenol (4-Hydroxy-m-phenylenediamine).**Leaflets. M.p. 78–80° decomp. Unstable. Rapidly darkens in air. Mod. sol. EtOH , Me_2CO . Spar. sol. Et_2O , CHCl_3 . Sol. in NaOH deep blue. FeCl_3 on aq. sol. → dark red col. The sulphate (Diamol) and hydrochloride (Amidol) are used as photographic developers.Me ether : 2:4-diaminoanisole. $\text{C}_7\text{H}_{10}\text{ON}_2$. MW, 138. Needles. M.p. 68°. 2:4-N-Diacetyl : m.p. 166–7°.Et ether : 2:4-diaminophenetole. $\text{C}_8\text{H}_{12}\text{ON}_2$. MW, 152. Needles. M.p. 67–8°. 2:4-N-Diacetyl : m.p. 193°.

4-N-Acetyl : m.p. 249°.

2:4-N-Diacetyl : m.p. 220–2°.

2:4-N-Dibenzoyl : m.p. 253–4°.

1:2:4-Triacetyl : m.p. 180–2°.

Picrate : yellow needles. M.p. 120° decomp.

Lumière, Seyewetz, *Compt. rend.*, 1893, 116, 1204.Bradt, *J. Phys. Chem.*, 1930, 34, 2711.Kirkbgoof, *Chem. Abstracts*, 1934, 28, 3668.

2 : 5 - Diaminophenol (2 - Hydroxy - p - phenylenediamine).

2 : 5-N-Diacetyl: needles. M.p. 265°. Turns brown in air.

1 : 2 : 5-Triacetyl: m.p. 234°.

Kehrmann, Betsch, *Ber.*, 1897, 30, 2098.

2 : 6 - Diaminophenol (2 - Hydroxy - m - phenylenediamine).

Very unstable.

Me ether: 2 : 6-diaminoanisole. 2 : 6-N-Diacetyl: m.p. 222°. 2 : 6-N-Dibenzoyl: m.p. 157°.

Et ether: 2 : 6-diaminophenetole. 2 : 6-N-Diacetyl: m.p. 240°.

2 : 6-N-Diacetyl: m.p. 165°.

1 : 2 : 6-Triacetyl: m.p. 224°.

1 : 2 : 2 : 6 : 6-Penta-acetyl: m.p. 167°.

2 : 6-N-Dibenzoyl: m.p. 181°.

1 : 2 : 6-Tribenzoyl: m.p. 220°.

1-p-Toluenesulphonyl: m.p. 141°. 2 : 6-N-Dibenzoyl: m.p. 191°.

2 : 6-N-Di-p-toluenesulphonyl: m.p. 190°.

Fromm, Ebert, *J. prakt. Chem.*, 1924, 108, 76.

3 : 4 - Diaminophenol (4 - Hydroxy - o - phenylenediamine).

M.p. 167-8° decomp. Unstable. $\text{FeCl}_3 \rightarrow$ deep red col.

Et ether: 3 : 4-diaminophenetole. $\text{C}_8\text{H}_{12}\text{ON}_2$. MW, 152. Leaflets. M.p. 71-2°. B.p. 294-6°.

Sol. EtOH, Et_2O , CHCl_3 . Mod. sol. hot H_2O .

3 : 4-N-Diacetyl: m.p. 189°.

3 : 4-N-Diacetyl: prisms. M.p. 205-7°.

3 : 4-N-Dibenzoyl: plates. M.p. 203-5°.

1 : 3 : 4-Tribenzoyl: m.p. 225°.

Bertels, *Ber.*, 1904, 37, 2279.

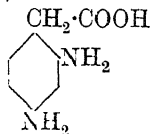
3 : 5 - Diaminophenol (5 - Hydroxy - m - phenylenediamine).

Prisms. M.p. 168-70°. Sol. H_2O . Spar. sol. Et_2O .

3 : 5-N-Diacetyl: m.p. 195°.

Pollak, *Monatsh.*, 1893, 14, 425.

2 : 4-Diaminophenylacetic Acid (2 : 4-Diamino- α -toluic acid)



$\text{C}_8\text{H}_{10}\text{O}_2\text{N}_2$ MW, 166

2 : 4-N-Diacetyl: cryst. from EtOH. M.p. 190°.

2 : 4-N-Dibenzoyl: cryst. from EtOH. M.p. 161°.

Et ester: $\text{C}_{10}\text{H}_{14}\text{O}_2\text{N}_2$. MW, 194. Needles from EtOH. M.p. 75°.

Ruggli, Grand, *Helv. Chim. Acta*, 1937, 20, 384.

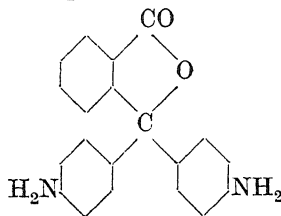
Diaminophenyl naphthylamine.

See under Triaminonaphthalene.

Diaminophenylphenanthridine.

See Dimidium.

Diaminophthalophenone (Aniline-phthalein, 3 : 3-di-[p-aminophenyl]-phthalide)



$\text{C}_{20}\text{H}_{16}\text{O}_2\text{N}_2$

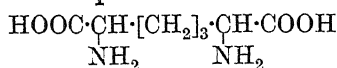
MW, 316

Colourless cryst. from EtOH. M.p. 204° (179-80°).

Baeyer, *Ann.*, 1880, 202, 167.

Schwarzenbach, Brandenberger, *Helv. Chim. Acta.*, 1937, 20, 1253.

1 : 5-Diaminopimelic Acid



$\text{C}_7\text{H}_{14}\text{O}_4\text{N}_2$

MW, 190

Occurs in *Corynebacterium diphtheriae* and *Mycobacterium tuberculosis*. Needles from H_2O . M.p. above 305°. Sol. dil. acids and alkalis. Sol. to 0.92% in H_2O at 21°.

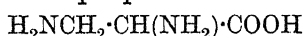
B, 2HCl: plates. Decomp. at 240°.

Work, *Biochem. J.*, 1951, 49, 17.

Diaminopropane.

See Propylenediamine and Trimethylenediamine.

1 : 2-Diaminopropionic Acid



$\text{C}_3\text{H}_8\text{O}_2\text{N}_2$

MW, 104

dl.

Softens at 97°, liq. at 110-20°. Sol. H_2O . Insol. EtOH, Et_2O . Aq. sol. reacts strongly alk. Hygroscopic. Absorbs CO_2 . Dist. \rightarrow ethylenediamine. $\text{HNO}_2 \rightarrow$ glyceric acid.

Hydrochloride: m.p. 225° decomp.

Hydrobromide: m.p. 228-30° decomp.

$\text{B}_2(\text{COOH})_2 \cdot 2\text{H}_2\text{O}$: m.p. 175-8° decomp.

$\text{B}_2\text{H}_2\text{SO}_4$: m.p. 223-4° decomp.

Et ester: $\text{C}_5\text{H}_{12}\text{O}_2\text{N}_2$. MW, 132. M.p. 142-4° decomp.

1 : 2-N-Diacetyl: m.p. 181-2°.

d.

B, HNO3: m.p. 191-3° decomp.

Acetyl deriv.: m.p. 110-12°.

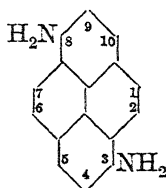
1 : 2-N-Dibenzoyl: m.p. 156-7°. $[\alpha]_D^{16} - 23.9^\circ$ in MeOH. *Me ester*: m.p. 153-4°. $[\alpha]_D^{16} - 21.58^\circ$ in MeOH. *Et ester*: m.p. 151°. $[\alpha]_D^{18} - 13.3^\circ$ in EtOH.

Karrer, Escher, Widmer, *Helv. Chim. Acta*, 1926, 9, 314.

Bergmann, Grafe, *Z. physiol. Chem.*, 1930, 187, 187.

Di - [ω -aminopropyl] - tetramethylenedi-amine.

See Spermine.

3 : 8-Diaminopyrene $C_{16}H_{12}N_2$

MW, 232

Olive-green prisms from chlorobenzene. M.p. 232-3°.

3 : 8-N-Diacetyl : needles from $PhNO_2$. Darkens at 375°. M.p. about 410°.Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, 531, 121.I.G., B.P. 472,398, (*Chem. Zentr.*, 1938, I, 1461).**3 : 10-Diaminopyrene.**

Olive-green prisms from chlorobenzene. M.p. 160-2°.

3 : 10-N-Diacetyl : needles from $PhNO_2$. Darkens at 350°.Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, 531, 121.I.G., B.P. 472,398, (*Chem. Zentr.*, 1938, I, 1461).**2 : 3-Diaminopyridine** $C_5H_7N_3$

MW, 109

Needles from C_6H_6 . M.p. 113°. Sol. H_2O , EtOH. Sublimes.

Picrate : m.p. 262-4°.

Konopnicki, Plazek, *Ber.*, 1927, 60, 2046. Tschitschibabin, Kirsanow, *Chem. Abstracts*, 1928, 22, 2563; *Ber.*, 1927, 60, 771.Schickh, Binz, Schulz, *Ber.*, 1936, 69, 2602.**2 : 4-Diaminopyridine.**

Leaflets or needles. M.p. 107°. Deliquescent. Stable in air.

 $B_2H_2PtCl_6$: golden-yellow needles. M.p. 224° decomp. B_2HAuCl_4 : reddish-brown needles. M.p. 183° decomp.

2 : 4-N-Dibenzoyl : needles. M.p. 191-2°.

Meyer, Tropsch, *Monatsh.*, 1914, 35, 202.**2 : 5-Diaminopyridine.**

Needles. M.p. 107-10°. Rapidly decomp. by air and light. Aq. sols. show blue fluor.

2 : 5-N-Diacetyl : m.p. 289-90°.

2 : 5-N-Dibenzoyl : needles. M.p. 229-30°.

Tschitschibabin, Kirsanov, *Chem. Abstracts*, 1928, 22, 2563; *Ber.*, 1927, 60, 768.Räth, Prange, *Ann.*, 1928, 467, 3.**2 : 6-Diaminopyridine.**

Leaflets. M.p. 121.5°. B.p. 148-50°/5 mm. Couples with diazo-comps.

 B_2HCl : cryst. from EtOH in two forms, m.p.s 81-3° and 156-7°.

2 : 6-N-Diacetyl : plates. M.p. 203°.

2 : 6-N-Dibenzoyl : m.p. 176°.

Picrate : m.p. 240°.

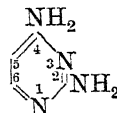
Tschitschibabin, Zeide, *Chem. Abstracts*, 1924, 18, 1496.Philipp, U.S.P. 1,789,022, (*Chem. Abstracts*, 1931, 25, 974).Plazek, *Chem. Abstracts*, 1937, 31, 1808.Hertog, Wibaut, *Rec. trav. chim.*, 1936, 55, 122.**3 : 4-Diaminopyridine.**M.p. 218-9°. Deliquescent. Absorbs CO_2 from the air. $B_2H_2PtCl_6$: m.p. 231-2°.

Picrate : red needles from EtOH. M.p. 235-7°.

3 : 4-N-Dibenzoyl : m.p. 222-3°.

Koenigs, Kinne, Weiss, *Ber.*, 1924, 57, 1178.Bremer, *Ann.*, 1935, 518, 274.Koenigs, Bueren, Jung, *Ber.*, 1936, 69, 2690.**3 : 5-Diaminopyridine.**Leaflets. M.p. 119-20°. Deliquescent. Sol. ord. org. solvents. Spar. sol. C_6H_6 . Reduces NH_3AgNO_3 . B_2HBr : prisms. M.p. 275° decomp.

3 : 5-N-Dibenzoyl : silky needles. M.p. 176°.

Meyer, Tropsch, *Monatsh.*, 1914, 35, 214.**2 : 4-Diaminopyrimidine** $C_4H_6N_4$

MW, 110

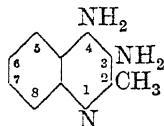
M.p. 149-50° (144-5°). Very sol. H_2O .Buttner, *Ber.*, 1903, 36, 2233.Johnson, Johns, *Am. Chem. J.*, 1905, 34, 190.English, Clapp, U.S.P. 2,416,617, (*Chem. Abstracts*, 1947, 41, 3493).

2 : 5-Diaminopyrimidine.Cryst. from H_2O . M.p. 200°.Raiziss, Freifelder, *J. Am. Chem. Soc.*, 1942, **64**, 2340.**4 : 5-Diaminopyrimidine.**

M.p. 204°. B.p. 229°/32 mm.

 $B.HNO_3$: decomp. at 260°.*Picrate*: plates from EtOH. M.p. 264° decomp.Isay, *Ber.*, 1906, **39**, 257.Jones, *Nature*, 1948, **162**, 524.Brown, *J. appl. Chem.*, 1952, **2**, 239.**4 : 6-Diaminopyrimidine.**

Cryst. from EtOH. M.p. 267-8°.

Kenner, Lythgoe, Todd, Topham, *J. Chem. Soc.*, 1943, 574.**3 : 4-Diaminoquinoline (3 : 4-Diamino-2-methylquinoline)** $C_{10}H_{11}N_3$

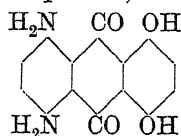
MW, 173

Needles from $CHCl_3$ -pet. ether. M.p. 226-7°. Sol. H_2O , EtOH, $CHCl_3$, Me_2CO . Spar. sol. Et_2O . Insol. C_6H_6 , pet. ether. $B.HCl$: yellow plates + $1H_2O$ from EtOH. M.p. 317-8°.*Picrate*: yellow needles from EtOH. M.p. 227-8°.Koenigs, Freund, *Ber.*, 1941, **74**, 1085.**4 : 6-Diaminoquinoline.**

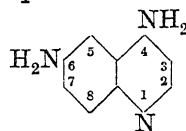
M.p. 197°.

6-*N*-Acetyl: m.p. 250°.6-*N*-Cinnamoyl: m.p. 253-4°.4-*N*-Et: $C_{12}H_{15}N_3$, MW, 201. M.p. 195°.6-*N*-Et: m.p. 232°.I.G., D.R.P. 591,480, (*Chem. Zentr.*, 1934, I, 2160).**4 : 8-Diaminoquinoline.**

M.p. 168°.

8-*N*-Cinnamoyl: m.p. 202-3°.I.G., D.R.P. 591,480, (*Chem. Zentr.*, 1934, I, 2160).**5 : 8-Diaminoquinizarin (1 : 4-Dihydroxy-5 : 8-diaminoanthraquinone)** $C_{14}H_{10}O_4N_2$

MW, 270

Brown-violet cryst. from $PhNO_2$. M.p. above 300°. Blue sols. in solvents, acids and alkalis.1 : 4-*Di-Me ether*: $C_{16}H_{14}O_4N_2$. MW, 298. Violet-black cryst. with green reflex from AcOH. Decomp. about 250°. *N*:*N*'-Diacetyl: brownish-red needles from $PhNO_2$. M.p. above 300°. *N*:*N*'-Di-*p*-toluenesulphonyl: red cryst. from chlorobenzene. M.p. 275°.5 : 8-*N*-Dibenzoyl: brownish-violet needles from xylene. M.p. 284-5°.5 : 8-*N*-Diphenyl: 5 : 8-dianilinoquinizarin. Dark blue needles from C_6H_6 -ligroin. M.p. 258-60°.Waldmann, Hartisch, *J. prakt. Chem.*, 1931, **130**, 92.M.L.B., D.R.P. 205,149, (*Chem. Zentr.*, 1909, I, 477).**4 : 6-Diaminoquinoline** $C_9H_9N_3$

MW, 159

M.p. 215°. Strong green fluor. in weakly acid sol.

I.G., D.R.P. 591,480, (*Chem. Zentr.*, 1934, I, 2160).**4 : 8-Diaminoquinoline.**

M.p. 185° decomp.

Gouley *et al.*, *J. Am. Chem. Soc.*, 1947, **69**, 303.**5 : 6-Diaminoquinoline.**

Brown needles. M.p. 150° (95°).

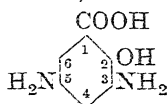
Hydrochloride: m.p. 300°.Kaufmann, Zeller, *Ber.*, 1917, **50**, 1629.Rudy, *Ber.*, 1938, **71**, 847.Hall, Turner, *J. Chem. Soc.*, 1945, 699.Linsker, Evans, *J. Am. Chem. Soc.*, 1946, **68**, 874.**5 : 7-Diaminoquinoline.**

Golden-yellow needles. M.p. 156°. Sol. EtOH. Non-volatile in steam.

B,2HI: red needles. M.p. 215-6°.Claus, Kramer, *Ber.*, 1885, **18**, 1247.Claus, Dewitz, *J. prakt. Chem.*, 1896, **53**, 544.**5 : 8-Diaminoquinoline.**Yellow needles. M.p. 156°. Sol. Et_2O . Spar. sol. EtOH. Non-volatile in steam.Claus, Kramer, *Ber.*, 1885, **18**, 1247.**6 : 8-Diaminoquinoline.**Needles or leaflets. M.p. 162-3°. Sol. H_2O , EtOH. Mod. sol. Et_2O , C_6H_6 . Spar. sol. ligroin, $CHCl_3$. Non-volatile in steam. Does not sublime.Claus, Kramer, *Ber.*, 1885, **18**, 1247.

Diaminoquinone.See Diamino-*p*-benzoquinone.**Diaminoresorcinol.**

See Dihydroxyphenylenediamine.

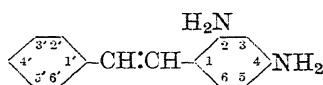
3:5-Diaminosalicylic Acid (2-Hydroxy-3:5-diaminobenzoic acid) $C_7H_8O_3N_2$

MW, 168

Needles. Mod. sol. hot H_2O . Prac. insol. EtOH.

5-N-Acetyl: m.p. 220°.

5-N-Benzoyl: m.p. 221°.

Saytzeff, *Ann.*, 1865, 133, 324.**2:4-Diaminostilbene.** $C_{14}H_{14}N_2$

MW, 210

Pale yellow needles from C_6H_6 . M.p. 119–20°.Thiele, Escales, *Ber.*, 1901, 34, 2843.**2:2'-Diaminostilbene.***Cis*-.

Red needles. M.p. 123° (107°).

 B_2HCl : m.p. 230°.

2:2'-N-Diacetyl: cryst. from EtOH.Aq. M.p. 214–5°.

Picrate: m.p. 155–6°.

Trans-.

Golden-yellow prisms from EtOH. M.p. 176° (168°). EtOH sol. shows bluish-violet fluor.

 B_2HCl : m.p. 267° decomp.

2:2'-N-Diacetyl: cryst. from AcOH. M.p. 364°.

Picrate: m.p. 209°.

Thiele, Dimroth, *Ber.*, 1895, 28, 1412.Ruggli, Zaeslin, *Helv. Chim. Acta*, 1935, 18, 853.**2:4'-Diaminostilbene.***Cis*-.Cryst. from $CHCl_3$ -pet. ether. M.p. 105°.

2:4'-N-Diacetyl: m.p. 180°.

Trans-.

M.p. 125–6°.

2:4'-N-Diacetyl: m.p. 241°.

Ruggli, Dinger, *Helv. Chim. Acta*, 1941, 24, 173.**4:4'-Diaminostilbene.***Cis*-.

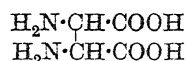
Pale yellow prisms from MeOH. M.p. 121°.

4:4'-N-Diacetyl: m.p. 172°.

4:4'-N-Dibenzoyl: needles from anisole. M.p. 253°.

Trans-.Yellow needles or leaflets from EtOH. M.p. 231°. Sol. MeOH. Spar. sol. C_6H_6 , CS_2 , hot H_2O . Sublimes. B_2HCl : decomp. at 234°.4:4'-N-Diacetyl: needles from $PhNO_2$. M.p. 353°.

4:4'-N-Dibenzoyl: m.p. 352°.

Fischer, Hepp, *Ber.*, 1893, 26, 2232.Elbs, Hoermann, *J. prakt. Chem.*, 1889, 39, 502.Bogoslovkii, Chernyshev, *J. Gen. Chem. U.S.S.R.*, 1937, 7, 2782.Ruggli, Lang, *Helv. Chim. Acta*, 1936, 19, 1002.**Diaminosuccinic Acid** $C_4H_8O_4N_2$

MW, 148

dl-.Prisms + $1H_2O$. Decomp. on heating. Mod. sol. hot H_2O . $HNO_3 \rightarrow dl$ -tartaric acid.

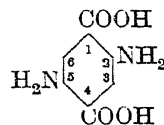
1:2-N-Diacetyl: decomp. at 235°.

1:2-N-Dibenzoyl, $1H_2O$: m.p. 164° decomp.*d*-.1:2-N-Dibenzoyl: m.p. 163–4°. $[\alpha]_D^{20} + 106.5^\circ$ in NH_3 .Aq.*l*-. $[\alpha]_D^{20} - 18.9^\circ$ in HCl.Aq.1:2-N-Dibenzoyl: m.p. 163–4°. $[\alpha]_D^{20} - 104.2^\circ$ in NH_3 .Aq.*Meso*-.Prisms. Decomp. and part. sublimes on heating (Cryst. from H_2O . M.p. 305–6°). Prac. insol. H_2O and most org. solvents. $HNO_3 \rightarrow meso$ -tartaric acid.*Di-Et ester*: $C_8H_{16}O_4N_2$. MW, 204. Needles. M.p. 38°. B.p. 164–6°/15 mm. 1:2-N-Diacetyl: m.p. 180–5°.

1:2-N-Diacetyl: decomp. at 235°.

1:2-N-Dibenzoyl: m.p. 212–3° decomp.

1:2-N-Diphenyl: see Dianilinosuccinic Acid.

Kuhn, Zumstein, *Ber.*, 1926, 59, 479.Tafel, Stern, *Ber.*, 1905, 38, 1590.Farchy, Tafel, *Ber.*, 1893, 26, 1980.Wenner, U.S.P. 2,389,099, (*Chem. Abstracts*, 1946, 40, 1539).**2:5-Diaminoterephthalic Acid (2:5-Diaminobenzene-1:4-dicarboxylic acid, tereanilic acid)** $C_8H_8O_4N_2$

MW, 196

Greenish-yellow prisms. Does not melt. Prac. insol. in most ord. org. solvents. Sol. glycerol. Esters fluoresce strongly.

Di-Me ester: $C_{10}H_{12}O_4N_2$. MW, 224. Orange-red prisms with orange fluor. M.p. 185° . 2:5-N-Diacetyl: m.p. 284° . 2:5-N-Dibenzoyl: m.p. 268° .

Di-Et ester: $C_{12}H_{16}O_4N_2$. MW, 252. Exists in two forms. (1) Red needles from EtOH. (2) Yellow needles. M.p. 168° . Recryst. from EtOH \rightarrow (1). 2:5-N-Diacetyl: m.p. 219° .

Schroeter, *Ber.*, 1924, 57, 2024.

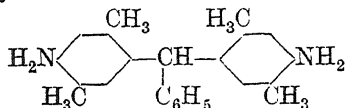
2 : 6-Diaminoterephthalic Acid.

2 : 6-N-Diacetyl: does not melt below 280° .

Di-Me ester: yellow cryst. M.p. 162° . Sols. show violet to green fluor. 2 : 6-N-Diacetyl: m.p. 204° . 2 : 6-N-Dibenzoyl: m.p. 248° .

Kauffmann, Weissel, *Ann.*, 1912, 393, 5.

4 : 4'-Diamino-2 : 5 : 2' : 5'-tetramethyl-triphenylmethane



$C_{23}H_{26}N_2$ MW, 330

Prisms from EtOH. M.p. 210° . Sol. C_6H_6 , hot EtOH. Spar. sol. Et₂O. Insol. H_2O .

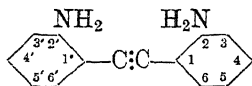
4 : 4'-N-Diacetyl: m.p. 217° .

4 : 4'-N-Dibenzoyl: m.p. $249-50^\circ$.

M.L.B., D.R.P. 308,785, (*Chem. Zentr.*, 1918, II, 924).

Schultz, Petény, *J. prakt. Chem.*, 1907, 76, 331.

2 : 2'-Diaminotolane (oo'-Diaminodiphenyl-acetylene)



$C_{14}H_{12}N_2$ MW, 208

Colourless leaflets with blue fluor. M.p. 154° . Conc. H_2SO_4 at $100^\circ \rightarrow$ 2-o-aminophenyl-indole.

Ruggli, *Ann.*, 1917, 412, 9.

3 : 4'-Diaminotolane.

Pale brown needles from EtOH.Aq. M.p. $124-5^\circ$. Sol. EtOH, Et₂O, AcOEt, Me₂CO, hot C_6H_6 . Spar. sol. CS₂, pet. ether.

3 : 4'-N-Diacetyl: red needles from MeOH. M.p. 226° .

Harrison, *J. Chem. Soc.*, 1926, 1237.

4 : 4'-Diaminotolane.

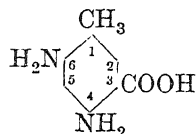
Pale yellow needles from EtOH. M.p. 236° . Spar. sol. ord. org. solvents except Me₂CO.

Reinhardt, *Ber.*, 1913, 46, 3599.

Diaminotoluene.

See Tolylenediamine and Aminobenzylamine.

4 : 6-Diamino-m-toluic Acid

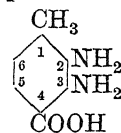


$C_8H_{10}O_2N_2$ MW, 166

4 : 6-N-Diacetyl: colourless needles from H_2O . M.p. 272.4° . Sol. EtOH, AcOH. Spar. sol. H_2O .

Bogert, Kropff, *J. Am. Chem. Soc.*, 1909, 31, 846.

2 : 3-Diamino-p-toluic Acid



$C_8H_{10}O_2N_2$ MW, 166

Needles from H_2O . M.p. 192° . Sol. EtOH. Spar. sol. cold H_2O .

Claus, Joachim, *Ann.*, 1891, 266, 216.

2 : 5-Diamino-p-toluic Acid.

Needles from H_2O . M.p. 240° decomp. Sol. EtOH. Spar. sol. cold H_2O .

Claus, Joachim, *Ann.*, 1891, 266, 216.

2 : 6-Diamino-p-toluic Acid.

Cryst. + $1H_2O$. M.p. anhyd. 212° . Sol. EtOH. Spar. sol. cold H_2O .

Me ester: $C_9H_{12}O_2N_2$. MW, 180. Brownish cryst. M.p. 129° .

2 : 6-N-Diacetyl: m.p. above 280° .

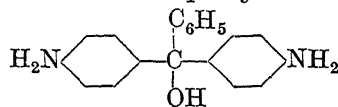
Kauffmann, Weissel, *Ann.*, 1912, 393, 21.

Claus, Joachim, *Ann.*, 1891, 266, 216.

Diaminotolyl-naphthylamine.

See under Triaminonaphthalene.

4 : 4'-Diaminotriphenylcarbinol (α -Hydroxy-4 : 4'-diaminotriphenylmethane)



$C_{19}H_{18}ON_2$ MW, 290

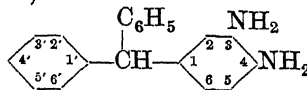
Prisms from Py.Aq. M.p. $167-8^\circ$ (slow heat.), $173-5^\circ$ (rapid heat.). Sol. EtOH, hot C_6H_6 . Insol. H_2O . Sol. dil. min. acids to colourless sols., turning red on warming.

Me ether: $C_{20}H_{20}ON_2$. MW, 304. Plates. M.p. $161-3^\circ$.

4 : 4'-N-Diacetyl: red prisms. M.p. $266-7^\circ$.

Baeyer, Villiger, *Ber.*, 1904, 37, 2861.

3 : 4-Diaminotriphenylmethane (3 : 4-Diaminotritane)



$C_{19}H_{18}N_2$

MW, 274

Cryst. (containing C_6H_6) from C_6H_6 . M.p. 71-2°. Sol. EtOH, Et_2O , C_6H_6 , AcOH. Spar. sol. ligroin.

3 : 4-N-Diacetyl : m.p. 226°.

3 : 4-N-Dibenzoyl : m.p. 243°.

Thomas, *J. prakt. Chem.*, 1905, 71, 569.

4 : 4'-Diaminotriphenylmethane (4 : 4'-Diaminotritane).

M.p. 139° (136-7°). Sol. EtOH, Et_2O , $CHCl_3$, ligroin. Prac. insol. H_2O .

4 : 4'-N-Diacetyl : needles + $1C_6H_6$ from C_6H_6 . M.p. 234-5° (233-4°).

4 : 4'-N-Tetra-acetyl : m.p. 172-3°.

Weil, Sapper, Krämer, Klöter, Selberg, *Ber.*, 1928, 61, 1294 (*Bibl.*).

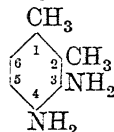
Diamino-*n*-valeric Acid.

See Ornithine.

Diaminoveratrol.

See under 4 : 5-Dihydroxy-*o*-phenylenediamine.

3 : 4-Diamino-*o*-xylene



$C_8H_{12}N_2$ MW, 136
Plates. M.p. 89°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. $FeCl_3 \rightarrow$ red col.

3 : 4-N-Diacetyl : needles. M.p. 196-7°.

Noelting, Braun, Thesmar, *Ber.*, 1901, 34, 2251.

3 : 5-Diamino-*o*-xylene.

Needles from EtOH. M.p. 67°. Sol. H_2O , EtOH, Et_2O , C_6H_6 .

3 : 5-N-Diacetyl : needles. M.p. 241°.

Noelting, Thesmar, *Ber.*, 1902, 35, 632.

Noelting, Braun, Thesmar, *Ber.*, 1901, 34, 2251.

3 : 6-Diamino-*o*-xylene.

Pale yellow needles from C_6H_6 . M.p. 116°. Sol. H_2O , EtOH. Spar. sol. Et_2O .

3 : 6-N-Diacetyl : m.p. 275-6°.

Noelting, Braun, Thesmar, *Ber.*, 1901, 34, 2252.

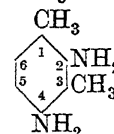
4 : 5-Diamino-*o*-xylene.

Leaflets. M.p. 126°. Sol. H_2O , EtOH, C_6H_6 . Spar. sol. Et_2O , ligroin. $FeCl_3 \rightarrow$ bluish-green.

4 : 5-N-Diacetyl : needles. M.p. 227-8°.

Noelting, Braun, Thesmar, *Ber.*, 1901, 34, 2252.

2 : 4-Diamino-*m*-xylene



$C_8H_{12}N_2$ MW, 136

Needles from ligroin. M.p. 65-6°. Sol. H_2O , EtOH, Et_2O , C_6H_6 .

2 : 4-N-Diformyl : m.p. 219-20°.

2 : 4-N-Diacetyl : m.p. above 260°.

2 : 4-N-Dibenzoyl : m.p. 232° (227°).

Noelting, Thesmar, *Ber.*, 1902, 35, 640.

2 : 5-Diamino-*m*-xylene.

Leaflets from C_6H_6 -ligroin. M.p. 104°. Sol. H_2O , EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. $FeCl_3 \rightarrow$ green col.

Noelting, Thesmar, *Ber.*, 1902, 35, 640.

4 : 5-Diamino-*m*-xylene.

Needles or leaflets. M.p. 78°. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. cold C_6H_6 , ligroin. $FeCl_3 \rightarrow$ red col.

Noelting, Thesmar, *Ber.*, 1902, 35, 640.

4 : 6-Diamino-*m*-xylene.

Needles from ligroin. M.p. 105°. Sol. H_2O , EtOH, Et_2O , hot C_6H_6 , hot ligroin. Sublimes.

4 : 6-N-Diformyl : m.p. 182-3°.

6-N-Acetyl : needles. M.p. 164-6°.

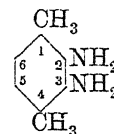
4 : 6-N-Diacetyl : m.p. 295°.

4 : 6-N-Dibenzoyl : m.p. 258-9°.

4 : 6-N-Di-*p*-toluenesulphonyl : needles. M.p. 221-2°.

Noelting, Thesmar, *Ber.*, 1902, 35, 640.

2 : 3-Diamino-*p*-xylene



$C_8H_{12}N_2$ MW, 136

Needles. M.p. 75°. Sol. H_2O , EtOH, C_6H_6 . $FeCl_3 \rightarrow$ red col. Sublimes.

Noelting, Thesmar, *Ber.*, 1902, 35, 640.

2 : 5-Diamino-*p*-xylene.

Yellowish needles. M.p. 150°. Sol. EtOH, hot H_2O .

Noelting, Thesmar, *Ber.*, 1902, 35, 641.

2 : 6-Diamino-*p*-xylene.

Yellowish needles or prisms. M.p. 102-3°. Sol. EtOH, C_6H_6 , hot H_2O . Spar. sol. ligroin. Sublimes.

Noelting, Thesmar, *Ber.*, 1902, 35, 641.

ω -Diaminoxylene.

See Xylylenediamine.

Diamol.

See under 2 : 4-Diaminophenol.

Diamorphine.

See Heroin.

Di-*n*-amylamine



$C_{10}H_{23}N$

MW, 157

B.p. 200–10°, 91–3°/14 mm.

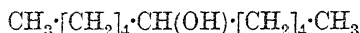
B.HCl: decomp. at 275°.

*B.(COOH)*₂: m.p. 213°.

Rupe, Metzger, Vogler, *Helv. Chim. Acta*, 1925, 8, 852.

Winans, Adkins, *J. Am. Chem. Soc.*, 1933, 55, 2051.

Di-*n*-amylcarbinol (6-*Hydroxyundecane*, *undecanol*-6)



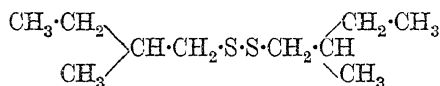
$\text{C}_{11}\text{H}_{24}\text{O}$ MW, 172

M.p. 16°. B.p. 235°/754 mm., 117–8°/16 mm., 111°/12 mm. D_4^{20} 0.8334. n_D^{20} 1.43740.

Hess, Bappert, *Ann.*, 1925, 441, 150.

Dreger *et al.*, *Ind. Eng. Chem.*, 1944, 36, 610.

Di-*active*-amyl disulphide

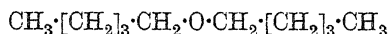


$\text{C}_{10}\text{H}_{22}\text{S}_2$ MW, 206

B.p. 120–2°/10 mm. D_{20}^{20} 0.923. $[\alpha]_D^{20} + 72.48^\circ$.

Brjuchonenko, *J. prakt. Chem.*, 1899, 59, 47, 596.

Di-*n*-amyl Ether



$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158

B.p. 70°/12 mm.

Blaise, Picard, *Ann. chim.*, 1912, 25, 260.

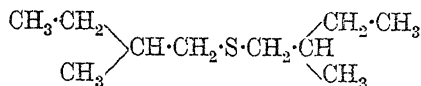
Di-*n*-amyl Ketone.

See *n*-Caprone.

Di-*tert*.-amyl Ketone.

See *tert*.-Caprone.

Di-*active*-amyl sulphide

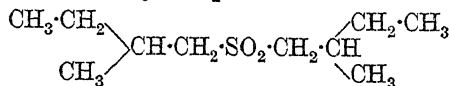


$\text{C}_{10}\text{H}_{22}\text{S}$ MW, 174

B.p. 95–8°/13 mm. D_0^{20} 0.8362. $[\alpha]_D^{20} + 24.52^\circ$.

Brjuchonenko, *J. prakt. Chem.*, 1899, 59, 47, 596.

Di-*active*-amyl sulphone

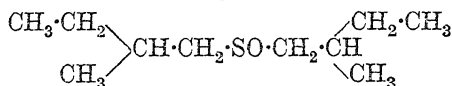


$\text{C}_{10}\text{H}_{22}\text{O}_2\text{S}$ MW, 206

Needles from pet. ether. M.p. 29–30°.

Hilditch, *J. Chem. Soc.*, 1908, 93, 1619.

Di-*active*-amyl sulphoxide



$\text{C}_{10}\text{H}_{22}\text{OS}$ MW, 190

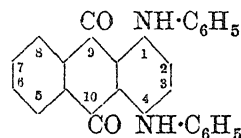
Prisms from pet. ether. M.p. 40°.

Hilditch, *J. Chem. Soc.*, 1908, 93, 1619.

Dianhydro-*d*-mannitol.

See Isomannide.

1 : 4-Dianilinoanthraquinone



$\text{C}_{26}\text{H}_{18}\text{O}_2\text{N}_2$ MW, 390

Blue plates with brown reflex from AcOH. M.p. 218°. Sol. hot CHCl_3 , Py, to blue sols. Spar. sol. C_6H_6 . Prac. insol. EtOH, Et_2O , Me_2CO .

Ullmann, Billig, *Ann.*, 1911, 381, 19.

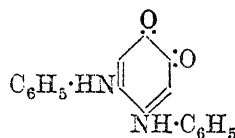
1 : 5-Dianilinoanthraquinone.

Needles. M.p. 238–40°.

Bayer, D.R.P. 131,538, (*Chem. Zentr.*, 1902, I, 1342).

Kaufler, *Chem. Zentr.*, 1903, I, 721.

4 : 5-Dianilino-*o*-benzoquinone

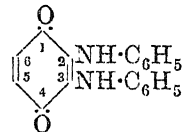


$\text{C}_{18}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 290

Brownish-red needles from EtOH. M.p. 193°. Insol. H_2O . Sol. conc. H_2SO_4 with turbid olive-green col.

Kehrmann, Cordone, *Ber.*, 1913, 46, 3011.

2 : 3-Dianilino-*p*-benzoquinone



$\text{C}_{18}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 290

Bluish-black cryst. from EtOH or hexane.

Gündel, Pummerer, *Ann.*, 1937, 529, 11.

2 : 5-Dianilino-*p*-benzoquinone (*Quinone-anilide*).

Reddish-brown cryst. M.p. 345°. Sublimes undecomp. Mod. sol. hot AcOH, aniline. Prac. insol. cold EtOH. Crimson sol. in conc. H_2SO_4 .

Anil: yellowish needles with metallic cast. M.p. 203°.

Dianil: see Azophenine.

S.C.I., B.P. 215,007, (*Chem. Abstracts*, 1924, 18, 2901).

Nietzki, Schmidt, *Ber.*, 1889, 22, 1655.

Willstätter, Majima, *Ber.*, 1910, 43, 2590.

Dianilinoethane.

See Diphenylethylenediamine and Diphenylethylenediamine.

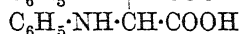
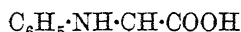
Dianilinomethane.

See Diphenylmethylenediamine.

Dianilinnaphthalene.

See Diphenylnaphthylenediamine.

Dianilinosuccinic Acid



$\text{C}_{16}\text{H}_{16}\text{O}_4\text{N}_2$ MW, 300

Leaflets from hot AcOH. M.p. 205°. Mod. sol. EtOH, CHCl_3 , hot Et_2O . Spar. sol. H_2O , C_6H_6 , ligroin.

Di-Et ester: $\text{C}_{20}\text{H}_{24}\text{O}_4\text{N}_2$. MW, 356. Needles. M.p. 152°. Sol. hot EtOH.

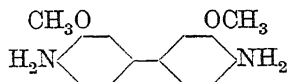
Dianilide: m.p. 220°.

Vorländer, *Ber.*, 1894, 27, 1604.

Dianisalacetone.

See Dianisylideneacetone.

Dianisidine (o-*Dianisidine*, 3:3'-dimethoxybenzidine, 3:3'-dimethoxy-4:4'-diaminodiphenyl)



$\text{C}_{14}\text{H}_{16}\text{O}_2\text{N}_2$ MW, 244

Leaflets. M.p. 137-8°. Sol. EtOH, Et_2O , Me_2CO , CHCl_3 , C_6H_6 . Mod. sol. boiling H_2O . Turns violet in air. Component for many azo dyestuffs.

4:4'-*N-Diacetyl*: prisms. M.p. 242-4° (231°). Sol. AcOH, CHCl_3 .

4:4'-*N-Dibenzoyl*: m.p. 236°.

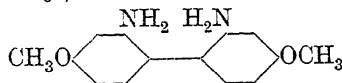
Dipicrate: decomp. at 225°.

Bodenstein, D.R.P. 172,569, (*Chem. Zentr.*, 1906, II, 479).

Starke, *J. prakt. Chem.*, 1899, 59, 211.

Langguth, *Chemie et Industrie*, 1930, 23, 34.

m-Dianisidine (4:4'-Dimethoxy-2:2'-diaminodiphenyl)



$\text{C}_{14}\text{H}_{16}\text{O}_2\text{N}_2$ MW, 244

M.p. 110.5-111°.

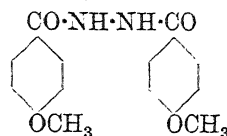
Hata, Tatematsu, Kubota, *Chem. Abstracts*, 1936, 30, 1056.

Dianisole.

See under Dihydroxydiphenyl.

Dict. of Org. Comp.—II.

sym.-Dianisoylhydrazine

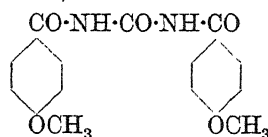


$\text{C}_{16}\text{H}_{16}\text{O}_4\text{N}_2$ MW, 300

Cryst. from EtOH. M.p. 224°. Mod. sol. hot EtOH. Prac. insol. H_2O , Et_2O .

Stollé, Bambach, *J. prakt. Chem.*, 1906, 74, 13.

sym.-Dianisoylurea (NN'-Di-p-methoxybenzoylcarbamide)

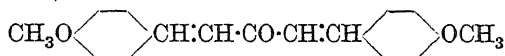


$\text{C}_{17}\text{H}_{16}\text{O}_5\text{N}_2$ MW, 328

M.p. 205-7° decomp. Spar. sol. H_2O , EtOH, AcOH.

Johnson, Jamieson, *Am. Chem. J.*, 1906, 35, 308.

Dianisylideneacetone (*Dianisalacetone*, di-p-methoxybenzylideneacetone, di-p-methoxydistyryl ketone)



$\text{C}_{19}\text{H}_{18}\text{O}_3$ MW, 294

Yellow leaflets from AcOEt. M.p. 129-30°. Sol. CHCl_3 , C_6H_6 , AcOH. Spar. sol. EtOH, Et_2O . Forms add. comps. with HCl, HBr, HI, H_2SO_4 , and other acids.

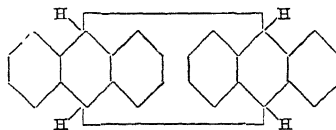
Oxime: m.p. 147-8°.

Baeyer, Villiger, *Ber.*, 1902, 35, 1192.

Straus, *Ann.*, 1910, 374, 59.

See also Kohler, Chadwell, *Organic Syntheses*, Collective Vol. I, 71.

Dianthracene (*Para-anthracene*, *dianthrene*, *paranthrene*)

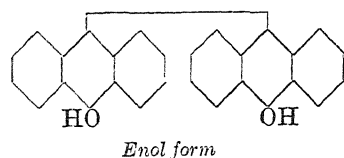
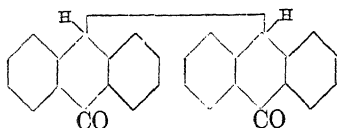


$\text{C}_{28}\text{H}_{20}$ MW, 356

Plates. M.p. 242-4° (275° slow heat.). Insol. MeOH, EtOH, Et_2O , AcOH, CS_2 , CHCl_3 , Me_2CO . Spar. sol. Py. Less sol. than anthracene in org. solvents. Non-fluorescent. Gives no picrate. Depolymerises to anthracene at 272°.

Luther, Weigert, *Chem. Zentr.*, 1904, II, 117.

Bodenstein, *Z. physik. Chem.*, 1913, 85, 338.

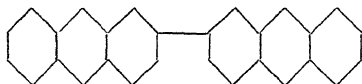
Dianthranol (*Dianthrol*, *dianthrone*)*Enol form**Keto form (Dianthrone)* $C_{28}H_{18}O_2$

MW, 386

Enol form. Leaflets. M.p. about 230°. Sol. alkalis. Spar. sol. EtOH. $FeCl_3$ on alc. sol. \rightarrow deep green col. Yellow sol. in conc. H_2SO_4 . CrO_3 in AcOH \rightarrow anthraquinone. Hot alc. HCl \rightarrow keto form (dianthrone).

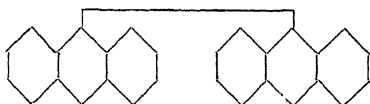
10 : 10'-*Diacetyl* : m.p. 284°.10 : 10'-*Dibenzoyl* : m.p. above 350°.10 : 10'-*Di-Me ether* : $C_{30}H_{22}O_2$. MW, 414. M.p. 245°.

Keto form. Dianthrone. M.p. about 250° decomp. Sol. $CHCl_3$. Spar. sol. EtOH. Insol. Et_2O , caustic alkalis. Alc. KOH \rightarrow enol form.

Meyer, *Ber.*, 1909, 42, 144.Barnett, Matthews, *J. Chem. Soc.*, 1923, 123, 387.Fisher, Eisner, *J. Org. Chem.*, 1941, 6, 169.Schönberg, Mustafa, *J. Chem. Soc.*, 1944, 67.Schönberg, Ismail, *ibid.*, 307.**2 : 2'-Dianthranyl** (2 : 2'-*Dianthrlyl*) $C_{28}H_{18}$

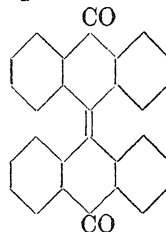
MW, 354

Yellow leaflets with green reflex from hot xylene. M.p. 355°.

Scholl, *Ber.*, 1919, 52, 1834.**9 : 9'-Dianthranyl** (*ms-Dianthrlyl*) $C_{28}H_{18}$

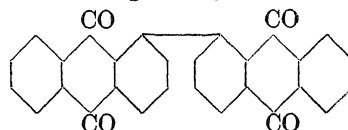
MW, 354

Two forms. (1) Cryst. from Py. M.p. above 360°. (2) Pale yellow cryst. M.p. 312° (300°).

Barnett, Matthews, *J. Chem. Soc.*, 1923, 123, 390.Barnett, Goodway, *J. Chem. Soc.*, 1929, 814.**Dianthraquinone** (*Bianthrone*, 9 : 9'-*dianthranyl*-10 : 10'-*quinone*) $C_{28}H_{16}O_2$

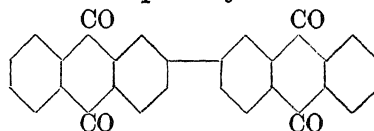
MW, 384

Yellow needles. M.p. above 300°. Spar. sol. ord. org. solvents. Mod. sol. hot acetophenone. Solid and sols. turn green on heating. Bordeaux red sol. in conc. H_2SO_4 . $CrO_3 \rightarrow$ anthraquinone. Zn dust + AcOH \rightarrow dianthranol.

Schönberg, Ismail, *J. Chem. Soc.*, 1944, 307.Barnett, Matthews, *J. Chem. Soc.*, 1923, 123, 390.Barnett, Goodway, *J. Chem. Soc.*, 1929, 814.**1 : 1'-Dianthraquinonyl** $C_{28}H_{14}O_4$

MW, 414

Brownish-yellow needles. M.p. 435° (426-7°). Spar. sol. most ord. org. solvents.

Ullmann, Minajeff, *Ber.*, 1912, 45, 689.Kopetschni, D.R.P. 360,419, (*Chem. Abstracts*, 1924, 18, 991).**2 : 2'-Dianthraquinonyl** $C_{28}H_{14}O_4$

MW, 414

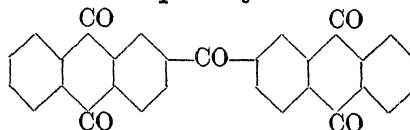
Brownish-yellow needles from $PhNO_2$. M.p. 387-8° (384°). Spar. sol. most ord. org. solvents.

Scholl, Neovius, *Ber.*, 1911, 44, 1089.Badische, D.R.P. 215,006, (*Chem. Zentr.*, 1909, II, 1906).Weber, Zink, *J. prakt. Chem.*, 1940, 155, 163.**Dianthraquinonylamine.**

See Dianthrimide.

Dianthraquinonylethylene.

See Anthraflavone.

2 : 2'-Dianthraquinonyl Ketone $C_{28}H_{14}O_5$

MW, 442

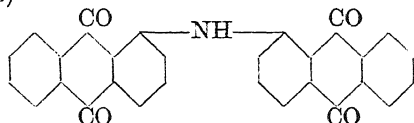
Green leaflets. M.p. 300–1°.

Mayer, Hoffmann, *Ber.*, 1932, 65, 1338.

Dianthrene.

See Dianthracene.

1 : 1'-Dianthrimide ($\alpha\alpha'$ -Dianthraquinonylamine)

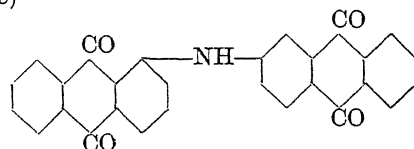


$C_{28}H_{15}O_4N$ MW, 429

Cryst. from $PhNO_2$ or aniline. Dark red needles. Spar. sol. most org. solvents. Green sol. in conc. H_2SO_4 , turning blue on addition of boric acid.

M.L.B., D.R.P. 201,327, (*Chem. Zentr.*, 1908, II, 997).

1 : 2'-Dianthrimide ($\alpha\beta'$ -Dianthraquinonylamine)



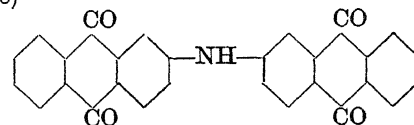
$C_{28}H_{15}O_4N$ MW, 429

Cryst. from $PhNO_2$ or aniline. Coppery-red needles with metallic lustre. Spar. sol. most org. solvents. Greenish-blue sol. in conc. H_2SO_4 .

Eckert, Steiner, *Monatsh.*, 1914, 35, 1132.

M.L.B., D.R.P. 201,327, (*Chem. Zentr.*, 1908, II, 997).

2 : 2'-Dianthrimide ($\beta\beta'$ -Dianthraquinonylamine)



$C_{28}H_{15}O_4N$ MW, 429

Pale coppery-red needles. Spar. sol. $PhNO_2$, aniline, quinoline. Insol. EtOH. Scarlet sol. in conc. H_2SO_4 turning green on standing.

Eckert, Steiner, *Monatsh.*, 1914, 35, 1133.

M.L.B., D.R.P. 216,083, (*Chem. Zentr.*, 1909, II, 1950).

Dianthrol.

See Dianthranol.

Dianthrone.

See Dianthranol.

Dianthryl.

See Dianthranyl.

Diarsenic tetraethyl.

See Arsenic diethyl.

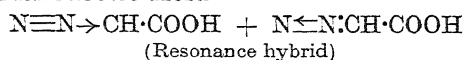
Diarsenoacetic Acid.

See Arsenoacetic acid.

Diazine.

See Pyrazine, Pyridazine and Pyrimidine.

Diazoacetic Acid



$C_2H_2O_2N_2$ MW, 86

Free acid unknown.

Me ester: $C_3H_4O_2N_2$. MW, 100. Yellow oil. B.p. 129°/720 mm., 73°/80 mm. D^{21}_4 1.139.

Et ester: diazoacetic ester. $C_4H_6O_2N_2$. MW, 114. Yellow oil. M.p. -22°. B.p. 141°/720 mm. (slight decomp.), 84°/61 mm. D^{24}_4 1.083. Sol. EtOH, Et₂O, C₆H₆, ligroin. Spar. sol. H₂O. Decomp. with explosion with conc. HCl or conc. H_2SO_4 . Boiling H₂O \rightarrow glycolic acid. Reduces Fehling's and AgNO₃.

Amide: $C_2H_3ON_3$. MW, 85. Yellow prisms. M.p. 114° decomp. Sol. H₂O, EtOH.

Nitrile: cyanodiazomethane. C_2HN_3 . MW, 67. Dark yellow oil. B.p. 47°/15 mm. Sol. H₂O. Unstable.

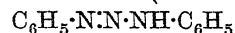
Curtius, *J. prakt. Chem.*, 1888, 38, 401.

Traube, *Ber.*, 1896, 29, 668.

Staudinger, *Helv. Chim. Acta*, 1921, 4, 239.

Womack, Nelson, *Organic Syntheses*, 1944, XXIV, 56.

Diazoaminobenzene (Diazobenzene-anilide)



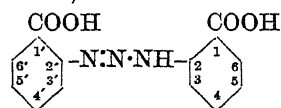
$C_{12}H_{11}N_3$ MW, 197

Two forms. (1) Golden-yellow leaflets or prisms from EtOH. M.p. 98°. Decomp. with slight explosion on sudden strong heating. Sol. Et₂O, C₆H₆. Mod. sol. hot EtOH. Insol. H₂O, dil. min. acids. Hot conc. HCl \rightarrow phenol, aniline, and nitrogen. Aniline hydrochloride \rightarrow *p*-aminoazobenzene. (2) Yellow prisms. M.p. 80–1°. Mod. sol. ligroin. Heat \rightarrow (1).

N-Acetyl: m.p. 130° decomp.

Hartmann, Dickey, *Organic Syntheses*, 1934, XIV, 24.

2 : 2'-Diazoaminobenzoic Acid (o-Diazoaminobenzoic acid)



$C_{14}H_{11}O_4N_3$ MW, 285

Brownish-yellow plates. M.p. 123°. Sol. ord. org. solvents. Insol. H₂O.

Me ester: $C_{15}H_{13}O_4N_3$. MW, 299. M.p. 127°.

Dinitrile: $C_{14}H_9N_5$. MW, 247. M.p. 133° decomp.

Niementowski, *Chem. Zentr.*, 1902, II, 938.

3 : 3'-Diazoaminobenzoic Acid (m-Diazoaminobenzoic acid).

Orange-yellow cryst. Explodes at 180°. Insol. H₂O, ord. org. solvents.

Di-Me ester: $C_{16}H_{15}O_4N_3$. MW, 313. M.p. 160°.

Di-Et ester: $C_{18}H_{19}O_4N_3$. MW, 341. M.p. 146°.

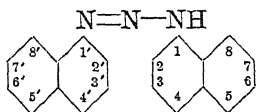
Bauer, Einhorn, *Ann.*, 1901, 319, 339.

4 : 4'-Diazoaminobenzoic Acid (*p*-Diazaminobenzoic acid).

Orange cryst. Spar. sol. hot EtOH.

Wilbrand, Beilstein, *Ann.*, 1863, 128, 269.

1 : 1'-Diazoaminonaphthalene



$C_{20}H_{15}N_3$

MW, 297

Yellow leaflets from EtOH. M.p. below 100°.

Martius, *Z. Chem.*, 1866, 137.

2 : 2'-Diazoaminonaphthalene.

Red needles from xylene. M.p. 156°.
 $H_2SO_4 \rightarrow$ violet col.

Nietzki, Goll, *Ber.*, 1886, 19, 1282.

Diazoaminotoluene.

See Dimethyldiazoaminobenzene.

Diazobenzene-anilide.

See Diazoaminobenzene.

Diazobenzene chloride.

See Benzenediazonium chloride.

Diazobenzene nitrate.

See Benzenediazonium nitrate.

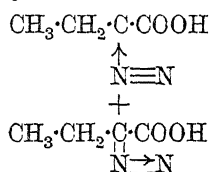
Diazobenzene sulphate.

See Benzenediazonium sulphate.

Diazobenzolimide.

See Phenyl azide.

1-Diazobutyric Acid



$C_4H_6O_2N_2$

MW, 114

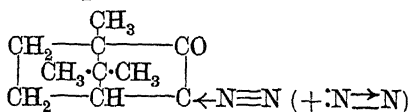
Free acid unknown.

Me ester: $C_5H_8O_2N_2$. MW, 128. Orange-yellow liq. B.p. 54-6°/12 mm. D_4^{18} 1.043. n_D^{24} 1.4465. Volatile in steam.

Et ester: $C_6H_{10}O_2N_2$. MW, 142. Golden-yellow liq. B.p. 63-5°/11 mm. D_4^{12} 1.028. n_D^{21} 1.4460.

Curtius, Müller, *Ber.*, 1904, 37, 1275.

Diazocamphor



$C_{10}H_{14}ON_2$

MW, 178

dl.

Yellow plates from pet. ether. M.p. 74°.
 $Zn + AcOH \rightarrow$ aminocamphor.

d.

M.p. 73°. $[\alpha]_D + 100^\circ$ in Et_2O , $+ 134.8^\circ$ in $CHCl_3$.

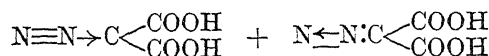
Noyes, Meitzner, *J. Am. Chem. Soc.*, 1932, 54, 3768.

Takeuchi, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 23, 288.

Diazole.

See Glyoxaline and Pyrazole.

Diazomalonic Acid



$C_3H_2O_4N_2$

MW, 130

Free acid unknown.

Et ester: $C_5H_6O_4N_2$. MW, 158. Yellow oil solidifying in ice to needles. B.p. 105°/12 mm. *Amide*: $C_5H_7O_3N_3$. MW, 157. Prisms from EtOH. M.p. 143°. *Anilide*: yellow needles. M.p. 73-4°. *p-Bromoanilide*: yellow needles from EtOH. M.p. 138.5°. *p-Toluidide*: yellow prisms from EtOH. M.p. 98-9°.

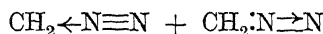
Monoanilide: pale yellow needles from Et_2O -pet. ether. M.p. 111-2° decomp.

Mono-p-bromoanilide: pale yellow needles from EtOH.Aq. Decomp. at 130°.

Mono-p-toluidide: yellow cryst. Sinters at 120°.

Piloty, Neresheimer, *Ber.*, 1906, 39, 514.

Diazomethane (*Azimeethylene*)



CH_2N_2

MW, 42

Yellow gas at ord. temp. B.p. about 0°. Sol. Et_2O . Explodes at 200°. Very poisonous. Powerful methylating agent. $HCl \rightarrow CH_3Cl$. $I \rightarrow CH_2I_2$. $HCN \rightarrow$ acetonitrile. Acetylene \rightarrow pyrazole. Acids \rightarrow methyl esters. Phenols \rightarrow methyl ethers.

Arndt, Amende, *Z. angew. Chem.*, 1930, 43, 444, (*Review, Bibl.*).

Arndt, *Organic Syntheses*, 1935, XV, 3.

Adamson, Kenner, *J. Chem. Soc.*, 1935, 286.

Arndt, Loewe, *Avan. Ber.*, 1940, 73, 606.

Eistert, *Z. angew. Chem.*, 1941, 54, 99, (*Review*).

Redemann *et al.*, *Organic Syntheses*, 1945, XXV, 28.

McPhee, Klingsberg, *Organic Syntheses*, 1946, XXVI, 13.

Diazonaphthalene chloride.

See Naphthalenediazonium chloride.

1-Diazopropionic Acid

 $\text{C}_3\text{H}_4\text{O}_2\text{N}_2$

MW, 100

Free acid unknown.

Me ester: $\text{C}_4\text{H}_6\text{O}_2\text{N}_2$. MW, 114. Yellow liq. B.p. $43-5^\circ/11$ mm. D_4^{15} 1.1011. n_D^{20} 1.4487. Volatile in steam.

Et ester: $\text{C}_5\text{H}_8\text{O}_2\text{N}_2$. MW, 128. Golden-yellow liq. B.p. $65-8^\circ/41$ mm. D_4^{15} 1.086. n_D^{18} 1.4472.

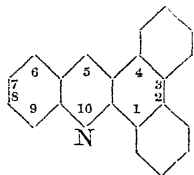
Curtius, Lang, *J. prakt. Chem.*, 1891, 44, 559.

Curtius, Müller, *Ber.*, 1904, 37, 1270.

Dibarbituric Acid.

See Hydurilic Acid.

1 : 2 : 3 : 4-Dibenzacridine (*Phenanthracridine*, *phenophenanthracridine*)

 $\text{C}_{21}\text{H}_{13}\text{N}$

MW, 279

Yellow needles from C_6H_6 . M.p. 204° . Sol. toluene, AcOH \rightarrow fluor. sols.

Austin, *J. Chem. Soc.*, 1908, 93, 1765.

1 : 2 : 6 : 7-Dibenzacridine (1 : 2 : 6 : 7-Dinaphthacridine, α -N- β : β -CH- α -dinaphthacridine). Yellow cryst. M.p. 228° . Spar. sol. EtOH. Sols. fluoresce. Not triboluminescent.

Kermack, Slater, Spragg, *Chem. Zentr.*, 1931, I, 618.

1 : 2 : 8 : 9-Dibenzacridine (1 : 2 : 8 : 9-Dinaphthacridine, α -N- α : β -CH- β -dinaphthacridine).

Yellow cryst. from EtOH. M.p. 189° (185°). Sol. Et_2O , C_6H_6 , CHCl_3 . Sublimes. Distills unchanged in vacuo. Sols. fluoresce. Triboluminescent.

Picrate: m.p. $176-8^\circ$.

Kermack, Slater, Spragg, *Chem. Zentr.*, 1931, I, 618.

2 : 3 : 6 : 7-Dibenzacridine (2 : 3 : 6 : 7-Dinaphthacridine, β -N- β : α -CH- β -dinaphthacridine).

Yellow needles from Py. M.p. 206° . Sol. Py. Spar. sol. EtOH, Et_2O . Insol. ligroin. Reddish-yellow sol. in conc. H_2SO_4 .

Strohbach, *Ber.*, 1901, 34, 4157.

3 : 4 : 6 : 7-Dibenzacridine (3 : 4 : 6 : 7-Dinaphthacridine, β -N- β : α -CH- α -dinaphthacridine).

Yellow needles or prisms. M.p. 216° . Sol. EtOH. Spar. sol. C_6H_6 . H_2SO_4 sol. shows green fluor. Triboluminescent.

B.HCl: deep yellow. M.p. $346-8^\circ$ decomp.

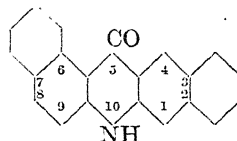
Picrate: bright yellow. M.p. $332-4^\circ$.

Kermack, Slater, Spragg, *Chem. Zentr.*, 1931, I, 618.

Lehmann, D.R.P. 703,567, (*Chem. Abstracts*, 1942, 36, 499).

Lehmann, U.S.P. 2,242,585, (*Chem. Abstracts*, 1941, 35, 5648).

2 : 3 : 6 : 7-Dibenzacridone

 $\text{C}_{21}\text{H}_{13}\text{ON}$

MW, 295

Yellow needles from MeOH or Py.Aq. M.p. above 300° . Sol. Py. Spar. sol. EtOH, Et_2O . *N-Et*: $\text{C}_{23}\text{H}_{17}\text{ON}$. MW, 323. Yellow needles from Me_2CO . M.p. 205° .

Strohbach, *Ber.*, 1901, 34, 4146.

Möhlau, *Ber.*, 1895, 28, 3098.

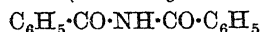
3 : 4 : 6 : 7-Dibenzacridone.

Plates from PhNO_2 or Py. M.p. 362° . Sol. acids with intense red col.

Abel, *Ber.*, 1892, 25, 3484.

Dischendorfer, *Ber.*, 1926, 59, 774.

Dibenzamide (N-Benzoylbenezamide)

 $\text{C}_{14}\text{H}_{11}\text{O}_2\text{N}$

MW, 225

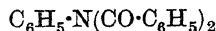
Rhombic cryst. from C_6H_6 or CHCl_3 . M.p. 148° . Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Prac. insol. H_2O . Forms *N*-Na deriv.

N-Phenyl: see Dibenzanilide.

Titherley, *J. Chem. Soc.*, 1904, 85, 1684.

Barth, Senhofer, *Ber.*, 1876, 9, 975.

Dibenzanilide (N-Dibenzoylaniline, N-phenyldibenzamide)

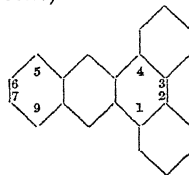
 $\text{C}_{20}\text{H}_{15}\text{O}_2\text{N}$

MW, 301

Needles from C_6H_6 . Prisms from EtOH. M.p. $163-4^\circ$. Very spar. sol. hot H_2O .

Freundler, *Compt. rend.*, 1903, 137, 712; *Bull. soc. chim.*, 1904, 31, 630.

1 : 2 : 3 : 4-Dibenzanthracene (1 : 2 : 3 : 4-Dinaphthantracene)

 $\text{C}_{22}\text{H}_{14}$

MW, 278

Straw-coloured needles from AcOH. M.p. $200-2^\circ$. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ pale violet-red col.

Picrate : red needles. M.p. 207°.

Clar, *Ber.*, 1929, 62, 350.

Bachmann, *J. Am. Chem. Soc.*, 1934, 56, 1363.

Moureu *et al.*, *Compt. rend.*, 1946, 223, 951.

1 : 2 : 5 : 6-Dibenzanthracene (1 : 2 : 5 : 6-*Dinaphthanthracene*).

Silvery leaflets from AcOH. M.p. 262°. Carcinogenic.

Dipicrate : orange needles. M.p. 214°.

Cook, *J. Chem. Soc.*, 1931, 487.

Fieser, Newman, *J. Am. Chem. Soc.*, 1936, 58, 2376.

Clar, *Ber.*, 1929, 62, 357.

Weitzenböck, Klingler, *Monatsh.*, 1918, 39, 315.

1 : 2 : 7 : 8-Dibenzanthracene (1 : 2 : 7 : 8-*Dinaphthanthracene*).

Needles from C₆H₆. M.p. 196°. Very spar. sol. EtOH, Et₂O. Sols. exhibit bluish-green fluor.

Picrate : crimson needles. M.p. 212°.

Cook, *J. Chem. Soc.*, 1932, 1472; 1931, 487.

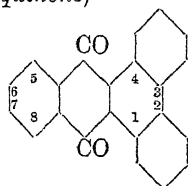
Waldmann, *J. prakt. Chem.*, 1932, 135, 1.

2 : 3 : 6 : 7-Dibenzanthracene (lin.-*Dinaphthanthracene*, *pentacene*).

Cryst. from C₆H₆. M.p. 270-1°.

Philippi, *Monatsh.*, 1914, 35, 379.

1 : 2 : 3 : 4-Dibenzanthraquinone (1 : 2 : 3 : 4-*Dinaphthanthraquinone*)



C₂₂H₁₂O₂

MW, 308

Cryst. from AcOH or butyl acetate. M.p. 181-3°.

Jeanes, Adams, *J. Am. Chem. Soc.*, 1937, 59, 2608.

Weizmann, Bergmann, Berlin, *J. Am. Chem. Soc.*, 1938, 60, 1331.

1 : 2 : 5 : 6-Dibenzanthraquinone (1 : 2 : 5 : 6-*Dinaphthanthraquinone*).

Reddish-yellow needles from AcOH. M.p. 245° (248-9°). Sol. xylene. Mod. sol. AcOH.

Waldmann, *J. prakt. Chem.*, 1932, 135, 1.

Clar, *Ber.*, 1929, 62, 350.

1 : 2 : 7 : 8-Dibenzanthraquinone (1 : 2 : 7 : 8-*Dinaphthanthraquinone*).

Reddish-yellow needles from AcOH. M.p. 227° (225-6°, 243-4°). Sublimes. Sol. AcOH, C₆H₆, Py.

Waldmann, *J. prakt. Chem.*, 1932, 135, 1.

Clar, *Ber.*, 1929, 62, 350.

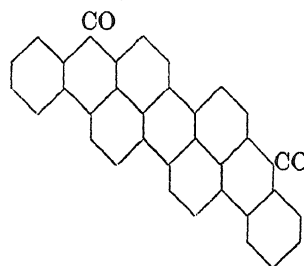
Cook, *J. Chem. Soc.*, 1932, 1472.

2 : 3 : 6 : 7-Dibenzanthraquinone (lin.-*Dinaphthanthraquinone*).

Yellow needles from Py or PhNO₂. M.p. 388-9° corr. (370-1°). Sublimes. Blue col. in conc. H₂SO₄ turning red on dilution.

Clar, John, *Ber.*, 1929, 62, 3021.

Dibenzanthrone (*Violanthrone*)



C₃₄H₁₆O₂

MW, 456

Bluish-black powder from PhNO₂. Sol. PhNO₂ → blue col. with reddish-brown fluor. Sol. conc. H₂SO₄ → bluish-violet col.

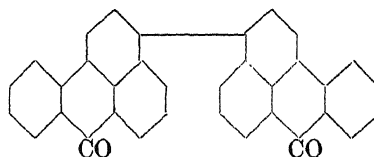
Emmer, U.S.P. 1,816,281, (*Chem. Abstracts*, 1931, 25, 5437).

Lüttringhaus, Neresheimer, *Ann.*, 1929, 473, 259, (*Bibl.*).

Jaeger, Daniels, U.S.P. 1,930,681, (*Chem. Abstracts*, 1934, 28, 182).

Howell, U.S.P. 2,388,743, (*Chem. Abstracts*, 1946, 40, 2007).

3 : 3'-Dibenzanthronyl (*Bz-1 : Bz-1'-Dibenzanthronyl*. See orientation under Benzanthrone)



C₃₄H₁₈O₂

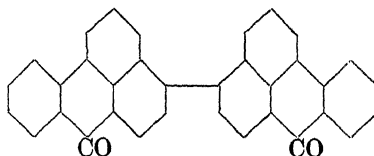
MW, 458

Dark yellow needles from *o*-dichlorobenzene. M.p. 412-4° (420° decomp.). Conc. H₂SO₄ → carmine-red col. with intense fluor.

S.C.I., B.P. 315,433, (*Chem. Abstracts*, 1930, 24, 1652).

Lüttringhaus, Neresheimer, *Ann.*, 1929, 473, 271.

4 : 4'-Dibenzanthronyl (See orientation under Benzanthrone)



C₃₄H₁₈O₂

MW, 458

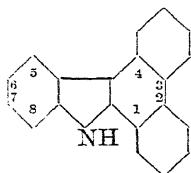
Yellow needles from *o*-dichlorobenzene. M.p. 230-1°. Sol. PhNO₂ with scarlet fluor. Spar. sol. ord. org. solvents. Ox. agents in presence

of 80–90°, H_2SO_4 at 115–40° \longrightarrow dibenzanthrone.

S.C.I. B.P. 315,433, (*Chem. Abstracts*, 1930, 24, 1652).

Lüttringhaus, Neresheimer, *Ann.*, 1929, 473, 271.

1 : 2 : 3 : 4-Dibenzcarbazole (1 : 2 : 3 : 4-Dinaphthacarbazole)



$\text{C}_{20}\text{H}_{13}\text{N}$

MW, 267

Needles from EtOH–pet. ether. M.p. 188–9°.

Japp, Maitland, *J. Chem. Soc.*, 1903, 83, 275.

Japp, Findlay, *J. Chem. Soc.*, 1897, 71, 1124.

1 : 2 : 5 : 6-Dibenzcarbazole (1 : 2 : 5 : 6-Dinaphthacarbazole).

Needles from Me_2CO or C_6H_6 . M.p. 231°.

Japp, Maitland, *J. Chem. Soc.*, 1903, 83, 274.

1 : 2 : 7 : 8-Dibenzcarbazole (1 : 2 : 7 : 8-Dinaphthacarbazole).

Leaflets from AcOH. M.p. 221°. Sol. EtOH, C_6H_6 . Spar. sol. AcOH, pet. ether.

N-Acetyl: does not melt below 300°.

N-Benzoyl: m.p. 119°.

N-Nitroso: does not melt below 300°.

Picrate: red needles. M.p. 242–3°.

Cumming, Howie, *J. Chem. Soc.*, 1932, 532.

Kalle, D.R.P. 343,149, (*Chem. Abstracts*, 1923, 17, 1334).

Hodgson, Habeshaw, *J. Chem. Soc.*, 1947, 77.

2 : 3 : 5 : 6-Dibenzcarbazole (2 : 3 : 5 : 6-Dinaphthacarbazole).

Needles from C_6H_6 . M.p. 295–6°. Sol. Me_2CO . Mod. sol. C_6H_6 . Spar. sol. EtOH.

Bucherer, Hayashi, *J. prakt. Chem.*, 1932, 132, 309.

3 : 4 : 5 : 6-Dibenzcarbazole (3 : 4 : 5 : 6-Dinaphthacarbazole).

Needles from EtOH. M.p. 158°. Sol. ord. org. solvents. Insol. pet. ether.

N-Acetyl: m.p. 144°.

N-Benzoyl: m.p. 269–72°.

N-Nitroso: reddish-yellow needles. M.p. 145–6°.

Picrate: m.p. 219°.

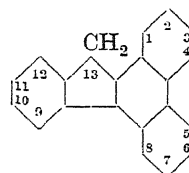
Cumming, Howie, *J. Chem. Soc.*, 1932, 531.

Corbellini, Marconi, *Gazz. chim. ital.*, 1932, 62, 39.

Dibenzdioxan.

See Diphenylene dioxide.

13-Dibenz-[a,c]-fluorene (1 : 2 : 3 : 4-Dibenzfluorene)



$\text{C}_{21}\text{H}_{14}$

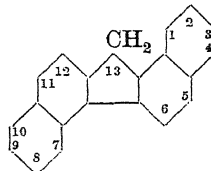
MW, 266

M.p. 115–16°.

Picrate: orange-yellow. M.p. 165–7°.

Bergmann, Blum-Bergmann, *J. Am. Chem. Soc.*, 1936, 58, 1678.

13-Dibenz-[a,g]-fluorene (1 : 2 : 5 : 6-Dibenzfluorene)



$\text{C}_{21}\text{H}_{14}$

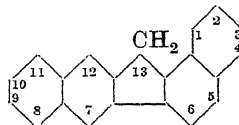
MW, 266

Plates from AcOEt. M.p. 174–5°.

Picrate: m.p. 187°.

Buu-Hoi, Cagniant, *Revue scientifique*, 1942, 80, 271.

13-Dibenz-[a,h]-fluorene (1 : 2 : 6 : 7-Dibenzfluorene)



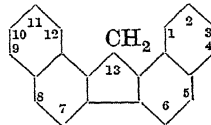
$\text{C}_{21}\text{H}_{14}$

MW, 266

Plates from C_6H_6 . M.p. 294–5°.

Cook, Preston, *J. Chem. Soc.*, 1944, 559.

13-Dibenz-[a,i]-fluorene (1 : 2 : 7 : 8-Dibenzfluorene)



$\text{C}_{21}\text{H}_{14}$

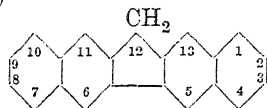
MW, 266

Plates from AcOEt. M.p. 234°.

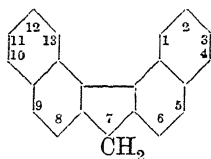
Picrate: orange needles. M.p. 191°.

Swain, Todd, *J. Chem. Soc.*, 1941, 679.

Buu-Hoi, Cagniant, *Compt. rend.*, 1943, 216, 299.

12-Dibenz-[b,h]-fluorene (2 : 3 : 6 : 7-Dibenzfluorene) $C_{21}H_{14}$

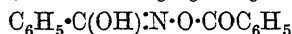
MW, 266

Plates from C_6H_6 . M.p. $282.5-3.5^\circ$.Martin, *J. Chem. Soc.*, 1941, 680.**7-Dibenz-[c,g]-fluorene** (3 : 4 : 5 : 6-Dibenzfluorene) $C_{21}H_{14}$

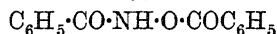
MW, 266

Plates from C_6H_6 . M.p. $152-2.5^\circ$.*Dipicrate*: reddish-brown. M.p. $154-5^\circ$.Martin, *J. Chem. Soc.*, 1941, 680.**Dibenzfuran.**

See Diphenylene oxide.

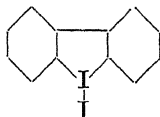
Dibenzhydroxamic Acid (*Benzhydroxamic benzoic ester*, *O*:*N*-dibenzoylhydroxylamine)

or

 $C_{14}H_{11}O_3N$

MW, 241

Needles or prisms. M.p. 165° ($158-9^\circ$). Mod. sol. hot EtOH. Prac. insol. H_2O , C_6H_6 , Et_2O , CS_2 . Reacts acid and forms alkali derivs. Decomp. on dist. Hyd. by alkalis to benzhydroxamic acid and benzoic acid. Hot alc. HCl \rightarrow hydroxylamine + benzoic acid.

N-Acetyl: m.p. $68-9^\circ$.Lossen, *Ann.*, 1894, 281, 221.Renfrow, Hauser, *J. Am. Chem. Soc.*, 1937, 59, 2312.Paolini, *Gazz. chim. ital.*, 1932, 62, 1053.**Dibenziodolium iodide** (*Diphenyleneiodonium iodide*) $C_{12}H_8I_2$

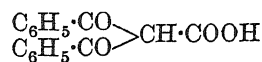
MW, 406

M.p. 215° .Mascarelli, Benati, *Gazz. chim. ital.*, 1908, 36, 627.Lothrop, *J. Am. Chem. Soc.*, 1941, 63, 1187.**Dibenzoquinone.**

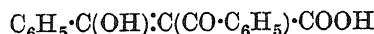
See Diphenoquinone.

Dibenzoyl.

See Benzil.

Dibenzoylacetic Acid

or

 $C_{16}H_{12}O_4$

MW, 268

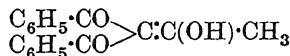
Needles from EtOH. M.p. 109° . Sol. Et_2O , C_6H_6 , hot EtOH. Spar. sol. H_2O . Boiling H_2O , or dist. \rightarrow dibenzoylmethane. Hot dil. $H_2SO_4 \rightarrow$ acetophenone + benzoic acid.

Et ester: $C_{18}H_{16}O_4$. MW, 296. M.p. 112° . Forms Cu deriv., m.p. 221° .

Nitrile: dibenzoylcyanomethane. $C_{16}H_{11}O_2N$. MW, 249. Needles. M.p. $156-7^\circ$.

Meyer, Togel, *Ann.*, 1906, 347, 78.**1 : 1-Dibenzoylacetone** (*Acetyldibenzoylmethane*)

or

 $C_{17}H_{14}O_3$

MW, 266

(1) *Enol form*: m.p. $80-5^\circ$: solidifies at $87-9^\circ$ and remelts at $99-101^\circ$.

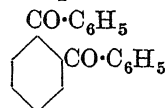
(2) *Keto form*: m.p. $150-1^\circ$.

Michael, *Ann.*, 1912, 390, 46.Claisen, *Ann.*, 1896, 291, 25.**Dibenzoylaniline.**

See Dibenzanilide.

***o*-Dibenzoylbenzene** (1 : 2-Dibenzoylbenzene).

Note.—This compound is sometimes erroneously referred to as phthalophenone, *q.v.*)

 $C_{20}H_{14}O_2$

MW, 286

Plates from $Me_2CO-EtOH$. M.p. 148° . Sol. EtOH, Et_2O , $CHCl_3$. Insol. H_2O .

Monoxime: m.p. 150° .Guyot, Vallette, *Ann. chim.*, 1911, 23, 363.Simonis, Remmert, *Ber.*, 1915, 48, 208.Kohler, *Am. Chem. J.*, 1908, 40, 227.Guyot, Haller, *Ann. chim.*, 1910, 19, 297.Lüttringhaus, Scholtis, *Ann.*, 1945, 557, 70.***m*-Dibenzoylbenzene** (1 : 3-Dibenzoylbenzene, *isophthalophenone*).

Leaflets from EtOH. M.p. $101-2^\circ$. Distils unchanged.

Monoxime: m.p. 201° .*Dioxime*: m.p. $70-3^\circ$.Ader, *Ber.*, 1880, 13, 320.Schlenk, Thal, *Ber.*, 1913, 46, 2850.

p-Dibenzoylbenzene (1:4-Dibenzoylbenzene, *terephthalophenone*).

Needles or leaflets from EtOH. M.p. 161°. Sol. hot AcOH, CHCl₃. Spar. sol. EtOH, Et₂O, C₆H₆.

Monoxime: m.p. 212–13°.

Dioxime: m.p. 235°.

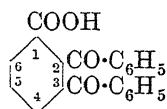
Schlenk, Thal, *Ber.*, 1913, **46**, 2850.

Philippi, *Monatsh.*, 1911, **32**, 634.

Münschmeyer, *Ber.*, 1886, **19**, 1847.

Delacre, *Bull. soc. chim.*, 1909, **5**, 961.

2:3-Dibenzoylbenzoic Acid



C₂₁H₁₄O₄ MW, 330

Cryst. from AcOH. M.p. 208°. Sol. EtOH, Et₂O. Dist. → diphenylphthalide.

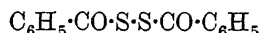
Graebe, Leonhardt, *Ann.*, 1896, **290**, 233.

2:6-Dibenzoylbenzoic Acid.

Cryst. M.p. about 100°.

Graebe, Leonhardt, *Ann.*, 1896, **290**, 233.

Dibenzoyl disulphide (*Benzoyl disulphide*)



C₁₄H₁₀O₂S₂ MW, 274

Prisms or plates from hot EtOH or CS₂. M.p. 133° (128°). Sol. hot CS₂. Spar. sol. hot EtOH, hot Et₂O. Insol. H₂O. Decomp. on dist. Decomp. by alc. KOH.

Binz, Marx, *Ber.*, 1907, **40**, 3857.

Fromm, Schmoldt, *ibid.*, 2862.

Shelton, Rider, *J. Am. Chem. Soc.*, 1936, **58**, 1282.

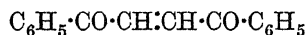
Bloch, Bergmann, *Ber.*, 1920, **53**, 969.

Westlake, Dougherty, *J. Am. Chem. Soc.*, 1945, **67**, 1861.

sym.-Dibenzoylthane.

See Diphenacyl.

***sym.*-Dibenzoylethylene** (1:2-Dibenzoyl-ethylene, diphenacylidene, 4:4'-diketo-4:4'-diphenylbutylene-2)



C₁₆H₁₂O₂ MW, 236

Cis.

Cryst. M.p. 134° (130°). Sol. ord. org. solvents.

Trans.

Yellow needles from C₆H₆ or EtOH. M.p. 111°. Sol. C₆H₆, CHCl₃, AcOH. Spar. sol. EtOH. Prac. insol. ligroin.

Dioxime: m.p. 210–11° decomp.

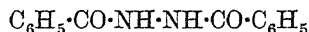
Conant, Lutz, *J. Am. Chem. Soc.*, 1923, **45**, 1305.

Kharasch, Nudenberg, Fields, *J. Am. Chem. Soc.*, 1944, **66**, 1276.

Bogoslovskii, *J. Gen. Chem. U.S.S.R.*, 1944, **14**, 993, (*Chem. Abstracts*, 1945, **39**, 4600).

Dupont, Germain, *Compt. rend.*, 1946, **223**, 743.

sym.-Dibenzoylhydrazine (*Hydrazodibenzoyl*)



C₁₄H₁₂O₂N₂ MW, 240

Silky needles from EtOH. M.p. 241° (234–5°). Prac. insol. cold H₂O, EtOH, Et₂O, CHCl₃. Sol. dil. caustic alkalis. Forms metallic derivs.

Benrath, Giesler, Gärtner, *J. prakt. Chem.*, 1924, **107**, 211.

Matzurevich, *Chem. Abstracts*, 1930, **24**, 5288.

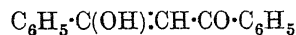
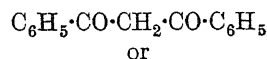
Dibenzoylhydroxylamine.

See Dibenzhydroxamic Acid.

Dibenzoyl-lysine.

See Lysuric Acid.

Dibenzoylmethane (*ω*-Benzoylacetophenone, phenyl phenacyl ketone, *γ*-hydroxychalkone)



C₁₅H₁₂O₂ MW, 224

Enol form:

Exists in two stereoisomeric modifications.

(1) M.p. 72–3°. (2) Cryst. from Et₂O. M.p. 78°. B.p. 165–70°/3 mm. FeCl₃ → reddish-violet col.

Keto form:

Plates. M.p. 81°. Sol. EtOH, Et₂O, CHCl₃.

Monoxime: m.p. 165°.

Monosemicarbazone: m.p. 205°.

Dufraisse, Gillet, *Compt. rend.*, 1926, **183**, 746.

Weygand, Bauer, Hennig, *Ber.*, 1929, **62**, 562.

Vila, *Chem. Abstracts*, 1930, **24**, 358.

Allen, Abell, Normington, *Organic Syntheses*, Collective Vol. I, 199.

Levine et al., *J. Am. Chem. Soc.*, 1945, **67**, 1510.

Haury, Cerrito, Ballard, U.S.P. 2,418,173, (*Chem. Abstracts*, 1947, **41**, 4510).

Dibenzoylmethyl bromide (*β*-Bromodibenzoylmethane)



C₁₅H₁₁O₂Br MW, 303

Needles from CHCl_3 . M.p. 93° . Sol. EtOH, CHCl_3 , C_6H_6 . Spar. sol. Et_2O , ligroin.

Kohler, Erickson, *J. Am. Chem. Soc.*, 1931, **53**, 2308.

Neufville, Pechmann, *Ber.*, 1890, **23**, 3377.

Keller, Halban, *Helv. Chim. Acta*, 1944, **27**, 1253.

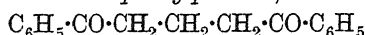
Dibenzoylornithine.

See Ornithuric Acid.

Dibenzoyl peroxide.

See Benzoyl peroxide.

1:3-Dibenzoylpropane (*Diphenacylmethane*, 1:5-diketo-1:5-diphenylpentane)



$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Needles or leaflets. M.p. 67.5° ($62-3^\circ$). Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Spar. sol. pet. ether.

Dioxime: m.p. $165-6^\circ$ decomp.

Japp, Michie, *J. Chem. Soc.*, 1901, **79**, 1017.

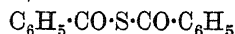
Milone, Venturello, *Gazz. chim. ital.*, 1936, **66**, 808.

See also Bauer, *Compt. rend.*, 1914, **158**, 1680.

Dibenzoylsuccinic Ester.

See Diethyl dibenzoylsuccinate.

Dibenzoyl sulphide (*Thiobenzoic anhydride*, *benzoyl sulphide*)



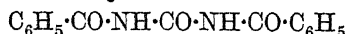
$\text{C}_{14}\text{H}_{10}\text{O}_2\text{S}$ MW, 242

Prisms from Et_2O . M.p. 48° . Sol. Et_2O . Insol. H_2O . Decomp. on dist.

Fromm, Schmoltdt, *Ber.*, 1907, **40**, 2862.

Blake, U.S.P. 2,331,650, (*Chem. Abstracts*, 1944, **38**, 1533).

sym.-Dibenzoylurea

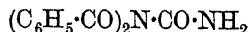


$\text{C}_{15}\text{H}_{12}\text{O}_3\text{N}_2$ MW, 268

Needles from hot AcOH or EtOH. M.p. 218° (203°). Sol. Me_2CO , AcOH. Mod. sol. C_6H_6 , CHCl_3 . Spar. sol. EtOH, Et_2O , hot H_2O . Decomp. above m.p. to benzamide, benzonitrile and CO_2 . Hot conc. HCl \longrightarrow benzoic acid + NH_3 .

Billeter, *Ber.*, 1903, **36**, 3219.

unsym.-Dibenzoylurea (*Dibenzoylamino-formamide*)

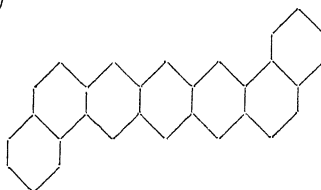


$\text{C}_{15}\text{H}_{12}\text{O}_3\text{N}_2$ MW, 268

Needles from hot EtOH. M.p. 197° . Spar. sol. cold EtOH. Insol. H_2O , Et_2O . Decomp. by acids and alkalis to benzoic acid, CO_2 and ammonia.

Buddéus, *J. prakt. Chem.*, 1890, **42**, 94.

Dibenz-[a,l]-pentacene (1:2:8:9-Dibenz-pentacene)



$\text{C}_{30}\text{H}_{18}$ MW, 378

Red leaflets. M.p. 440° decomp. Air + sunlight \longrightarrow colourless photo-oxide. SeO_2 in boiling $\text{PhNO}_2 \longrightarrow$ bright yellow quinone, m.p. $437-8^\circ$.

Clar, *Ber.*, 1943, **76**, 257.

Dibenz-[cd,lm]-perylene (*Peropyrene*)

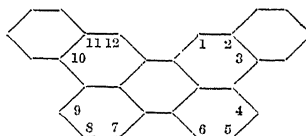


$\text{C}_{26}\text{H}_{14}$ MW, 326

Golden yellow cryst. from xylene. M.p. $374-5^\circ$. Sol. xylene with blue fluor. Conc. $\text{H}_2\text{SO}_4 \longrightarrow$ greenish-blue col.

Clar, *Ber.*, 1943, **76**, 149.

Dibenz-[b,n]-perylene (2:3:10:11-Dibenz-perylene)



$\text{C}_{28}\text{H}_{16}$ MW, 352

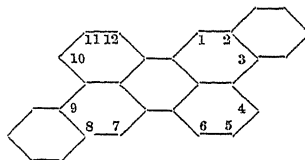
Yellow needles from xylene. M.p. $343-5^\circ$. Sol. EtOH, C_6H_6 , xylene to yellow sols. with greenish-blue fluor. Readily ox. in air. $\text{CrO}_3 \longrightarrow$ quinone, m.p. 300° . Conc. $\text{H}_2\text{SO}_4 \longrightarrow$ bluish-violet col.

Zinke, Troger, Ziegler, *Ber.*, 1941, **74**, 115.

Zinke, Ziegler, Gottschall, *Ber.*, 1942, **75**, 148.

Clar, *Ber.*, 1943, **76**, 458.

Dibenz-[b,k]-perylene (2:3:8:9-Dibenz-perylene)



$\text{C}_{28}\text{H}_{16}$ MW, 352

Golden yellow needles from xylene. M.p. 343° . Sol. xylene and PhNO_2 with blue fluor. Conc. $\text{H}_2\text{SO}_4 \longrightarrow$ violet-blue col.

Picrate: deep brown needles from xylene. M.p. 295° decomp.

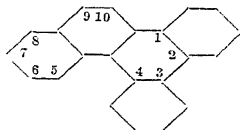
Schauenstein, Bürgermeister, *Ber.*, 1943, 76, 205.

Zinke, Ziegler, *Ber.*, 1941, 74, 115.

Joffe, *J. Gen. Chem. U.S.S.R.*, 1933, 3, 524.

Clar, *Ber.*, 1932, 65, 846.

1 : 2 : 3 : 4-Dibenzphenanthrene (*Benz-[g]-chrysene*)



$C_{22}H_{14}$ MW, 278

Needles from AcOH. M.p. 114.5–15°.

Picrate: scarlet needles from AcOH. M.p. 140–40.5°.

Hewett, *J. Chem. Soc.*, 1938, 93.

Bradsher, Smith, *J. Am. Chem. Soc.*, 1943, 65, 1643.

1 : 2 : 5 : 6-Dibenzphenanthrene (*Benz-[c]-chrysene*).

Needles from AcOH. M.p. 128°.

Picrate: reddish-orange needles. M.p. 126.5–7°.

Weidlich, *Ber.*, 1938, 71, 1203.

Bergmann, *J. Chem. Soc.*, 1938, 1291.

Hewett, *ibid.*, 1286.

2 : 3 : 5 : 6-Dibenzphenanthrene (*Benz-[b]-chrysene, naphth-2' : 3' : 1 : 2-phenanthrene*).

Greenish-yellow plates or leaves from AcOH. M.p. 261° (293–4°). Sol. AcOH or C_6H_6 with blue fluor. Conc. $H_2SO_4 \rightarrow$ red \rightarrow violet \rightarrow blue \rightarrow green col. Green fluor. in UV.

Dipicrate: orange-red cryst. M.p. 213°.

Clar, *Ber.*, 1929, 62, 1574.

Clar, Wallenstein, *Ber.*, 1931, 64, 2080.

Cook, Graham, *J. Chem. Soc.*, 1944, 329.

2 : 3 : 6 : 7-Dibenzphenanthrene.

Greenish-yellow leaflets or needles. M.p. 257°. Blue fluor. in sol., intense yellowish-green in UV.

Picrate: orange-red cryst. M.p. 184°.

Clar, John, *Ber.*, 1931, 64, 986.

2 : 3 : 7 : 8-Dibenzphenanthrene.

Greenish-yellow plates from xylene. M.p. 293–4°.

Clar, *Ber.*, 1929, 62, 1578.

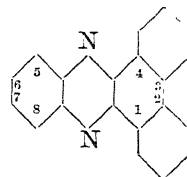
3 : 4 : 5 : 6-Dibenzphenanthrene.

Needles from EtOH. M.p. 177–8° (145–6°). Does not give a picrate.

Weitzenböck, Klingler, *Monatsh.*, 1918, 39, 323.

Cook, *J. Chem. Soc.*, 1933, 1597.

1 : 2 : 3 : 4-Dibenzphenazine



$C_{20}H_{12}N_2$ MW, 280

Pale yellow needles from EtOH. M.p. 219–20° (217°). Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. EtOH.

Yamada, Hasebe, *J. Soc. Chem. Ind. Japan*, 1938, 41, 290.

Willgerodt, Allert, *J. prakt. Chem.*, 1911, 84, 386.

Hinsberg, *Ann.*, 1887, 237, 340.

1 : 2 : 5 : 6-Dibenzphenazine.

Yellow needles from AcOH or C_6H_6 . M.p. 284° (279°). Spar. sol. ord. org. solvents. Green fluor. in C_6H_6 .

Fischer, Strauss, *Ber.*, 1908, 41, 397.

Japp, Burton, *J. Chem. Soc.*, 1887, 51, 100.

Meisenheimer, Witte, *Ber.*, 1903, 36, 4172.

1 : 2 : 6 : 7-Dibenzphenazine.

Yellow needles from AcOH. M.p. 283°.

Clemons, Dawson, *J. Chem. Soc.*, 1939, 1115.

Kramer, Bernhard, Bollweg, Zeh, U.S.P. 1,909,688, (*Chem. Abstracts*, 1933, 27, 3725).

1 : 2 : 7 : 8-Dibenzphenazine.

Yellow needles from EtOH or AcOH. M.p. 243°. EtOH, C_6H_6 and Py sols. show blue fluor. Green fluor. in AcOH.

Fischer, Hepp, *Ann.*, 1892, 272, 350.

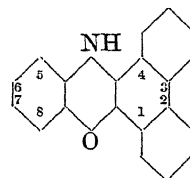
Fischer, Eilles, *J. prakt. Chem.*, 1909, 79, 568.

2 : 3 : 5 : 6-Dibenzphenazine.

Brownish-yellow needles from $PhNO_2$ or $CHCl_3$. M.p. 247°. Sublimes without decomp. Spar. sol. EtOH, C_6H_6 , AcOH, hot $CHCl_3$. Yellowish-green fluor. in C_6H_6 .

Hinsberg, *Ann.*, 1901, 319, 265.

1 : 2 : 3 : 4-Dibenzphenoxazine



$C_{20}H_{13}ON$ MW, 283

Yellow needles from alc. HCl in presence of $SnCl_2$.

Kehrmann, *Ber.*, 1905, 38, 2957.

1 : 2 : 7 : 8-Dibenzphenoxazine.

Lemon-yellow cryst. from C_6H_6 . M.p. 301° . Spar. sol. EtOH, Et_2O , AcOH, hot C_6H_6 . Sol. conc. H_2SO_4 with dark brown col.

N-Acetyl: yellowish cryst. from C_6H_6 -pet. ether. M.p. 235° .

Ris, *Ber.*, 1886, 19, 2244.

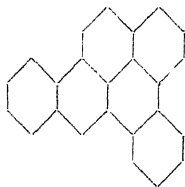
Dibenzphenthiazine.

See Dibenzthiodiphenylamine.

Dibenzpyran.

See Xanthene.

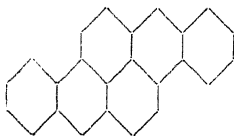
Dibenz-[a,e]-pyrene (1 : 2 : 4 : 5-Dibenzpyrene)



$C_{24}H_{14}$ MW, 302
Pale yellow. M.p. 225° . Sol. xylene. Conc. $H_2SO_4 \rightarrow$ red \rightarrow brown col.

Clar, *Ber.*, 1943, 76, 609.

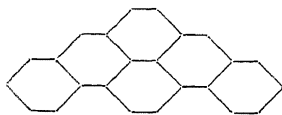
Dibenz-[a,h]-pyrene (3 : 4 : 8 : 9-Dibenzpyrene)



Golden orange plates from trichlorobenzene. M.p. 315° . Conc. $H_2SO_4 \rightarrow$ reddish-violet col.

Vollmann *et al.*, *Ann.*, 1939, 531, 1.

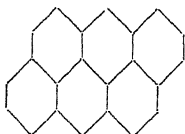
Dibenz-[a,i]-pyrene (3 : 4 : 9 : 10-Dibenzpyrene)



Greenish yellow needles or plates. M.p. $281.5-2^\circ$ (280°). Conc. $H_2SO_4 \rightarrow$ blue col.

Scholl, Neumann, *Ber.*, 1939, 72, 1648.

Dibenz-[cd,jk]-pyrene (Anthanthrene)



$C_{22}H_{12}$ MW, 276
Golden yellow plates from C_6H_6 . M.p. 261° (257°). Sol. $C_6H_6 \rightarrow$ yellow sol. with bright blue fluor. Conc. $H_2SO_4 \rightarrow$ brown col. CrO_3 in AcOH \rightarrow anthanthrone.

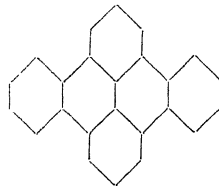
sym.-Trinitrobenzene add. comp.: deep red needles. M.p. $250-3^\circ$.

Scholl, Mayer, *Ber.*, 1934, 67, 1229.

Clar, *Ber.*, 1939, 72, 1645.

Orchin, Friedel, *J. Am. Chem. Soc.*, 1946, 68, 573.

Dibenz-[e,l]-pyrene (1 : 2 : 6 : 7-Dibenzpyrene)



Faintly yellow cryst. from C_6H_6 . M.p. $353-5^\circ$ ($340-2^\circ$). Sol. C_6H_6 , xylene. Conc. H_2SO_4 slowly \rightarrow green col.

Picrate: long red needles. Unstable.

Sako, *Bull. Chem. Soc. Japan*, 1934, 9, 55.

Clar, *Ber.*, 1943, 76, 609.

Dibenz- α -pyrone.

See under 2'-Hydroxydiphenyl-2-carboxylic Acid.

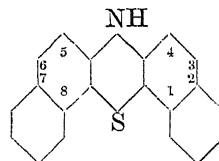
Dibenz- γ -pyrone.

See Xanthone.

Dibenzthiazyl disulphide.

See under 2-Mercaptobenzthiazole.

1 : 2 : 7 : 8-Dibenzthiodiphenylamine
(1 : 2 : 7 : 8-Dibenzphenthiazine)



$C_{20}H_{13}NS$ MW, 299

Yellowish-green needles from EtOH or C_6H_6 . M.p. 236° . Sol. EtOH, AcOH. Spar. sol. hot C_6H_6 . Sol. conc. H_2SO_4 with violet col.

N-Acetyl: needles from EtOH. M.p. 211° .

Picrate: almost black leaflets. M.p. about 256° decomp.

Ris, *Ber.*, 1886, 19, 2241.

Kym, *Ber.*, 1888, 21, 2811.

2 : 3 : 6 : 7-Dibenzthiodiphenylamine
(2 : 3 : 6 : 7-Dibenzphenthiazine).

Yellow needles from toluene. M.p. $222-3^\circ$.

Picrate: dark green prisms from $CHCl_3$. M.p. $250-1^\circ$ decomp.

Styphnate: dark green plates from EtOH- $CHCl_3$. M.p. $262-3^\circ$ decomp.

Fang, Liu, Sah, *Chem. Zentr.*, 1937, II, 2999.

3 : 4 : 5 : 6-Dibenzthiodiphenylamine
(3 : 4 : 5 : 6-Dibenzphenthiazine).

Orange-yellow leaflets from EtOH. M.p. 176–7°. Sol. conc. H_2SO_4 with bluish-green col. Kehrman, Misslin, Gressly, *Ann.*, 1902, 322, 51.

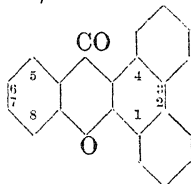
Dibenzthiophene.

See Diphenylene sulphide.

Dibenzthiopyran.

See Thioxanthene.

1 : 2 : 3 : 4-Dibenz-xanthone (1 : 2 : 3 : 4-Dinaphthaxanthone)



$\text{C}_{21}\text{H}_{12}\text{O}_2$ MW, 296

Needles from EtOH. M.p. 209°.

Ghigi, *Ber.*, 1937, 70, 743.

1 : 2 : 7 : 8-Dibenz-xanthone (1 : 2 : 7 : 8-Dinaphthaxanthone).

M.p. 184.5–5.5°.

S.C.I., F.P. 782,585, (*Chem. Abstracts*, 1935, 29, 6904).

1 : 2 : 8 : 9-Dibenz-xanthone (1 : 2 : 8 : 9-Dinaphthaxanthone).

Leaflets from xylene. M.p. 297° (240°) decomp. Darkens in light.

Clar, *Ber.*, 1929, 62, 357.

Barger, Starling, *J. Chem. Soc.*, 1915, 107, 420.

Strohbach, *Ber.*, 1901, 34, 4144.

2 : 3 : 7 : 8-Dibenz-xanthone (2 : 3 : 7 : 8-Dinaphthaxanthone, γ -dinaphthaxanthone).

Yellow needles from AcOH. M.p. 244.5–45°.

Clemo, Spence, *J. Chem. Soc.*, 1928, 2819.

S.C.I., F.P. 782,585, (*Chem. Abstracts*, 1935, 29, 6904).

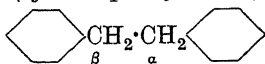
3 : 4 : 6 : 7-Dibenz-xanthone (3 : 4 : 6 : 7-Dinaphthaxanthone, α -dinaphthaxanthone).

Needles. M.p. 194°. Sublimes. Sol. CHCl_3 . Me_2CO , C_6H_6 . Spar. sol. EtOH, Et_2O , AcOH, $\text{H}_2\text{SO}_4 \rightarrow$ orange-yellow sol. with green fluor.

Dziewoński, Pizon, *Chem. Zentr.*, 1932, I, 390.

Dziewoński, Zalewska, *Chem. Zentr.*, 1933, II, 2395.

Gershzon, *J. Gen. Chem. U.S.S.R.*, 1943, 13, 136, (*Chem. Abstracts*, 1944, 38, 1479).

Dibenzyl (sym.-Diphenylethane)

$\text{C}_{14}\text{H}_{14}$ MW, 182

Cryst. from EtOH. M.p. 52°. B.p. 284°, 140–50°/13 mm. Sol. Et_2O , CS_2 , hot EtOH. D_{20}^{20} 0.9782. Heat of comb. C_p 1830.2 Cal.,

C_v 1828.3 Cal. CrO_3 or $\text{KMnO}_4 \rightarrow$ benzoic acid. $\text{HCl} + \text{KClO}_3$, hot PbO, or S in $\text{C}_6\text{H}_6 \rightarrow$ stilbene.

$\text{C}_{14}\text{H}_{14} \cdot 2\text{SbCl}_3$: m.p. 76°.

$\text{C}_{14}\text{H}_{14} \cdot 4\text{SbCl}_3$: m.p. 77.5°.

$\text{C}_{14}\text{H}_{14} \cdot 4\text{SbBr}_3$: m.p. 87°.

$\text{C}_{14}\text{H}_{14} \cdot 2\text{C}_6\text{H}_5(\text{NO}_2)_3$: 1 : 3 : 5 : m.p. 102°.

Michailenka, Protassowa, *Chem. Zentr.*, 1923, III, 1014.

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, 51, 2163.

Smith, Natelson, *J. Am. Chem. Soc.*, 1931, 53, 3476.

Evans, Pearson, Braithwaite, *J. Am. Chem. Soc.*, 1941, 63, 2574.

Wittig, Witt, *Ber.*, 1941, 74, 1474.

Schaack, U.S.P. 2,344,188, (*Chem. Abstracts*, 1944, 38, 3300).

Ratchevski, *Chem. Abstracts*, 1947, 41, 7121.

Dibenzylacetic Acid (1 : 3-Diphenylpropane-2-carboxylic acid, 2 : 2'-diphenylisobutyric acid)

$(\text{C}_6\text{H}_5 \cdot \text{CH}_2)_2\text{CH} \cdot \text{COOH}$

$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

M.p. 89°. Sol. EtOH, Et_2O , AcOH, CHCl_3 , C_6H_6 . Spar. sol. hot H_2O .

Me ester: $\text{C}_{17}\text{H}_{18}\text{O}_2$. MW, 254. Needles. M.p. 41°.

Et ester: $\text{C}_{18}\text{H}_{20}\text{O}_2$. MW, 268. B.p. 195–8°/14 mm.

Benzyl ester: $\text{C}_{23}\text{H}_{22}\text{O}_2$. MW, 330. M.p. 81°.

Chloride: $\text{C}_{16}\text{H}_{15}\text{OCl}$. MW, 258.5. B.p. 202°/18 mm., 192°/11 mm.

Amide: $\text{C}_{16}\text{H}_{17}\text{ON}$. MW, 239. Needles. M.p. 129°. B.p. 259°/18 mm. Sol. EtOH, Et_2O .

Nitrile: $\text{C}_{16}\text{H}_{15}\text{N}$. MW, 221. Leaflets. M.p. 89–91°. Sol. EtOH, Et_2O . Insol. H_2O .

Anilide: m.p. 155°.

Maxim, *Bull. soc. chim.*, 1926, 39, 1024.

Hill, *J. Chem. Soc.*, 1926, 956.

McElvain, Kuudiger, *J. Am. Chem. Soc.*, 1942, 64, 254.

Dibenzylacetone (Di-2-phenylethyl ketone, 3-keto-1 : 5-diphenylpentane)

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C}_6\text{H}_5$

$\text{C}_{17}\text{H}_{18}\text{O}$ MW, 238

M.p. 13–14° (9–10°). B.p. 352° (348°), 225°/15 mm., 208°/12 mm. D_4^{20} 1.0356. Does not form a bisulphite comp.

Oxime: needles. M.p. 95–6° (91°).

Semicarbazone: m.p. 118°.

2 : 4-Dinitrophenylhydrazone: red cryst. M.p. 115–17°.

Ipatieff, Orloff, *Chem. Abstracts*, 1928, 22, 1151.

Slotta, Behnisch, Szyszka, *Ber.*, 1934, 67, 1534.

Nightingale, Wadsworth, *J. Am. Chem. Soc.*, 1947, 69, 1181.

Dibenzylamine $\text{C}_{14}\text{H}_{15}\text{N}$

MW, 197

M.p. -26° . B.p. about 300° with some decomp., $270^\circ/250$ mm. Sol. EtOH, Et₂O. Insol. H₂O. D_4^{25} 1.0256. n_D^{25} 1.57432. Heat of comb. C_p 1860.9 Cal., C_v 1859.2 Cal. Cl.Aq. \rightarrow benzaldehyde.

B, HCl : leaflets. M.p. 256° . Sol. hot H₂O.

B, HBr : m.p. 266° (250°).

B, HI : m.p. 225° .

B, HNO_2 : m.p. 130° .

B, HNO_3 : m.p. 186° . Spar. sol. H₂O.

B, HCNS : m.p. $164-5^\circ$ ($156-7^\circ$).

$B, \text{C}_6\text{H}_5\text{COOH}$: m.p. 94° .

$B, 2\text{C}_6\text{H}_5\text{COOH}$: m.p. 111° .

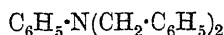
$B, \text{HCl}, \text{FeCl}_3$: m.p. 145° .

B, HAuBr_4 : m.p. 165° .

$B, \text{H}_2\text{PtCl}_6$: m.p. $230-2^\circ$ decomp.

p -Toluenesulphonate: m.p. $158-9^\circ$ corr.

Kindler, Peschke, Dehn, *Ann.*, 1931, 485, 113.

Dibenzylaniline (Phenyldibenzylamine) $\text{C}_{20}\text{H}_{19}\text{N}$

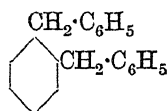
MW, 273

Needles or prisms. M.p. $71-2^\circ$ (69.5°). B.p. above 300° with decomp., $226^\circ/10$ mm. Sol. Et₂O, C₆H₆, hot EtOH, hot AcOH. Insol. H₂O. D_4^{20} 1.04436. n_D^{20} 1.60647.

Picrate: yellow needles. M.p. 132° decomp.

Courtot, Petitcolas, *Bull. soc. chim.*, 1926, 39, 455.

Desai, *J. Indian Inst. Sci.*, 1924, 7, 235, (*Chem. Abstracts*, 1925, 19, 2645).

***o*-Dibenzylbenzene ($\omega\omega'$ -Diphenyl-*o*-xylene)** $\text{C}_{20}\text{H}_{18}$

MW, 258

Needles from EtOH. M.p. 78° . Does not form a picrate. CrO_3 in AcOH \rightarrow *o*-dibenzoylbenzene.

Radzewanowski, *Ber.*, 1894, 27, 3237.

Huston, Friedemann, *J. Am. Chem. Soc.*, 1916, 38, 2531.

***m*-Dibenzylbenzene ($\omega\omega'$ -Diphenyl-*m*-xylene).**

B.p. $226-7^\circ/19$ mm., ($229-31^\circ/14$ mm.). Sol. Et₂O, C₆H₆. Spar. sol. EtOH. D_4^{20} 1.0535. Does not form a picrate. CrO_3 in AcOH \rightarrow *m*-dibenzoylbenzene.

Rabzewitsch-Sublowski, *Chem. Zentr.*, 1915, I, 836.

Zonew, *Chem. Zentr.*, 1923, I, 1498.

***p*-Dibenzylbenzene ($\omega\omega'$ -Diphenyl-*p*-xylene).**

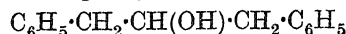
Leaflets. M.p. 86° . B.p. $225^\circ/18$ mm. Sol. CS₂, CHCl₃, C₆H₆, hot EtOH. Mod. sol. Et₂O. Does not form a picrate. Forms mixed cryst. with the *o*-isomer from EtOH, m.p. 87.5° . CrO_3 in AcOH \rightarrow *p*-dibenzoylbenzene.

Huston, Friedemann, *J. Am. Chem. Soc.*, 1916, 38, 2531.

Zonew, *Chem. Zentr.*, 1923, I, 1498.

Dibenzylcarbamic nitrile.

See Dibenzylcyanamide.

Dibenzylcarbinol (2-Hydroxy-1 : 3-diphenylpropane, 1 : 3-diphenylisopropyl alcohol) $\text{C}_{15}\text{H}_{16}\text{O}$

MW, 212

B.p. 327° , $188-9^\circ/12$ mm., $152-4^\circ/3.5$ mm. Sol. EtOH, Et₂O. Insol. H₂O. D_4^{17} 1.0619. $\text{CrO}_3 \rightarrow$ dibenzyl ketone.

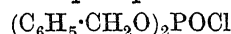
p-Nitrobenzoyl: m.p. $80-1^\circ$.

Zechmeister, Rom, *Ann.*, 1929, 468, 123.

Golovchanskaya, *J. Gen. Chem. U.S.S.R.*, 1946, 16, 1243, (*Chem. Abstracts*, 1947, 41, 3082).

Dibenzyl- α -carboxylic Acid.

See 1 : 2-Diphenylpropionic Acid.

Dibenzyl chlorophosphonate $\text{C}_{14}\text{H}_{14}\text{O}_3\text{ClP}$

MW, 296.5

Thick oil. Decomp. on standing. Used as phosphorylating agent.

Atherton, Openshaw, Todd, *J. Chem. Soc.*, 1945, 382.

Dibenzylcyanamide (Dibenzylcarbamic nitrile) $\text{C}_{15}\text{H}_{14}\text{N}_2$

MW, 222

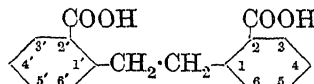
Leaflets from Et₂O. M.p. 54° . B.p. $145-8^\circ/10$ mm. Sol. EtOH, Et₂O. Insol. H₂O.

Traube, Engelhardt, *Ber.*, 1911, 44, 3151.

Hantzsch, Vogt, *Ann.*, 1901, 314, 364.

Dibenzylcyanoacetic Acid.

See under Dibenzylmalonic Acid.

Dibenzyl-2 : 2'-dicarboxylic Acid (sym.-Diphenylethane-*oo'*-dicarboxylic acid, di-*o*-carboxyphenylethane) $\text{C}_{16}\text{H}_{14}\text{O}_4$

MW, 270

Needles. M.p. 231° ($226-8^\circ$). Heat with soda-lime \rightarrow stilbene. Alk. $\text{KMnO}_4 \rightarrow$ dipthalic acid.

Di-Me ester: $\text{C}_{18}\text{H}_{16}\text{O}_4$. MW, 298. M.p. $100-1^\circ$. Sol. EtOH, CHCl₃, CS₂.

Di-Et ester: $C_{20}H_{22}O_4$. MW, 326. M.p. 71°.
Et ester-amide: $C_{18}H_{19}O_3N$. MW, 297.
 M.p. 65-8°.

Dinitrile: 2 : 2'-dicyanodibenzyl. $C_{16}H_{12}N_2$.
 MW, 232. M.p. 139°.

Fuson, *J. Am. Chem. Soc.*, 1926, **48**, 835.

Dibenzyl-4 : 4'-dicarboxylic Acid (sym.-
Diphenylethane-pp'-dicarboxylic acid, di-p-carboxyphenylethane).

Amorphous. M.p. above 320°. Insol. EtOH, Et₂O, C₆H₆. Alk. KMnO₄ → terephthalic acid.

Di-Me ester: m.p. 119°.

Di-Et ester: yellow cryst. M.p. 100°.

Dichloride: $C_{16}H_{12}O_2Cl_2$. MW, 307. Cryst. M.p. 119°. Sol. CS₂, C₆H₆.

Dinitrile: 4 : 4'-dicyanodibenzyl. M.p. 198°.

Fischer, Wolfenstein, *Ber.*, 1904, **37**, 3215.

Ratchewski, *Chem. Abstracts*, 1947, **41**, 7121.

Dibenzyl-α : β-dicarboxylic Acid.

See 1 : 2-Diphenylsuccinic Acid.

Dibenzyl disulphide (*Benzyl disulphide*)



$C_{14}H_{14}S_2$ MW, 246

Two forms.

(1) Leaflets from EtOH. M.p. 71-2°. Sol. Et₂O, C₆H₆, hot EtOH, hot MeOH. HNO₃ → benzoic + thiobenzoic acids. KOH fusion, or Zn + HCl → benzyl mercaptan. AcOH + H₂O₂ → dibenzyl disulphoxide, m.p. 108°. Sunlight → (2).

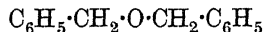
(2) M.p. 69-70°. Warmed with NaOH + EtOH → (1).

Fromm, Schmoldt, *Ber.*, 1907, **40**, 2870.

Hinsberg, *Ber.*, 1912, **45**, 2339.

Olin, Deger, U.S.P. 2,349,191, (*Chem. Abstracts*, 1945, **39**, 710).

Dibenzyl Ether



$C_{14}H_{14}O$ MW, 198

B.p. 295-8°, 224°/90 mm., 182-3°/22 mm., 160°/11 mm. D₄¹⁶ 1.0359. Decomp. on heating with Na or caustic alkali to toluene + benzoic acid. Decomp. on long standing in air.

Picrate: orange-yellow prisms. M.p. 77-8°.

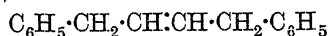
Szperl, Wierusz-Kowalski, *Chem. Zentr.*, 1918, **I**, 909.

Zeltner, Tarassoff, *Ber.*, 1910, **43**, 943.

Senderens, *Compt. rend.*, 1926, **182**, 612.

Strosacker, Amstutz, U.S.P. 2,237,241, (*Chem. Abstracts*, 1941, **35**, 4392).

sym.-Dibenzylethylene (1 : 4-Diphenyl-2-butylene)



$C_{16}H_{16}$ MW, 208

Two forms :

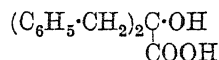
(1) Needles from MeOH. M.p. 45°. Sol. EtOH, Et₂O, CHCl₃, hot MeOH.

(2) B.p. 176°/13 mm.

Straus, *Ann.*, 1905, **342**, 255.

Schlenk *et al.*, *Ann.*, 1928, **463**, 98.

Dibenzylglycollic Acid (1-Hydroxydibenzyl-acetic acid, 1-hydroxy-2 : 2'-diphenylisobutyric acid)



$C_{16}H_{16}O_3$ MW, 256

Cryst. from EtOH or C₆H₆. M.p. 157-8° (154°). Sol. Et₂O. Very spar. sol. hot H₂O. Hot KOH.Aq. → toluene + oxalic acid.

Me ester: $C_{17}H_{18}O_3$. MW, 270. Needles. M.p. 71°. Sol. EtOH, Et₂O, C₆H₆.

Et ester: $C_{18}H_{20}O_3$. MW, 284. M.p. 45-6°.

Amide: $C_{16}H_{17}O_2N$. MW, 255. Needles. M.p. 192°.

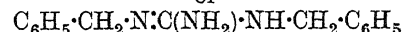
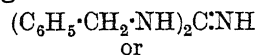
Nitrile: dibenzyl ketone cyanhydrin. $C_{16}H_{15}ON$. MW, 237. M.p. 110-13° decomp → dibenzyl ketone + HCN.

Acetyl: m.p. 106°.

Spiegel, *Ann.*, 1883, **219**, 45.

Claisen, Ewan, *Ann.*, 1895, **284**, 285.

Dibenzylguanidine



$C_{15}H_{17}N_3$ MW, 239

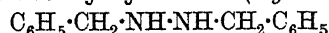
Leaflets or plates from EtOH. M.p. 100°.

B, HCl: m.p. 186°.

Strakosch, *Ber.*, 1872, **5**, 695.

Braun, Randall, *J. Am. Chem. Soc.*, 1934, **56**, 2134.

sym.-Dibenzylhydrazine (*Hydrazodibenzyl*)



$C_{14}H_{16}N_2$ MW, 212

Leaflets. M.p. 47°. Sol. EtOH, Et₂O. Insol. H₂O. Reduces NH₃.AgNO₃ but not Fehling's.

B, HCl: prisms. M.p. 222-5°.

N-Monoacetyl: needles. M.p. 78°.

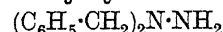
N : N'-Diacetyl: m.p. 117-18°.

N-Monobenzoyl: m.p. 87°.

Picrate: m.p. 130°.

Taipale, *Chem. Zentr.*, 1924, **I**, 902.

unsym.-Dibenzylhydrazine



$C_{14}H_{16}N_2$ MW, 212

Cryst. from pet. ether. M.p. 65°.

B, HCl: needles. M.p. 202°.

Busch, Weiss, *Ber.*, 1900, **33**, 2701.

Kenner, Wilson, *J. Chem. Soc.*, 1927, 1112.

N-Dibenzylhydroxylamine



$C_{14}H_{15}ON$ MW, 213
Needles. M.p. 123°. Sol. EtOH, Et₂O, C₆H₆. Mod. sol. AcOH, CS₂, ligroin. Spar. sol. hot H₂O. Insol. alkalis. Does not reduce Fehling's. HI or PCl₃ → dibenzylamine.
B, HCl: m.p. 186–94°.
Benzoyl: m.p. 96°.
Picrate: yellow leaflets. M.p. 151° (170° decomp.).

Gambarjan, Cialtician, *Ber.*, 1927, 60, 391.

Behrend, Leuchs, *Ann.*, 1890, 257, 208.

Dibenzylideneacetone.

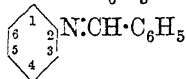
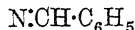
See Distyryl Ketone.

Dibenzylidene-ψ-butylene Glycol.

See Hydrocinnamoin.

Dibenzylidenhydrazine.

See Benzylideneazine.

Dibenzylidene-*o*-phenylenediamine

$C_{20}H_{16}N_2$ MW, 284
Prisms from ligroin. M.p. 106°. Sol. EtOH, Et₂O, ligroin. Insol. H₂O.

Hinsberg, Koller, *Ber.*, 1896, 29, 1499.

Dibenzylidene-*m*-phenylenediamine.

Yellowish needles from Et₂O. M.p. 105°. Spar. sol. ligroin. Insol. H₂O.

Meyer, Gross, *Ber.*, 1899, 32, 2366.

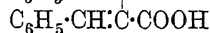
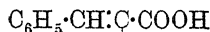
Dibenzylidene-*p*-phenylenediamine.

Leaflets from EtOH. M.p. 138–40°.

Ladenburg, *Ber.*, 1878, 11, 599.

Bucherer, Schwalbe, *Ber.*, 1906, 39, 2813.

Dibenzylidenesuccinic Acid (1 : 4-Diphenylfulgenic acid)



$C_{18}H_{14}O_4$ MW, 294

Prisms or leaflets from H₂O. M.p. 218° decomp. Sol. EtOH, Me₂CO, AcOEt. Spar. sol. Et₂O, CS₂, CHCl₃, C₆H₆, pet. ether, hot H₂O. KMnO₄ → benzoic + oxalic acids. NaHg → dibenzylsuccinic acid.

Di-Me ester: $C_{20}H_{18}O_4$. MW, 322. M.p. 116°.

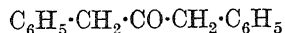
Di-Et ester: $C_{22}H_{22}O_4$. MW, 350. Prisms from Et₂O. M.p. 110–11°.

Stobbe, Naoúm, *Ber.*, 1904, 37, 2241.

Stobbe, Ljunggren, Freyberg, *Ber.*, 1926, 59, 270.

Müller, Gawlich, Kreutzmann, *Ann.*, 1935, 515, 108.

Dibenzyl Ketone (sym.-Diphenylacetone)



$C_{15}H_{14}O$ MW, 210

Cryst. from EtOH.Aq., Et₂O, or pet. ether. M.p. 35°. B.p. 331°. Gradually decomposes on standing in air and sunlight. CrO₃ → benzoic acid. Red. → dibenzylcarbinol.

Cyanhydrin: see under Dibenzylglycollic Acid.

Oxime: m.p. 125° (118°).

Semicarbazone: m.p. 146°.

Phenylhydrazone: needles or leaflets. M.p. 128–9° (121°).

Senderens, *Bull. soc. chim.*, 1910, 7, 648.

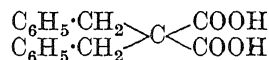
Apitzsch, *Ber.*, 1904, 37, 1429.

Hurd et al., *J. Am. Chem. Soc.*, 1933, 55, 2589.

Hurd, Thomas, *J. Am. Chem. Soc.*, 1936, 58, 1240.

Ashley et al., *J. Chem. Soc.*, 1942, 103.

Dibenzylmalonic Acid (1 : 3-Diphenylpropane-2 : 2-dicarboxylic acid)



$C_{17}H_{16}O_4$ MW, 284

Cryst. from H₂O. M.p. 175°. Sol. EtOH, Et₂O, Me₂CO, C₆H₆. Spar. sol. cold H₂O. Insol. ligroin. k (first) = 4.0×10^{-2} at 25°; (second) = 1.9×10^{-7} .

Di-Et ester: $C_{21}H_{24}O_4$. MW, 340. M.p. 14°. B.p. 234–5°/23 mm. D_4^{20} 1.093.

Chloride: $C_{17}H_{15}O_3Cl$. MW, 302.5. M.p. 68–9°. B.p. 216–8°/17 mm.

Amide: $C_{17}H_{17}O_3N$. MW, 283. M.p. 198–9°.

Diamide: $C_{17}H_{18}O_2N_2$. MW, 282. M.p. 197° (193°).

Nitrile: dibenzylcyanoacetic acid. $C_{17}H_{15}O_2N$. MW, 265. M.p. 194–5°. Et ester: $C_{19}H_{19}O_2N$. MW, 293. F.p. 33°. B.p. 237°/25 mm. Amide: $C_{17}H_{16}ON_2$. MW, 264. M.p. 165°.

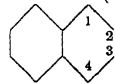
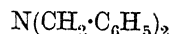
Dinitrile: $C_{17}H_{14}N_2$. MW, 246. Leaflets. M.p. 131°. Sol. EtOH, Et₂O.

Mono-anilide: m.p. 196–7°.

Leuchs, Radulescu, *Ber.*, 1912, 45, 194.

Bischoff, Siebert, *Ann.*, 1887, 239, 100.

Dibenzyl-1-naphthylamine



$C_{24}H_{21}N$ MW, 323

Needles from hot EtOH. M.p. 108°. Alc. sol. shows blue fluor.

B, HCl: m.p. 186°. Decomp. by H₂O.

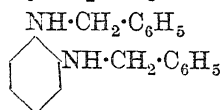
Bucherer, Seyde, *J. prakt. Chem.*, 1907, 75, 257.

Dibenzyl-2-naphthylamine.

Cryst. from EtOH. M.p. 120°. Spar. sol. EtOH. Red. in presence of AcOH and PdO → 2-naphthylamine.

Picrate: m.p. 137-8°.

Morgan, *J. Chem. Soc.*, 1900, 77, 825.

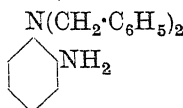
sym.-Dibenzyl-o-phenylenediamine

$\text{C}_{20}\text{H}_{20}\text{N}_2$ MW, 288

Cryst. from C_6H_6 -pet. ether. M.p. 71°.

B, HCl: m.p. 149°.

Fischer, Veiel, *Ber.*, 1905, 38, 323.

unsym.-Dibenzyl-o-phenylenediamine (2-Dibenzylaminoaniline, o-aminodibenzylaniline)

$\text{C}_{20}\text{H}_{20}\text{N}_2$ MW, 288

2-N-Acetyl: m.p. 121-2°.

2-N-Benzoyl: m.p. 155-6°.

Desai, *J. Indian Chem. Soc.*, 1928, 5, 425.

unsym.-Dibenzyl-m-phenylenediamine (3-Dibenzylaminoaniline, m-aminodibenzylaniline).

B, HCl: m.p. 185° decomp.

3-N-Acetyl: m.p. 143-4°.

3-N-Benzoyl: m.p. 171-2°.

3-N-Benzylidene: m.p. 156-8°.

Desai, *J. Indian Chem. Soc.*, 1928, 5, 425.

unsym.-Dibenzyl-p-phenylenediamine (4-Dibenzylaminoaniline, p-aminodibenzylaniline).

Needles from EtOH. M.p. 89-90°. Sol. Et₂O. Spar. sol. EtOH.

4-N-Acetyl: m.p. 137-8°.

4-N-Benzoyl: m.p. 166°.

4-N-Benzylidene: m.p. 166-7°.

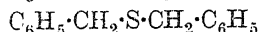
B, ZnCl₂: needles. M.p. 200-2°.

Matzudaira, *Ber.*, 1887, 20, 1614.

Desai, *J. Indian Chem. Soc.*, 1928, 5, 425.

Dibenzyl phosphate.

See under Phosphoric Acid.

Dibenzyl sulphide (Dibenzyl thioether, benzyl mercaptan benzyl ether, benzyl sulphide)

$\text{C}_{14}\text{H}_{14}\text{S}$ MW, 214

Plates from Et₂O or CHCl_3 . M.p. 49°. Sol. EtOH, Et₂O. Insol. H₂O. D_{20}^{25} 1.0712. De-comp. on dist.

$2\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{PtCl}_4$: m.p. 172° decomp.

$2\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{PtCl}_2$: m.p. 159°.

$2\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{PtBr}_2$: m.p. 139°.

$2\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{PtI}_2$: m.p. 129°.

Dict. of Org. Comp.—II.

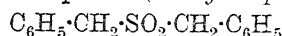
$\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{HgI}_2$: m.p. 37-8°.

$\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{FeCl}_3$: m.p. 94°.

$\text{C}_{14}\text{H}_{14}\text{S} \cdot \text{HgCl}_2$: m.p. 136°.

Shriner, Struck, Jorison, *J. Am. Chem. Soc.*, 1930, 52, 2066.

Snyder, Handrick, *J. Am. Chem. Soc.*, 1944, 66, 1860.

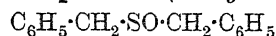
Dibenzyl sulphone (Benzyl sulphone)

$\text{C}_{14}\text{H}_{14}\text{O}_2\text{S}$ MW, 246

Needles from EtOH- C_6H_6 . M.p. 151°. Sol. C_6H_6 , AcOH, hot H₂O. Decomp. at 290°. Ox. → benzoic acid.

Wood, Travis, *J. Am. Chem. Soc.*, 1928, 50, 1226.

Böhme, Fischer, *Ber.*, 1942, 75, 1310.

Dibenzyl sulfoxide (Benzyl sulfoxide)

$\text{C}_{14}\text{H}_{14}\text{OS}$ MW, 230

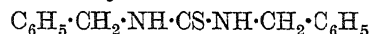
Leaflets from EtOH or H₂O. M.p. 134° (130°). Sol. EtOH, Et₂O, hot H₂O. Decomp. at 210°. HNO₃ → benzoic acid.

Shriner, Struck, Jorison, *J. Am. Chem. Soc.*, 1930, 52, 2066.

Fromm, Erfurt, *Ber.*, 1909, 42, 3808.

Böhme, *Ber.*, 1937, 70, 383.

Böhme, Fischer, *Ber.*, 1942, 75, 1310.

sym.-Dibenzylthiourea

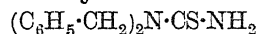
$\text{C}_{15}\text{H}_{16}\text{N}_2\text{S}$ MW, 256

Leaflets or plates from EtOH. M.p. 148° (145-6°). Sol. EtOH, Et₂O. Insol. H₂O.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 376T.

Underwood, Dains, *J. Am. Chem. Soc.*, 1935, 57, 1768.

Zetzsche, Friedrich, *Ber.*, 1940, 73, 1114.

unsym.-Dibenzylthiourea

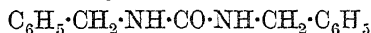
$\text{C}_{15}\text{H}_{16}\text{N}_2\text{S}$ MW, 256

Cryst. from EtOH. M.p. 139-40° (134-5°). Sol. EtOH. Spar. sol. H₂O.

Wallach, *Ber.*, 1899, 32, 1874.

Dibenzyltoluidine.

See under Toluidine.

sym.-Dibenzylurea

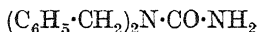
$\text{C}_{15}\text{H}_{16}\text{ON}_2$ MW, 240

Needles from EtOH. M.p. 168°. Sol. EtOH, AcOH. Insol. H₂O.

Mazourewitch, *Bull. soc. chim.*, 1924, 35, 1185.

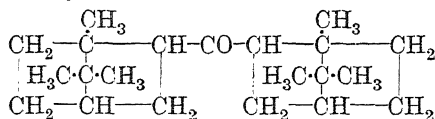
Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 793.

Dermer, King, *J. Org. Chem.*, 1943, 8, 168.

unsym.-Dibenzylurea

$C_{15}H_{16}ON_2$ MW, 240
Prisms from EtOH. M.p. 125°. Sol. EtOH,
hot H_2O .

Paternò, Spica, *Ber.*, 1876, 9, 81.

Dibornyl Ketone

$C_{21}H_{34}O$ MW, 302

B.p. 165°/4 mm. D_{20}^{20} 0.91. n_D^{25} 1.5019.
[α]₅₇₈₀¹⁵ - 43.7°, [α]₄₂₆₀¹⁵ - 46.7° in EtOH.

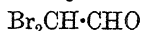
Quesnel, Tatibouet, *Bull. soc. chim.*, 1947,
1079.

Dibromin.

See Dibromobarbituric Acid.

1 : 2-Dibromoacenaphthene.

See under Acenaphthylene.

Dibromoacetaldehyde

$C_2H_2OBr_2$ MW, 202

B.p. 142° (138°/772 mm.). Very sol. H_2O ,
EtOH. Polymerises on standing. Decomp. by
alkalis.

Hydrate : m.p. 58-60°.

Di-Et acetal : b.p. 94-7°/12 mm. D_{25}^{25} 1.6200.
 n_D^{25} 1.4790.

Dibutyl acetal : b.p. 104°/1 mm. D_4^{20} 1.3937.
 n_D^{20} 1.4750.

Mylo, *Ber.*, 1912, 45, 647.

See also Dworzak, *Monatsh.*, 1925, 46,
253.

2 : 3-Dibromoacetanilide

$C_8H_7ONBr_2$ MW, 293

Needles from EtOH. M.p. 164°. Spar. sol.
hot EtOH.

Körner, Contardi, *Atti accad. Lincei*,
1906, 15, i, 528.

2 : 4-Dibromoacetanilide.

Needles from EtOH. M.p. 146° (144.7°).

Chattaway, Orton, Hurtle, *Ber.*, 1899,
32, 3637.

Owen, *J. Chem. Soc.*, 1923, 123, 3394.

Chaudhri, Desai, Hunter, *J. Indian Chem.*
Soc., 1934, 11, 249.

Thomassin, *Compt. rend.*, 1946, 222, 503.

2 : 5-Dibromoacetanilide.

M.p. 171-2°.

Wheeler, Valentine, *Am. Chem. J.*, 1899,
22, 277.

2 : 6-Dibromoacetanilide.

Prisms from EtOH. M.p. 210°. D^{16} 1.923.

Smith, Orton, *J. Chem. Soc.*, 1908, 93,
1249.

3 : 4-Dibromoacetanilide.

Needles or prisms. M.p. 128° (158°). Sol.
EtOH. Mod. sol. Et_2O . Spar. sol. ligroin.

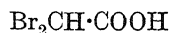
Vecchiotti, *Gazz. chim. ital.*, 1928, 58,
181.

Körner, *Atti accad. Lincei*, 1894, 3, ii,
158; *Gazz. chim. ital.*, 1895, 25, i, 96.

3 : 5-Dibromoacetanilide.

Needles from EtOH. M.p. 231°. Sol. EtOH,
AcOH. Spar. sol. $CHCl_3$, C_6H_6 .

Chattaway, Orton, *Ber.*, 1900, 33, 2397.

Dibromoacetic Acid

$C_2H_2O_2Br_2$ MW, 218

Deliquescent cryst. M.p. 48°. B.p. 232-4°
decomp., 195-7°/250 mm. Sol. EtOH, Et_2O .

Me ester : $C_3H_4O_2Br_2$. MW, 232. B.p.
182-4°.

Et ester : $C_4H_6O_2Br_2$. MW, 246. B.p. 194°,
121°/74 mm. D_{20}^{20} 1.9025. n_D^{15} 1.50167.

Bromide : $C_2H_2OBr_3$. MW, 281. Fuming
liq. B.p. 194°.

Amide : $C_2H_3ONBr_2$. MW, 217. M.p. 156°.

Nitrile : C_2HNBr_2 . MW, 199. B.p. 67-
9°/24 mm.

Schäffer, *Ber.*, 1871, 4, 368.

Perkin, Duppa, *Ann.*, 1858, 108, 111.

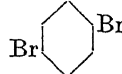
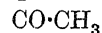
Genvresse, *Bull. soc. chim.*, 1892, 7, 365.

sym.-Dibromoacetone

$C_3H_4OBr_2$ MW, 216

Needles. M.p. 24°. Decomp. on dist. at
ord. press. Sol. Et_2O , CS_2 . D^{18} 2.167.

Hjelt, Siven, *Ber.*, 1888, 21, 3288.

2 : 5-Dibromoacetophenone

$C_8H_6OBr_2$ MW, 278

Needles from EtOH. M.p. 41°. $KMnO_4 \rightarrow$
2 : 5-dibromobenzoic acid.

Gibson, Levin, *J. Chem. Soc.*, 1931, 2395.

3 : 5-Dibromoacetophenone.

Needles from EtOH. M.p. 68° (65°). B.p.
198°/15 mm. Sol. EtOH, Et_2O , C_6H_6 . Insol.
 H_2O . Alk. $KMnO_4 \rightarrow$ 3 : 5-dibromobenzoic
acid.

Phenylhydrazone : yellow needles from EtOH.
M.p. 109-10°.

Semicarbazone : cryst. from AcOH.Aq. M.p.
268° decomp.

Azine : cryst. from C_6H_6 . M.p. 231° .

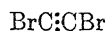
Bruining, *Rec. trav. chim.*, 1922, **41**, 655.

Fuchs, *Monatsh.*, 1915, **36**, 122, 129.

Dibromoacetophenone.

See also Phenacylidene bromide and Bromophenacyl bromide.

Dibromoacetylene



C_2Br_2 MW, 184

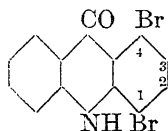
Heavy, poisonous liq. with unpleasant odour. M.p. -25° to -23° . B.p. about 76° . Sol. most ord. org. solvents. Insol. H_2O . Decomp. in air and explodes on heating.

I.G., B.P. 333,946, (*Chem. Abstracts*, 1931, **25**, 711).

Straus, Kollek, Heyn, *Ber.*, 1930, **63**, 1875.

Biltz, *Ber.*, 1927, **60**, 2413.

1 : 4-Dibromoacridone



$C_{13}H_7ONBr_2$ MW, 353

Pale yellow needles. M.p. $232-3^\circ$.

Nisbet, *J. Chem. Soc.*, 1933, 1372.

2 : 3-Dibromoacridone.

Does not melt below 360° . EtOH sol. shows bluish-violet fluor. \rightarrow green when alkaline.

Tanasesco, Ramontianu, *Bull. soc. chim.*, 1939, **6**, 486.

1 : 2-Dibromoacrylic Acid



$C_3H_2O_2Br_2$ MW, 230

Cryst. M.p. $85-6^\circ$. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. ligroin, CS_2 , C_6H_6 , cold H_2O . HBr \rightarrow 1 : 2 : 2-tribromopropionic acid.

Hill, Andrews, *Ber.*, 1881, **14**, 1676.

2 : 2-Dibromoacrylic Acid



$C_3H_2O_2Br_2$ MW, 230

Pearly leaflets. M.p. $85-6^\circ$. B.p. $243-50^\circ$ part. decomp. Sol. EtOH, Et_2O . Spar. sol. cold H_2O .

Et ester : $C_5H_6O_2Br_2$. MW, 258. B.p. $212-14^\circ$ part. decomp.

Lossen, Bergau, *Ann.*, 1906, **348**, 267.

1 : 2-Dibromoadipic Acid

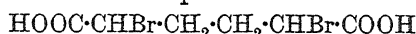


$C_6H_8O_4Br_2$ MW, 304

Cryst. from $Me_2CO-C_6H_6$. M.p. 143° .

Bedos, Ruyer, *Compt. rend.*, 1935, **200**, 944.

1 : 4-Dibromoadipic Acid.



$C_6H_8O_4Br_2$ MW, 304

d.

Cryst. from H_2O . M.p. $151-3^\circ$. $[\alpha]_D^{18} + 66.3^\circ$ in EtOH.

l.

Cryst. from H_2O . M.p. $151-3^\circ$. $[\alpha]_D^{18} - 65.1^\circ$ in EtOH.

dl.

Cryst. from formic acid. M.p. 139° . Sol. H_2O , Et_2O , AcOEt. Insol. C_6H_6 , ligroin.

Di-Me ester : $C_8H_{12}O_4Br_2$. MW, 332. M.p. $11-12^\circ$. B.p. $176-8^\circ/22$ mm., $169-70^\circ/14$ mm.

Di-Et ester : $C_{10}H_{16}O_4Br_2$. MW, 360. M.p. 9.5° .

Meso.

Prisms from formic acid. M.p. 193° . Sol. Et_2O , AcOEt. Spar. sol. cold EtOH. Insol. boiling C_6H_6 , cold H_2O .

Di-Me ester : needles from pet. ether. M.p. 75° . B.p. $182^\circ/10$ mm. Spar. sol. EtOH, pet. ether.

Di-Et ester : m.p. 67° . B.p. $195^\circ/10$ mm.

Diphenyl ester : cryst. from C_6H_6 . M.p. $146-8^\circ$.

Di- α -naphthyl ester : m.p. $165-7^\circ$.

Dibenzyl ester : cryst. from EtOH. M.p. 83° . B.p. about $280^\circ/15$ mm.

Diamide : $C_6H_{10}O_4Br_2$. MW, 302. M.p. 196° .

Ingold, *J. Chem. Soc.*, 1921, **119**, 962.

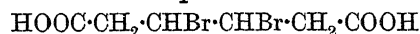
Holmberg, Müller, *Ber.*, 1925, **58**, 1601.

Guha, Sankaran, *Organic Syntheses*, 1946, XXVI, 57.

Buchman et al., *J. Am. Chem. Soc.*, 1942, **64**, 2696.

Zanden, Knotnerus, *Rec. trav. chim.*, 1944, **63**, 113.

2 : 3-Dibromoadipic Acid



$C_6H_8O_4Br_2$ MW, 304

Needles. M.p. 196° . Sol. EtOH, Et_2O , hot H_2O .

Di-Me ester : two forms. (1) Prisms from MeOH. M.p. 93° . (2) Cryst. powder from MeOH. M.p. 43° .

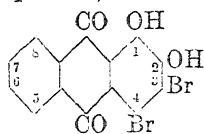
Di-Et ester : two forms. (1) Prisms from EtOH or pet. ether. M.p. 64° . (2) B.p. $180^\circ/14$ mm.

Baeyer, Rupe, *Ann.*, 1889, **256**, 19.

Farmer, *J. Chem. Soc.*, 1923, **123**, 2531.

Dibromoaldehydeacrylic Acid.

See Mucobromic Acid.

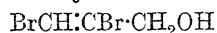
3 : 4-Dibromoalizarin (3 : 4-Dibromo-1 : 2-dihydroxyanthraquinone)

$C_{14}H_6O_4Br_2$ MW, 398

Yellow needles from AcOH. M.p. 251-2°.

1 : 2-Diacetyl : pale yellow needles from AcOH. M.p. 199-200°.

Dimroth, Schutze, Heinze, *Ber.*, 1921, 54, 3049.

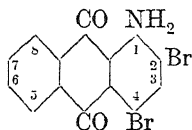
2 : 3-Dibromoallyl Alcohol

$C_3H_4OBr_2$ MW, 216

B.p. 205-8°.

Acetyl : b.p. 106-9°/20 mm.

Lespieau, *Ann. chim. phys.*, 1897, 11, 262.

2 : 4-Dibromo-1-aminoanthraquinone

$C_{14}H_7O_2NBr_2$ MW, 381

Bright red needles from toluene. M.p. 226° (222°). Sol. hot Py, hot $PhNO_2$. Spar. sol. EtOH, Et_2O , C_6H_6 , AcOH. Hot conc. H_2SO_4 → 2-bromo-4-hydroxy-1-aminoanthraquinone.

Bayer, D.R.P. 115,048, (*Chem. Zentr.*, 1900, II, 1093).

Ullmann, Eiser, *Ber.*, 1916, 49, 2165.

Mangini, Weger, *Chem. Abstracts*, 1945, 39, 418.

1 : 3-Dibromo-2-aminoanthraquinone.

Brownish-yellow prisms from AcOH. Needles from $PhNO_2$. M.p. 249.5° (247°). Sol. $PhNO_2$. Spar. sol. Et_2O , cold EtOH, AcOH, toluene.

2-N-Diacetyl : greenish-yellow cryst. M.p. 202° (211°).

2-N-Dibenzoyl : m.p. 233°.

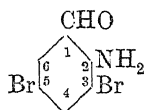
N-Benzylidene : greenish-yellow needles from C_6H_6 . M.p. 195°.

Bayer, D.R.P. 158,474, (*Chem. Zentr.*, 1905, I, 844).

Ullmann, Junghans, *Ann.*, 1913, 399, 330.

Ullmann, Medenwald, *Ber.*, 1913, 46, 1808.

Evenson, *Chem. Abstracts*, 1944, 38, 4133.

3 : 5-Dibromo-o-aminobenzaldehyde

$C_7H_5ONBr_2$

MW, 279

Pale yellow prisms from EtOH. M.p. 137-137.5°. Sol. EtOH, ligroin.

Oxime : needles. M.p. 189°.

Bamberger, Demuth, *Ber.*, 1901, 34, 1338.
Müller, *Ber.*, 1909, 42, 3699.

3 : 5-Dibromo-p-aminobenzaldehyde.

Cryst. from EtOH.Aq. M.p. 150°.

Oxime : needles. M.p. 164°.

Semicarbazone : yellow needles from AcOH.Aq. M.p. 294°.

Phenylhydrazone : yellow cryst. from EtOH. M.p. 147°. Turns brown in light.

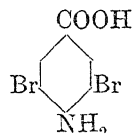
Anil : pale yellow cryst. from EtOH. M.p. 99°.

Janse, *Rec. trav. chim.*, 1921, 40, 285.

Blanksma, *Chem. Zentr.*, 1910, I, 260.

Dibromo-o-aminobenzoic Acid.

See Dibromoanthranilic Acid.

3 : 5-Dibromo-p-aminobenzoic Acid

$C_7H_5O_2NBr_2$ MW, 295

Needles from EtOH or $PhNO_2$. M.p. 330° decomp. Spar. sol. EtOH and most org. solvents. Insol. H_2O .

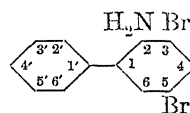
Me ester : m.p. 131-2.5°.

Ester : $C_9H_9O_2NBr_2$. MW, 323. M.p. 108°.

Propyl ester : m.p. 62-4.5°.

Beilstein, Geitner, *Ann.*, 1866, 139, 1.

Sudborough, Karvé, *Chem. Abstracts*, 1920, 14, 3652.

3 : 5-Dibromo-2-aminodiphenyl

$C_{12}H_9NBr_2$ MW, 327

Needles from EtOH.Aq. M.p. 51-2°.

N-Benzoyl : needles from EtOH. M.p. 218°.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 95.

4 : 5-Dibromo-2-aminodiphenyl.

Plates. M.p. 86°.

B.HCl : prisms. M.p. 215° decomp.

N-Acetyl : prisms. M.p. 151-2°.

Bellavita, *Chem. Zentr.*, 1936, I, 2341.

4 : 4'-Dibromo-2-aminodiphenyl.

Needles. M.p. 132°.

N-Acetyl : needles from EtOH. M.p. 192°.

N-Benzoyl : needles from EtOH. M.p. 176°.

Ritchie, *J. Proc. Roy. Soc. N.S. Wales*, 1945, 78, 141, (*Chem. Abstracts*, 1946, 40, 877).

4 : 5-Dibromo-3-aminodiphenyl.

N-Acetyl: needles from EtOH.Aq. M.p. 177°.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 1840.**4 : 2'-Dibromo-3-aminodiphenyl.**

Prisms. M.p. 88°.

N-Acetyl: prisms. M.p. 118°.

Bellavita, *Gazz. chim. ital.*, 1935, 65, 632.**3' : 5'-Dibromo-3-aminodiphenyl.**

Cryst. from pet. ether. M.p. 67-8°.

N-Acetyl: cryst. from C₆H₆. M.p. 177-8°.Case, *J. Am. Chem. Soc.*, 1939, 61, 770.**3 : 5-Dibromo-4-aminodiphenyl.**

Needles from EtOH. M.p. 119°.

N-Acetyl: cryst. from EtOH. M.p. 162°.

Scarborough, Waters, *J. Chem. Soc.*, 1926, 561.**2 : 4'-Dibromo-4-aminodiphenyl.**

Plates. M.p. 105°.

N-Acetyl: leaflets. M.p. 195°.

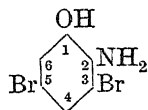
Finzi, Bellavita, *Gazz. chim. ital.*, 1934, 64, 335.**3 : 2'-Dibromo-4-aminodiphenyl.**Cryst. from Et₂O-pet. ether. M.p. 69-70°.

N-Acetyl: cryst. from MeOH. M.p. 161-2°.

Case, *J. Am. Chem. Soc.*, 1939, 61, 768.**3 : 4'-Dibromo-4-aminodiphenyl.**Cryst. from C₆H₆-pet. ether. M.p. 107-8°.N-Acetyl: needles from Me₂CO. Cryst. from EtOH. M.p. 194-5° (197°).Case, Sloviter, *J. Am. Chem. Soc.*, 1937, 59, 2382.**3' : 5'-Dibromo-4-aminodiphenyl.**

Prisms. M.p. 114°.

N-Acetyl: leaflets. M.p. 217-8°.

Bellavita, *Gazz. chim. ital.*, 1937, 67, 574.**3 : 5-Dibromo-o-aminophenol**C₆H₅ONBr₂

MW, 267

Needles from ligroin. M.p. 145° (142-3°). Sol. caustic alkalis. Sol. H₂O, hot ligroin. FeCl₃ → violet col. → brown ppt.

B.HCl: m.p. above 190°.

Me ether: 3 : 5-dibromo - o - anisidine. C₇H₇ONBr₂. MW, 281. N-acetyl: 3 : 5-dibromo-o-acetanisidide. M.p. 145°.Et ether: 3 : 5-dibromo - o - phenetidine. C₈H₉ONBr₂. MW, 295. M.p. 52-5°.Auwers, *Fortschritte der Chemie, Physik und physikalische Chemie*, 1926, 18, 34. Kohn, Karlin, *Monatsh.*, 1927, 48, 599.**4 : 6-Dibromo-o-aminophenol.**Pale yellow needles from EtOH.Aq. M.p. 99° (91-2°). Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O.Et ether: 4 : 6-dibromo-o-phenetidine. M.p. 92°. Sol. EtOH, Et₂O.N-Acetyl: yellow needles. M.p. 186°. Sol. EtOH, Et₂O, C₆H₆, alkalis.

N-Benzoyl: m.p. 198°.

Thiele, Eichwede, *Ann.*, 1900, 311, 373.**5 : 6-Dibromo-m-aminophenol.**Yellow needles. M.p. 133°. Sol. EtOH, Et₂O, CHCl₃, hot C₆H₆.Heller, *Ber.*, 1923, 56, 1873.**2 : 5-Dibromo-p-aminophenol.**

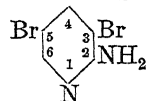
Yellow cryst. M.p. 195-7°.

Bargellini, Grippa, *Gazz. chim. ital.*, 1930, 60, 571.**2 : 6-Dibromo-p-aminophenol.**Needles from C₆H₆. M.p. 191-3°. Sol. EtOH. Mod. sol. Et₂O. Insol. H₂O.Me ether: 2 : 6-dibromo - p - anisidine. C₇H₇ONBr₂. MW, 281. M.p. 66°. N-Acetyl: needles from EtOH. M.p. 198°.Et ether: 2 : 6-dibromo - p - phenetidine. C₈H₉ONBr₂. MW, 295. Needles. M.p. 107°.Sol. EtOH, Et₂O, C₆H₆. N-Acetyl: m.p. 198°.N-Acetyl: leaflets + 1H₂O. M.p. 173-4°.

N-Benzoyl: needles from EtOH. M.p. 208°.

N-Benzylidene: plates. M.p. 94-5°.

N-Piperonylidene: yellow needles. M.p. 150-2°.

Bargellini, Monti, *Atti accad. Lincei*, 1930, 11, 574.**3 : 5-Dibromo-2-aminopyridine**C₅H₄N₂Br₂

MW, 252

Needles from EtOH.Aq. or pet. ether. M.p. 106-7° (103-4°). Volatile in steam.

Hydrochloride: needles from EtOH-Et₂O. M.p. 193°. Sol. H₂O.

N-Acetyl: needles from EtOH.Aq. M.p. 102°.

N-Benzoyl: needles from EtOH.Aq. M.p. 142-3°.

N-Salicylidene: orange needles from ligroin. M.p. 162°.

Chloroaurate: m.p. 212°.

Chloroplatinate: yellow needles. Decomp. at 285-315°.

HgCl₂ salt: needles. M.p. 174°.

Picrate: yellow needles. M.p. 228°.

Tschitschibabin, Tjashelowa, *Chem. Zentr.*, 1923, III, 1021.Fischer, Chur, *J. prakt. Chem.*, 1916, 93, 363.Hertog, *Rec. trav. chim.*, 1945, 64, 85.

2 : 6-Dibromo-3-aminopyridine.

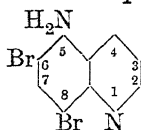
Needles from C_6H_6 . M.p. 145° (142°). Sol. EtOH, Et_2O .

Schickh, Binz, Schulz, *Ber.*, 1936, 69, 2605.
Plazek, Marcinkow, *Chem. Abstracts*, 1935, 29, 2535.

3 : 5-Dibromo-4-aminopyridine.

Needles from EtOH. M.p. $169-70^\circ$. Sublimes slowly at 80° . Sol. MeOH, EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin, hot H_2O .

Dohrn, Diedrich, *Ann.*, 1932, 494, 301.
Hertog, *Rec. trav. chim.*, 1945, 64, 85.

6 : 8-Dibromo-5-aminoquinoline

$C_9H_6N_2Br_2$ MW, 302

Plates or prisms from EtOH. M.p. 184° (179°).

B, HCl : red cryst. Decomp. at 216° without melting.

B, HBr : reddish-yellow cryst. M.p. 235° decomp.

$B_2, SnCl_4$: deep red needles. M.p. $325-30^\circ$.
 B_2, H_2PtCl_6 : orange-red ppt. Decomp. at 275° .

Methiodide: yellow needles. M.p. 238° .

Claus, Setzer, *J. prakt. Chem.*, 1896, 53, 408.

Claus, Caroselli, *J. prakt. Chem.*, 1895, 51, 479.

3 : 5-Dibromo-6-aminoquinoline.

Needles from EtOH. M.p. 146° . Sublimes. B, HBr : yellow cryst. M.p. 210° .

Claus, Schnell, *J. prakt. Chem.*, 1896, 53, 115.

5 : 8-Dibromo-6-aminoquinoline.

Needles. M.p. 162° . Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 .

Claus, Wolf, *J. prakt. Chem.*, 1895, 51, 491.

5 : 7-Dibromo-8-aminoquinoline.

Needles from EtOH. M.p. 127° . Sol. EtOH, Et_2O , $CHCl_3$. Prac. insol. cold H_2O . Sublimes. Volatile in steam.

B, HCl : red needles. M.p. 191° .

B, HBr : m.p. 265° .

B_2, H_2PtCl_6 : yellow needles. Decomp. at 230° .

N-Acetyl: plates from EtOH. M.p. 172° .

N-Benzoyl: yellowish plates from EtOH.Aq. M.p. $155-6^\circ$.

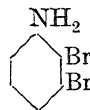
Claus, Setzer, *J. prakt. Chem.*, 1896, 53, 401.

Claus, Ammelburg, *J. prakt. Chem.*, 1894, 50, 34.

Kunckell, *Chem. Zentr.*, 1910, II, 95.

Dibromoaminoxylene.

See Dibromoxylidine.

2 : 3-Dibromoaniline

$C_6H_5NBr_2$ MW, 251

Plates from EtOH.Aq. M.p. 43° . Sol. EtOH, Et_2O , AcOEt. Spar. sol. H_2O . Volatile in steam.

N-Acetyl: see 2 : 3-Dibromoacetanilide.

Körner, Contardi, *Atti accad. Lincei*, 1906, 15, i, 527.

2 : 4-Dibromoaniline.

Leaflets or needles from EtOH.Aq. M.p. $79-80^\circ$. Sol. EtOH, AcOH. $D^{20} 2.260$.

N-Formyl: m.p. 146° .

N-Acetyl: see 2 : 4-Dibromoacetanilide.

N-Diacetyl: m.p. $54-5^\circ$.

N-Benzoyl: m.p. 134° .

Picrate: m.p. 124° .

N-Me: $C_7H_7NBr_2$, MW, 265. Plates from EtOH. M.p. $48-9^\circ$. B_2, H_2PtCl_6 : yellow needles. Sinters at 210° . M.p. about 216° .

N-Di-Me: $C_8H_9NBr_2$, MW, 279. B.p. $275^\circ/740$ mm. B, HBr : plates from EtOH. M.p. 110° . B_2, H_2PtCl_6 : yellow needles from dil. HCl. M.p. 237° decomp.

Wurster, *Ber.*, 1873, 6, 1491.

Baltzly, Buck, *J. Am. Chem. Soc.*, 1941, 63, 1757.

Putokhin, *J. Gen. Chem. U.S.S.R.*, 1945, 15, 332, (*Chem. Abstracts*, 1946, 40, 3741).

2 : 5-Dibromoaniline.

Cryst. from EtOH. M.p. $51-2^\circ$.

N-Acetyl: see 2 : 5-Dibromoacetanilide.

N-Di-Me: b.p. $134-7^\circ/10$ mm. *Picrate*: light yellow prisms. M.p. 149° .

Meyer, Stücker, *Ann.*, 1873, 165, 180.

2 : 6-Dibromoaniline.

Needles from EtOH. M.p. $83-4^\circ$ ($87-8^\circ$). B.p. $262-4^\circ$. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 .

B, HCl : needles. M.p. 126° .

N-Acetyl: see 2 : 6-Dibromoacetanilide.

N-Diacetyl: m.p. $100-1^\circ$.

Picrate: m.p. $123-4^\circ$.

Claus, Weil, *Ann.*, 1892, 269, 219.

Siekel, *Organic Syntheses*, 1944, XXIV, 47.

3 : 4-Dibromoaniline.

Cryst. from EtOH.Aq. M.p. $80-1^\circ$. Sublimes above m.p. Sol. EtOH.

B, HCl : decomp. at $220-30^\circ$.

N-Acetyl: see 3 : 4-Dibromoacetanilide.

N-Diacetyl: m.p. 208° decomp.

Picrate: yellow needles. M.p. 149° .

N-Di-Me: needles or plates from Me_2CO .

M.p. 68–70°. *Picrate*: yellow cryst. from AcOH. M.p. 161–3° decomp.

Wheeler, Valentine, *Am. Chem. J.*, 1899, 22, 275.

3 : 5-Dibromoaniline.

Needles. M.p. 56·5° (47·5–50·5°). Sol. EtOH, Et₂O.

N-*Formyl*: m.p. 100°.

N-*Acetyl*: see 3 : 5-Dibromoacetanilide.

N-*Benzoyl*: m.p. 169°.

N-*Di-Me*: plates from Me₂CO. M.p. 77–9°.

Picrate: yellow prisms from EtOH. M.p. 151–3°.

Körner, *Gazz. chim. ital.*, 1874, 4, 368.

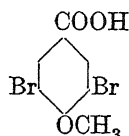
Holleman, *Rec. trav. chim.*, 1906, 25, 195.

Blanksma, *Rec. trav. chim.*, 1909, 28, 108.

Senear *et al.*, *J. Org. Chem.*, 1946, 11, 378.

Shepherd, *J. Org. Chem.*, 1947, 12, 275.

3 : 5-Dibromoanisic Acid



C₈H₆O₃Br₂

MW, 310

Prisms from EtOH. M.p. 214° (207°). Sublimes. Heat with Br.Aq. → 2 : 4 : 6-tribromoanisole → bromanil.

Me ester: C₉H₈O₃Br₂. MW, 324. Needles. M.p. 92°.

Et ester: C₁₀H₁₀O₃Br₂. MW, 338. M.p. 88°.

Zincke, *Ann.*, 1912, 388, 294.

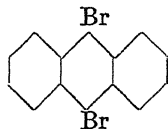
Dibromoanisidine.

See under Dibromoaminophenol.

Dibromoanisole.

See under Dibromophenol.

9 : 10-Dibromoanthracene



C₁₄H₈Br₂

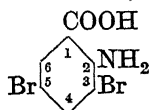
MW, 336

Yellow needles from xylene. M.p. 226°. Mod. sol. hot C₆H₆, hot toluene. Very spar. sol. EtOH, Et₂O. Sublimes. Ox. → anthraquinone.

sym.-*Trinitrobenzene add. comp.*: m.p. 179°.

Heilbron, Heaton, *Organic Syntheses*, Collective Vol. I, 201.

3 : 5-Dibromoanthranilic Acid (3 : 5-Dibromo-o-aminobenzoic acid)



C₇H₅O₂NBr₂

MW, 295

Needles from EtOH. M.p. 235–6° (225°). Decomp. at 260–70°. Sol. EtOH, Et₂O, Me₂CO, AcOH, hot C₆H₆. Insol. H₂O, ligroin.

N-*Acetyl*: m.p. 221° decomp.

Me ester: C₈H₇O₂NBr₂. MW, 309. Needles. M.p. 90° (84°). N-*Acetyl*: m.p. 91°.

Et ester: C₉H₉O₂NBr₂. MW, 323. Needles. M.p. 74°.

Amide: C₇H₆ON₂Br₂. MW, 294. M.p. 196–7°.

Nitrile: C₇H₄N₂Br₂. MW, 276. Needles from EtOH. M.p. 156°.

Hübner, Hesemann, Köhler, *Ann.*, 1884, 222, 175.

Wells, *Chem. Abstracts*, 1942, 36, 4779.

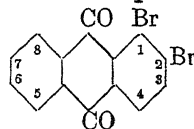
4 : 5-Dibromoanthranilic Acid.

Needles from EtOH. M.p. 228–9° decomp. (224° decomp.). Sol. EtOH. Spar. sol. H₂O. Insol. C₆H₆, CHCl₃, ligroin.

N-*Acetyl*: m.p. 240°.

Chapman, Stephen, *J. Chem. Soc.*, 1925, 127, 1791.

1 : 2-Dibromoanthraquinone



C₁₄H₆O₂Br₂

MW, 366

Yellow cryst. M.p. 223°.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 3-Dibromoanthraquinone.

Canary-yellow needles. M.p. 210°. Sol. AcOH, C₆H₆, PhNO₂, Py. Spar. sol. EtOH, Et₂O, ligroin.

Dhar, *J. Chem. Soc.*, 1920, 117, 999.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 4-Dibromoanthraquinone.

Orange needles. M.p. 196°. Spar. sol. ord. org. solvents.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 5-Dibromoanthraquinone.

Golden-yellow needles from PhNO₂. M.p. 292° (above 320°).

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 210.

Dhar, *J. Chem. Soc.*, 1920, 117, 997.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 6-Dibromoanthraquinone.

Yellow cryst. from anisole. M.p. 204°.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 210.

Dhar, *J. Chem. Soc.*, 1920, 117, 997.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 7-Dibromoanthraquinone.

Yellow needles from anisole. M.p. 220°.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

1 : 8-Dibromoanthraquinone.

Orange-yellow needles from chlorobenzene. M.p. 232-3°.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 211.

Battegay, Claudin, *Bull. soc. chim.*, 1921, 29, 1017.

2 : 3-Dibromoanthraquinone.

Yellow needles from anisole. M.p. 283° (269-70°). Mod. sol. CHCl_3 , C_6H_6 . Spar. sol. EtOH. Sublimes.

Battegay, Claudin, *Chem. Abstracts*, 1921, 15, 2439.

2 : 6-Dibromoanthraquinone.

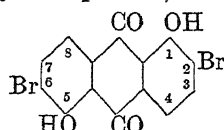
Yellow cryst. M.p. 289-90° (285°). Mod. sol. hot C_6H_6 . Spar. sol. EtOH, AcOH.

Waldmann, *J. prakt. Chem.*, 1930, 126, 74.

2 : 7-Dibromoanthraquinone.

Yellow plates. M.p. 248° (236-7°). Sol. hot AcOH. Spar. sol. EtOH.

Battegay, Claudin, *Chem. Abstracts*, 1921, 15, 2439.

2 : 6-Dibromoanthrarufin (2 : 6-Dibromo-1 : 5-dihydroxyanthraquinone)

$\text{C}_{14}\text{H}_6\text{O}_4\text{Br}_2$ MW, 398

Red cryst. powder. Mod. sol. hot $\text{H}_2\text{O} \rightarrow$ yellow sol. Spar. sol. AcOH, hot EtOH. Sol. NaOH \rightarrow red sol. $\text{H}_2\text{SO}_4 \rightarrow$ yellowish-red sol.

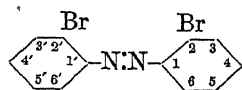
Bayer, D.R.P. 101,806, (*Chem. Zentr.*, 1899, I, 1171).

4 : 8-Dibromoanthrarufin (4 : 8-Dibromo-1 : 5-dihydroxyanthraquinone).

Red needles or orange cryst. M.p. above 315°. Spar. sol. ord. org. solvents. Spar. sol. aq. alkalis \rightarrow bluish-red sols. $\text{H}_2\text{SO}_4 \rightarrow$ reddish-yellow sol.

M.L.B., D.R.P. 293,694, (*Chem. Zentr.*, 1916, II, 533).

Bayer, D.R.P. 127,699, (*Chem. Zentr.*, 1902, I, 338).

2 : 2'-Dibromoazobenzene

$\text{C}_{12}\text{H}_8\text{N}_2\text{Br}_2$

MW, 340

Golden-yellow cryst. M.p. 187°. Mod. sol. Me_2CO . Spar. sol. EtOH, Et₂O. Red. \rightarrow o-bromoaniline.

Janowsky, *Monatsh.*, 1865, 8, 55.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

2 : 4-Dibromoazobenzene.

Orange-red prisms. M.p. 96°.

Valori, *Atti accad. Lincei*, 1914, 22, ii, 125.

3 : 3'-Dibromoazobenzene.

Needles. M.p. 126°. Sol. Et₂O, CS_2 , C_6H_6 . Spar. sol. EtOH.

Gabriel, *Ber.*, 1876, 9, 1407.

3 : 5-Dibromoazobenzene.

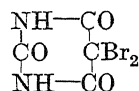
Dark red needles. M.p. 104°.

Burns, McCombie, Scarborough, *J. Chem. Soc.*, 1928, 2936.

4 : 4'-Dibromoazobenzene.

Yellow needles. M.p. 205°. Spar. sol. EtOH.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

Dibromobarbituric Acid (Dibromin)

$\text{C}_4\text{H}_2\text{O}_3\text{N}_2\text{Br}_2$

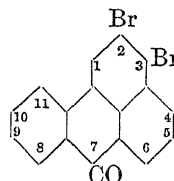
MW, 286

Prisms or leaflets. Decomp. on heating. Sol. EtOH, Et₂O, hot H_2O . Heat with $\text{H}_2\text{O} \rightarrow$ alloxan.

Clover, Can. P. 245,806, (*Chem. Abstracts*, 1925, 19, 657).

Baeyer, *Ann.*, 1863, 127, 229.

Biltz, *Hamburger, Ber.*, 1916, 49, 641.

2 : 3-Dibromobenzanthrone

$\text{C}_{17}\text{H}_8\text{OBr}_2$

MW, 388

M.p. 239-41°.

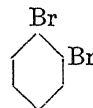
Perkins, U.S.P. 2,059,646, (*Chem. Abstracts*, 1937, 31, 551).

3 : 9-Dibromobenzanthrone.

Yellow needles from chlorobenzene. M.p. 255-6°.

Rule, Smith, *J. Chem. Soc.*, 1937, 1102.

Lee, Belcher, U.S.P. 2,353,049, (*Chem. Abstracts*, 1944, 38, 5847).

o-Dibromobenzene

$\text{C}_6\text{H}_4\text{Br}_2$

MW, 236

F.p. 6.7°. B.p. 224° (221°), 104°/15 mm.
Sol. EtOH, Et₂O. D_4^{20} 1.9557. n_D^{17} 1.6117.

Wibaut, van de Lande, Wallach, *Rec. trav. chim.*, 1933, 52, 794.

Narbutt, *Ber.*, 1919, 52, 1032.

Hosaeus, *Monatsh.*, 1893, 14, 325.

m-Dibromobenzene.

F.p. -7°. M.p. -7°. B.p. 219.5°. Sol. EtOH, Et₂O. D_4^{20} 1.9523. n_D^{17} 1.6083.

Wibaut, van de Lande, Wallach, *Rec. trav. chim.*, 1933, 52, 794.

Narbutt, *Ber.*, 1919, 52, 1032.

Jackson, Cohoe, *Am. Chem. J.*, 1901, 26, 3.

p-Dibromobenzene.

Plates. M.p. 86.9°. B.p. 218-19°. Sol. EtOH, Et₂O, Me₂CO, ligroin. D^{20} 2.261.

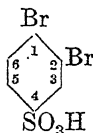
Wibaut, van de Lande, Wallach, *Rec. trav. chim.*, 1933, 52, 794.

Blair, Ledbury, Wheeler, *J. Soc. Chem. Ind.*, 1924, 43, 289.

Narbutt, *Ber.*, 1919, 52, 1031.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1916, 38, 2548.

1 : 2-Dibromobenzene-4-sulphonic Acid



C₆H₄O₃Br₂S MW, 316

Needles + 3H₂O. M.p. anhyd. 66.5-7.5°.

Chloride: C₆H₃O₂ClBr₂S. MW, 334.5. Needles. M.p. 34°.

Amide: C₆H₅O₂NBr₂S. MW, 315. Needles. M.p. 175°. Spar. sol. cold H₂O.

Goslich, *Ann.*, 1877, 186, 149.

Spiegelberg, *Ann.*, 1879, 197, 263.

1 : 3-Dibromobenzene-4-sulphonic Acid.

Needles + 1H₂O from H₂O. M.p. anhyd. 110°. Sol. EtOH. Spar. sol. Et₂O.

Chloride: plates from Et₂O. M.p. 79°.

Amide: needles. M.p. 190°.

Langforth, *Ann.*, 1878, 191, 184.

1 : 3-Dibromobenzene-5-sulphonic Acid.

Needles + 1H₂O. M.p. 84-6°. Sol. H₂O, 95% EtOH. Spar. sol. Et₂O.

Chloride: cryst. from Et₂O or Et₂O-pet. ether. M.p. 57.5°.

Amide: needles from H₂O. M.p. 203°.

Sachse, *Ann.*, 1877, 188, 153.

1 : 4-Dibromobenzene-2-sulphonic Acid.

Cryst. + 3H₂O. Loses H₂O at 98°. M.p. anhyd. 128°. Does not deliquesce. Sol. H₂O. Mod. sol. EtOH. Spar. sol. Et₂O.

Me ester: C₇H₆O₃Br₂S. MW, 330. Prisms from Me₂CO. M.p. 63°.

Et ester: C₈H₆O₃Br₂S. MW, 344. Cryst. from Me₂CO. M.p. 106°.

Chloride: prisms from Et₂O or C₆H₆-pet. ether. M.p. 71°.

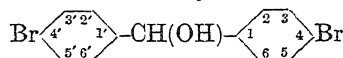
Bromide: prisms from C₆H₆-pet. ether. M.p. 114°.

Amide: needles from EtOH. M.p. 194°.

Borns, *Ann.*, 1877, 187, 351.

Bahlmann, *Ann.*, 1877, 186, 312.

4 : 4'-Dibromobenzhydrol



C₁₃H₁₀OBr₂ MW, 342

Needles from Et₂O. M.p. 117°. Sol. EtOH, Et₂O, AcOH. Spar. sol. ligroin.

Acetyl: needles. M.p. 71-2°.

Et ether: C₁₅H₁₄OBr₂. MW, 370. B.p. 228°/16 mm.

Montagne, van Charante, *Rec. trav. chim.*, 1912, 31, 338.

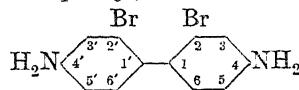
Biltz, *Ber.*, 1910, 43, 1819.

3 : 5-Dibromobenzhydrol.

M.p. 75.5°.

Montagne, *Rec. trav. chim.*, 1922, 41, 703.

2 : 2'-Dibromobenzidine (2 : 2' -Dibromo-4 : 4'-diaminodiphenyl)



C₁₂H₁₀N₂Br₂ MW, 342

M.p. 152°. Sol. Et₂O, C₆H₆, hot EtOH. Spar. sol. CS₂.

Gabriel, *Ber.*, 1876, 9, 1407.

2 : 6-Dibromobenzidine.

Needles from EtOH.Aq. M.p. 185°.

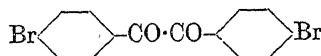
Burns, McCombie, Scarborough, *J. Chem. Soc.*, 1928, 2936.

3 : 3'-Dibromobenzidine.

M.p. 104°. Sol. EtOH, C₆H₆. Insol. H₂O. Gradually darkens on standing in air.

Levinstein, D.R.P. 97,101, (*Chem. Zentr.*, 1898, II, 522).

4 : 4'-Dibromobenzil (4 : 4'-Dibromodiphenyl diketone)



C₁₄H₈O₂Br₂ MW, 368

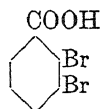
Needles from C₆H₆. M.p. 228-9°. Sol. hot C₆H₆. Mod. sol. Ac₂O, hot AcOH. Spar. sol. EtOH, CHCl₃, Me₂CO, AcOEt. CrO₃ in AcOH → p-bromobenzoic acid.

Monoxime: m.p. 159-60°.

Mono-phenylhydrazone: m.p. 189°.

Biltz, *Ber.*, 1910, 43, 1815.

2 : 3-Dibromobenzoic Acid



$C_7H_4O_2Br_2$ MW, 280

Needles from H_2O . M.p. 149–50°. Sol. hot ligroin.

Chloride: $C_7H_3OClBr_2$. MW, 298.5. M.p. 60–2°.

Hübner, Beutnagel, *Ann.*, 1884, 222, 104.
Neville, Winther, *Ber.*, 1880, 13, 965.

2 : 4-Dibromobenzoic Acid.

Leaflets from H_2O . M.p. 174°. Sol. EtOH, Et_2O . Sublimes. Volatile in steam.

Me ester: $C_8H_6O_2Br_2$. MW, 294. Needles. M.p. 33°.

Chloride: prisms. M.p. 51°. B.p. 162–4°/22 mm.

Amide: $C_7H_5ONBr_2$. MW, 279. Needles. M.p. 198°.

Nitrile: $C_7H_3NBr_2$. MW, 261. Needles. M.p. 92°.

Sudborough, *J. Chem. Soc.*, 1895, 67, 602.

Miller, *J. Chem. Soc.*, 1892, 61, 1034.

Olivier, *Rec. trav. chim.*, 1929, 48, 568.

2 : 5-Dibromobenzoic Acid.

Needles from H_2O or EtOH. M.p. 157°. Sol. EtOH, Et_2O , AcOH, hot H_2O . Volatile in steam.

m-Nitrophenyl ester: m.p. 165°.

p-Nitrophenyl ester: m.p. 183–4°.

Chloride: m.p. 39–41°.

Nitrile: needles. M.p. 132°.

Claus, Reh, *Ann.*, 1891, 266, 207.

Claus, Weil, *Ann.*, 1892, 269, 223.

2 : 6-Dibromobenzoic Acid.

Needles from H_2O . M.p. 151°. B.p. approx. 335° part. decomp., 209–10°/16 mm. Sol. EtOH, Et_2O , $CHCl_3$, hot H_2O . Volatile in steam.

Me ester: m.p. 83°.

Chloride: m.p. 46°.

Amide: needles. M.p. 208.5°.

Nitrile: needles. M.p. 155°. B.p. 308–9°. Sublimes. Volatile in steam.

Hydrazide: m.p. 204°.

Olivier, *Rec. trav. chim.*, 1924, 43, 872.

Sudborough, *J. Chem. Soc.*, 1895, 67, 603.

3 : 4-Dibromobenzoic Acid.

Needles from H_2O . M.p. 234–5°. Sol. EtOH, Et_2O , hot H_2O . Sublimes.

Et ester: $C_9H_8O_2Br_2$. MW, 308. Needles. M.p. 38–9°.

Chloride: $C_7H_3OClBr_2$. MW, 298.5. M.p. 64–6°.

Amide: $C_7H_5ONBr_2$. MW, 279. Needles. M.p. 151–2°.

Miller, *J. Chem. Soc.*, 1892, 61, 1033.

3 : 5-Dibromobenzoic Acid.

Needles or leaflets. M.p. 219–20°. Sol. EtOH, AcOH. Spar. sol. cold H_2O , cold C_6H_6 . Sublimes.

Me ester: $C_8H_6O_2Br_2$. MW, 294. Needles. M.p. 63°.

Et ester: m.p. 51° (57.5–58°).

Chloride: needles. M.p. 41–2°. B.p. 189°/45 mm.

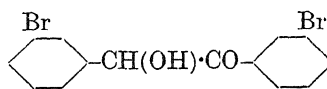
Amide: needles. M.p. 187°.

Nitrile: $C_7H_3NBr_2$. MW, 261. Needles. M.p. 97°. Sublimes. Volatile in steam.

Bogert, Hand, *J. Am. Chem. Soc.*, 1903, 25, 942.

Rosanoff, Prager, *J. Am. Chem. Soc.*, 1908, 30, 1904.

3 : 3'-Dibromobenzoin

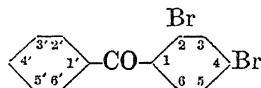


$C_{14}H_{10}O_2Br_2$ MW, 370

Needles from EtOH.Aq. M.p. 123–4°. Sol. most ord. org. solvents.

Ekecrantz, Ahlqvist, *Chem. Zentr.*, 1908, II, 1690.

2 : 4-Dibromobenzophenone



$C_{13}H_8OBr_2$ MW, 340

Needles. M.p. 55°. B.p. 378–9° part decomp., 229°/26 mm.

Montagne, van Charante, *Rec. trav. chim.*, 1912, 31, 329.

2 : 6-Dibromobenzophenone.

Needles from pet. ether. M.p. 121.5°. B.p. 381°/747 mm. part decomp.

Montagne, van Charante, *Rec. trav. chim.*, 1912, 31, 337.

3 : 4-Dibromobenzophenone.

Needles. M.p. 119°.

Böeseken, *Rec. trav. chim.*, 1908, 27, 15.

3 : 5-Dibromobenzophenone.

Plates from MeOH. M.p. 75°. B.p. 232°/18 mm.

Waters, *J. Chem. Soc.*, 1929, 2109.

2 : 2'-Dibromobenzophenone.

Plates from EtOH. M.p. 86°. Sol. Et_2O , $CHCl_3$, Me_2CO , CCl_4 , hot EtOH, hot AcOH. Insol. H_2O . Does not form oxime or semicarbazone.

Thorp, Wildman, *J. Am. Chem. Soc.*, 1915, 37, 377.

2 : 4'-Dibromobenzophenone.

Prisms from pet. ether. M.p. 62° (51–2°). B.p. 381–4° part. decomp.

Oxime : m.p. 141-2°.

Heidenreich, *Ber.*, 1894, 27, 1453.

Goldthwaite, *Am. Chem. J.*, 1903, 30, 453.

Montagne, *Rec. trav. chim.*, 1910, 29, 157.

3 : 3'-Dibromobenzophenone.

Needles from EtOH. M.p. 141°.

Oxime : m.p. 181-2° decomp.

Gomberg, Bailar, *J. Am. Chem. Soc.*, 1929, 51, 2232.

3 : 4'-Dibromobenzophenone.

Needles from EtOH or C₆H₆. M.p. 130°.

Gomberg, Bailar, *J. Am. Chem. Soc.*, 1929, 51, 2232.

4 : 4'-Dibromobenzophenone.

Leaflets. M.p. 177°. B.p. 395°. Sol. CHCl₃, Me₂CO, CS₂, C₆H₆, hot EtOH. Spar. sol. Et₂O, AcOH.

Oxime : needles. M.p. 150-2°.

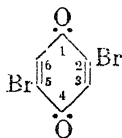
Hydrazone : m.p. 92-4°.

Montagne, *Rec. trav. chim.*, 1910, 29, 156.

Biltz, *Ber.*, 1910, 43, 2262.

Dufraisse, Rocher, *Bull. soc. chim.*, 1935, 2, 2235.

2 : 5-Dibromo-*p*-benzoquinone



C₆H₂O₂Br₂ MW, 266

Yellow needles or leaflets from EtOH. M.p. 188°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Insol. H₂O. Sublimes.

Bargellini, Grippa, *Gazz. chim. ital.*, 1930, 60, 571.

2 : 6-Dibromo-*p*-benzoquinone.

Golden leaflets from EtOH. M.p. 131°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, AcOEt. Spar. sol. pet. ether. Sublimes with part decomp. Volatile in steam.

4-*Oxime* : brown needles. M.p. 170° decomp.

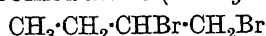
4-*Semicarbazone* : yellow needles from EtOH. M.p. 225° decomp.

Hodgson, Nixon, *J. Chem. Soc.*, 1930, 1086.

1 : 2-Dibromo-2-benzoylpropionic Acid.

See under 2-Benzoylacrylic Acid.

1 : 2-Dibromobutane (1-Butylene dibromide)

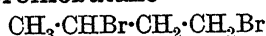


C₄H₈Br₂ MW, 216

M.p. -65.4°. B.p. 166°, 50.8°/13 mm. D₄²⁰ 1.8204.

Léplinge, *Bull. soc. chim.*, 1926, 39, 741.

1 : 3-Dibromobutane



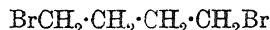
C₄H₈Br₂ MW, 216

B.p. 174°, 127.5°/200 mm., 107°/100 mm., 89.5°/50 mm., 72°/20 mm., 64°/13 mm. D₄²⁰ 1.829. n_D²⁰ 1.507.

Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1356.

Grishkewitsch, Trochimowski, *Chem. Zentr.*, 1923, III, 774.

1 : 4-Dibromobutane (Tetramethylene bromide)



C₄H₈Br₂ MW, 216

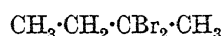
F.p. -20°. B.p. 197-8°, 110°/58 mm., 76°/11 mm. D₄²⁰ 1.8466.

Steele, *J. Am. Chem. Soc.*, 1931, 53, 283 (*Bibl.*).

Fried, Kleene, *J. Am. Chem. Soc.*, 1940, 62, 3258; 1941, 63, 2691.

Wilson, *J. Chem. Soc.*, 1945, 48.

2 : 2-Dibromobutane

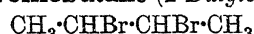


C₄H₈Br₂ MW, 216

B.p. 144-5°. H₂O at 160° → methyl ethyl ketone.

Wislicenus, Holz, *Ann.*, 1889, 250, 232.

2 : 3-Dibromobutane (2-Butylene dibromide)



C₄H₈Br₂ MW, 216

dl.

M.p. -34.5°. B.p. 157.3°, 75.6-75.8°/50 mm., 51-2°/16 mm. D₄²⁰ 1.7916. n_D²⁰ 1.5147.

Meso.

M.p. -34.5°. B.p. 157.3°, 72.7-72.9°/50 mm., 51.4°/19 mm. D₄²⁰ 1.7829. n_D²⁰ 1.5116.

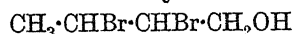
Young, Dillon, Lucas, *J. Am. Chem. Soc.*, 1929, 51, 2528.

Macallum, Whitby, *Chem. Abstracts*, 1928, 22, 2080.

Dibromobutanone.

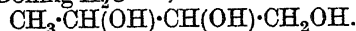
See Methyl dibromoethyl Ketone.

2 : 3-Dibromo-*n*-butyl Alcohol



C₄H₈OBr₂ MW, 232

Prisms from pet. ether. M.p. 32°. B.p. 99.5°/10 mm. D₄²⁰ 1.9475. n_D²⁰ 1.5442. Sol. H₂O. Boiling H₂O →



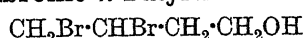
NaHg → crotyl alcohol.

Acetyl : b.p. 109.5°/10 mm. D₄²⁰ 1.7363. n_D²⁰ 1.5070.

Charon, *Ann. chim. phys.*, 1899, 17, 226.

Petrov, *J. Gen. Chem. U.S.S.R.*, 1941, 11, 713, (*Chem. Abstracts*, 1942, 36, 404).

3 : 4-Dibromo-*n*-butyl Alcohol



C₄H₈OBr₂ MW, 232

B.p. 114°/11 mm., 110°/3 mm. D_{20}^{15} 1.98. n_D^{15} 1.548.

Acetyl: 3 : 4-dibromo-n-butyl acetate. B.p. 135°/16 mm. D_{20}^{18} 1.73. n_D^{18} 1.508.

Phenylurethane: m.p. 70–1°.

Pariselle, *Ann. chim. phys.*, 1911, 24, 355.

Amstutz, *J. Org. Chem.*, 1944, 9, 310.

1 : 4-Dibromo-sec.-n-butyl Alcohol

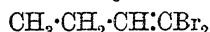


$\text{C}_4\text{H}_8\text{OBr}_2$ MW, 232

B.p. 114–15°/13 mm. D_0^{20} 2.023. n_D^{20} 1.544.

Pariselle, *Ann. chim. phys.*, 1911, 24, 363.

1 : 1-Dibromo-1-butylene

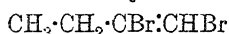


$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

B.p. 53–5°/22 mm. D_{20}^{20} 1.8348. n_D^{20} 1.5168.

Bachman, *J. Am. Chem. Soc.*, 1933, 55, 4279.

1 : 2-Dibromo-1-butylene

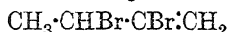


$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

M.p. — 49.5°. B.p. 150°. Sol. EtOH, Et₂O. D_0^{18} 1.887.

Dupont, *Compt. rend.*, 1909, 148, 1523.

2 : 3-Dibromo-1-butylene



$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

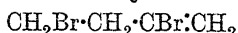
B.p. 146–7°, 75°/20 mm. n_D^{20} 1.5464.

Hurd, Meinert, *J. Am. Chem. Soc.*, 1931, 53, 293.

Pfeiffer, *Z. physik. Chem.*, 1904, 48, 58.

Wislicenus, Schmidt, *Ann.*, 1900, 313, 225.

2 : 4-Dibromo-1-butylene



$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

B.p. 57–60°/14 mm.

Lespieau, Pariselle, *Compt. rend.*, 1908, 146, 1035.

3 : 4-Dibromo-1-butylene (Butadiene 3 : 4-dibromide)

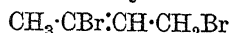


$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

B.p. 52°/10 mm. D_4^{21} 1.865. n_D^{21} 1.541.

Prévost, *Compt. rend.*, 1928, 186, 1209.

1 : 3-Dibromo-2-butylene



$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

Yellow lachrymatory oil. B.p. 168–9° decomp., 73°/23 mm. D_4^{20} 1.8768. n_D^{20} 1.5485.

Carothers, Collins, Kirby, *J. Am. Chem. Soc.*, 1933, 55, 786.

1 : 4-Dibromo-2-butylene (Butadiene 1 : 4-dibromide)



$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

Trans-.

Leaflets from pet. ether. M.p. 54°. B.p. 85°/10 mm.

Cis-.

B.p. 82°/14 mm. n_D^{15} 1.574.

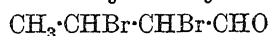
Prévost, *Compt. rend.*, 1928, 186, 1209.

Petrov, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 1887, (*Chem. Abstracts*, 1941, 35, 4347).

Shantz, *J. Am. Chem. Soc.*, 1946, 68, 2553.

Prévost, Valette, *Compt. rend.*, 1946, 222, 326.

2 : 3-Dibromobutyraldehyde



$\text{C}_4\text{H}_6\text{OBr}_2$ MW, 230

B.p. 75–82°/14 mm. Readily resinifies. Forms bisulphite comp.

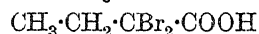
Di-Et acetal: b.p. 113–14°/13 mm.

Claisen, *Ber.*, 1911, 44, 1164.

Lieben, Zeisel, *Monatsh.*, 1858, 1, 822.

Viguiet, *Compt. rend.*, 1909, 149, 403.

1 : 1-Dibromobutyric Acid

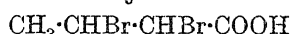


$\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$ MW, 246

B.p. 150°/3 mm. D 1.97.

Schneider, *Jahresber. Fortschr. Chem.*, 1861, 458.

1 : 2-Dibromobutyric Acid



$\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$ MW, 246

Exists in two stereoisomeric forms corresponding to crotonic and isocrotonic acids (*q.v.*).

1. Crotonic acid dibromide. M.p. 87°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Decomp. by boiling H₂O. Alkalis → 1-bromoisocrotonic acid.

Et ester: C₆H₁₀O₂Br₂. MW, 274. B.p. 113°/30 mm., 103–4°/17 mm.

Chloride: C₄H₅OClBr₂. MW, 264.5. B.p. 112°/20 mm.

2. Isocrotonic acid dibromide. Deliquescent cryst. from ligroin. M.p. 59–60°.

Me ester: C₅H₈O₂Br₂. MW, 260. B.p. 125°/48 mm., 103°/15 mm.

Et ester: C₆H₁₀O₂Br₂. MW, 274. B.p. 123–4°/30 mm.

Allyl ester: C₇H₁₀O₂Br₂. MW, 286. B.p. 141–5°/30 mm.

James, *J. Chem. Soc.*, 1910, 97, 1565 (*Bibl.*).

Pfeiffer, *Ber.*, 1915, 48, 1056.

Carter, Ney, *J. Am. Chem. Soc.*, 1942, 64, 1223.

2 : 3-Dibromobutyric Acid


 $\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$ MW, 246

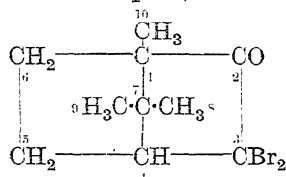
Cryst. from CS_2 . M.p. 50° . Boiling $\text{H}_2\text{O} \rightarrow$ 2-bromobutyrolactone \rightarrow 2-hydroxybutyrolactone. Zn in EtOH \rightarrow vinylacetic acid.

Ester : $\text{C}_6\text{H}_{10}\text{O}_2\text{Br}_2$. MW, 274. B.p. $125^\circ/13$ mm.

Amide : $\text{C}_4\text{H}_7\text{ONBr}_2$. MW, 245. M.p. 86° . Sol. EtOH, Et₂O. Unstable.

Nitrile : $\text{C}_3\text{H}_5\text{NBr}_2$. MW, 227. B.p. $138-9^\circ/20$ mm. $D_4^{20} 2.02$.

Fichter, Sonneborn, *Ber.*, 1902, 35, 942.

3 : 3-Dibromo-*d*-camphor ($\alpha\alpha'$ -Dibromocamphor, α -dibromocamphor)
 $\text{C}_{10}\text{H}_{14}\text{OBr}_2$ MW, 310

Cryst. from ligroin. M.p. 64° . Sol. EtOH, Et₂O, AcOEt, ligroin. Insol. H_2O . $D_4^{21} 1.854$. $[\alpha]_D + 39-57^\circ$ in C_6H_6 . Volatile in steam.

Burgess, Lowry, *J. Chem. Soc.*, 1923, 123, 1870.

Cutter, Burgess, Lowry, *J. Chem. Soc.*, 1925, 127, 1269.

3 : 6-Dibromo-*d*-camphor ($\alpha\beta$ -Dibromocamphor, β -dibromocamphor).

Plates from EtOH. M.p. 114° . Sol. Et₂O. Spar. sol. EtOH, AcOEt. Prac. insol. H_2O . $D_4^{27} 1.825$. $[\alpha]_D + 82.0^\circ$ in C_6H_6 .

3' : 6-Dibromocamphor ($\alpha'\beta$ -Dibromocamphor).

Stereoisomer of above. Prisms from hot C_6H_6 . M.p. 136° . Sol. EtOH, Et₂O, C_6H_6 , CHCl_3 , Me_2CO , AcOEt. Spar. sol. pet. ether. $D_4^{27} 1.809$. $[\alpha]_D - 70.8^\circ$ in C_6H_6 .

Burgess, Lowry, *J. Chem. Soc.*, 1923, 123, 1870.

3 : 8-Dibromo-*d*-camphor ($\alpha\pi$ -Dibromocamphor).

Needles from EtOH.Aq. Prisms from AcOEt. M.p. 156° . $D_4^{21} 1.835$. $[\alpha]_D + 87.3^\circ$ in C_6H_6 .

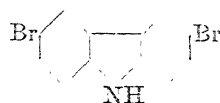
3' : 8-Dibromocamphor ($\alpha'\pi$ -Dibromocamphor).

Stereoisomer of above. M.p. 182° . Sol. CHCl_3 . Mod. sol. Et₂O, C_6H_6 , AcOEt, Me_2CO . Spar. sol. MeOH, EtOH. $D_4^{21} 1.830$. $[\alpha]_D + 98.1^\circ$ in C_6H_6 .

Burgess, Lowry, *J. Chem. Soc.*, 1923, 123, 1871.

Guha, Bhattacharyya, *J. Indian Chem. Soc.*, 1944, 21, 271, (*Chem. Abstracts*, 1946, 40, 5036).

3 : 6-Dibromocarbazole


 $\text{C}_{12}\text{H}_7\text{NBr}_2$ MW, 325

Prisms or needles from EtOH. M.p. $212-3^\circ$.

N-Me : needles from EtOH or AcOH. M.p. $158-60^\circ$.

N-Acetyl : needles from C_6H_6 . M.p. $189-96^\circ$.

N-Benzoyl : prisms from C_6H_6 . M.p. $215-6^\circ$.

N-Nitroso : yellow needles from C_6H_6 . M.p. 192° decomp.

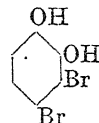
McLintock, Tucker, *J. Chem. Soc.*, 1927, 1216.

Lindemann, Mühlhaus, *Ber.*, 1925, 58, 2372.

6 : 8-Dibromocarbostryl.

See 6 : 8-Dibromo-2-hydroxyquinoline.

3 : 4-Dibromocatechol (3 : 4-Dibromo-1 : 2-dihydroxybenzene)


 $\text{C}_6\text{H}_4\text{O}_2\text{Br}_2$ MW, 268

M.p. $73-4^\circ$.

1 : 2-Diacetyl : m.p. $95-6^\circ$.

Frejka, Šefránek, *Chem. Zentr.*, 1936, I, 2338.

3 : 5-Dibromocatechol.

M.p. $58-60^\circ$. Sol. EtOH, Et₂O, C_6H_6 . Insol. cold H_2O , ligroin.

1 : 2-Diacetyl : m.p. 96° .

Cousin, *Ann. chim.*, 1898, 13, 492.

4 : 5-Dibromocatechol.

Cryst. from C_6H_6 . M.p. 122° (92°).

1 : 2-Diacetyl : m.p. 110° .

Slooff, *Rec. trav. chim.*, 1935, 54, 1001.

Frejka, Šefránek, *Chem. Zentr.*, 1936, I, 2338.

 α : β -Dibromocinnamic Acid
 $\text{C}_9\text{H}_6\text{O}_2\text{Br}_2$ MW, 306

Cis-.

Yellow prisms. M.p. 100° . Sol. EtOH, Et₂O, CHCl_3 , AcOH, hot ligroin. Spar. sol. pet. ether. Insol. H_2O .

Me ester : $\text{C}_{10}\text{H}_8\text{O}_3\text{Br}_2$. MW, 320. B.p. $124^\circ/0.5$ mm. $D_4^{21} 1.7199$. $n_D^{21} 1.59965$.

A, $\text{C}_6\text{H}_5\text{NH}_2$: m.p. 126° .

Trans-.

Plates from CHCl_3 -pet. ether. M.p. 136° . Sol. EtOH, Et₂O, CHCl_3 , AcOH. Spar. sol. pet. ether, ligroin. Insol. H_2O .

Me ester: m.p. 5–6°. B.p. 138°/0.5 mm.
D₄²⁰ 1.6607. *n*_D²⁰ 1.57295.

Et ester: see Zebromal.

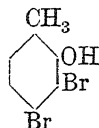
A, C₆H₅NH₂: m.p. 128°.

Stoermer, Heymann, *Ber.*, 1913, 46, 1264.

Stoermer, Kirchner, *Ber.*, 1920, 53, 1298.

Auwers, Schmellenkamp, *Ber.*, 1921, 54, 626.

3 : 4-Dibromo-*o*-cresol



C₇H₆OBr₂

MW, 266

Needles. M.p. 94–5°. Sol. EtOH, Et₂O, C₆H₆, AcOH.

2-Acetyl: m.p. 49°.

Janney, *Ann.*, 1913, 398, 360.

3 : 5-Dibromo-*o*-cresol.

Needles. M.p. 57°. Sol. EtOH, Et₂O, AcOH, C₆H₆, alkalis. Spar. sol. pet. ether. Insol. H₂O. Volatile in steam. Forms add. comp. with 2NH₃.

Me ether: *C₈H₈OBr₂*. MW, 280. M.p. 33.5°.

Et ether: *C₉H₁₀OBr₂*. MW, 294. M.p. 34.5°.

Acetyl: m.p. 62°.

p-Nitrobenzoyl: m.p. 136–7°.

Bureš, Polak, *Chem. Abstracts*, 1928, 22, 3643.

Zincke, Hedenström, *Ann.*, 1906, 350, 275.

Chien, Chung, Tai, *Chem. Abstracts*, 1937, 31, 1156.

3 : 6-Dibromo-*o*-cresol.

Cryst. M.p. about 38°. B.p. 255–60°. Sol. ord. org. solvents.

Benzoyl: m.p. 104°.

Janney, *Ann.*, 1913, 398, 361.

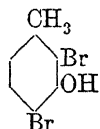
4 : 6-Dibromo-*o*-cresol.

M.p. 98–101°.

Benzoyl: m.p. 91–3°.

Kohn, Jawets, *Monatsh.*, 1923, 44, 204.

2 : 4-Dibromo-*m*-cresol



C₇H₆OBr₂

MW, 266

Needles from pet. ether. M.p. 64–5°.

Benzoyl: needles from EtOH. M.p. 81–1.5°.

Benzenesulphonyl: plates from EtOH. M.p. 92–2.5°.

p-Toluenesulphonyl: plates from EtOH. M.p. 89.5–90°.

Huston, Hutchinson, *J. Am. Chem. Soc.*, 1932, 54, 1505.

2 : 6-Dibromo-*m*-cresol.

B.p. 114–6°/4 mm.

Benzoyl: needles from EtOH. M.p. 89.5–90°.

Benzenesulphonyl: plates from EtOH. M.p. 94–5°.

p-Toluenesulphonyl: needles from EtOH. M.p. 122–3°.

Huston, Peterson, *J. Am. Chem. Soc.*, 1933, 55, 3881.

4 : 6-Dibromo-*m*-cresol.

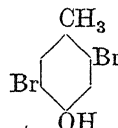
Needles from pet. ether. M.p. 65–6°.

Benzoyl: m.p. 84–5°.

Gibbs, Robertson, *J. Chem. Soc.*, 1914, 105, 1888.

Huston, Hutchinson, *J. Am. Chem. Soc.*, 1932, 54, 1505.

2 : 5-Dibromo-*p*-cresol



C₇H₆OBr₂

MW, 266

Needles from pet. ether. M.p. 60°.

Me ether: *C₈H₈OBr₂*. MW, 280. Cryst. from EtOH. M.p. 78°. B.p. 274–7°.

Kohn, Aron, *Monatsh.*, 1929, 53–4, 58.

Baddeley, Plant, *J. Chem. Soc.*, 1943, 525.

2 : 6-Dibromo-*p*-cresol.

M.p. 97° (109°). B.p. 280–6°.

Benzoyl: m.p. 64°.

Kohn, Wiesen, *Monatsh.*, 1924, 45, 255.

Baddeley, Plant, *J. Chem. Soc.*, 1943, 525.

3 : 5-Dibromo-*p*-cresol.

Needles from C₆H₆. M.p. 54° (49°). Sol. EtOH, Et₂O, AcOH, CHCl₃, C₆H₆, alkalis. Forms add. comp. with 1 or 2 NH₃.

Acetyl: m.p. 67°.

Benzoyl: m.p. 94–5°.

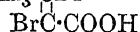
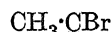
p-Nitrobenzoyl: m.p. 141–2°.

Zincke, Wiederhold, *Ann.*, 1902, 320, 204.

Dibromo-*m*-cresotic Acid.

See 2 : 6-Dibromo-3-hydroxy-*p*-toluic Acid.

1 : 2-Dibromocrotonic Acid



C₄H₄O₂Br₂

MW, 244

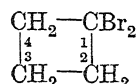
Prisms or plates. M.p. 94°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃, ligroin. Spar. sol. cold H₂O. HBr → 1 : 2-dibromoisocrotonic acid.

1 : 1-Dibromocyclobutane

Me ester : $C_5H_6O_2Br_2$. MW, 258. B.p. $94^\circ/11$ mm.

Michael, *Ber.*, 1901, **34**, 4223.

1 : 1-Dibromocyclobutane



$C_4H_6Br_2$ MW, 214

B.p. $159-61^\circ$. Sol. most ord. org. solvents. D_{20}^{20} 1.933 (1.8934). n_D^{20} 1.53618.

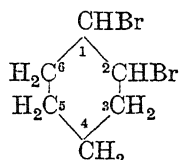
Willstätter, Bruce, *Ber.*, 1907, **40**, 3995.

1 : 2-Dibromocyclobutane.

F.p. -2° . M.p. $1-4^\circ$. B.p. $171-4^\circ$, $69-70^\circ/24$ mm. D_4^4 1.972.

Willstätter, Schmaedel, *Ber.*, 1905, **38**, 1995.

1 : 2-Dibromocyclohexane (o-Dibromohexahydrobenzene)



$C_6H_{10}Br_2$ MW, 242

B.p. $145-6^\circ/100$ mm., $116^\circ/29$ mm., $101^\circ/13$ mm. D^{22} 1.760. Decomp. in moist air.

Greengard, *Organic Syntheses*, 1932, XII, 26.

Markownikoff, *Ann.*, 1898, **302**, 29.

Seka, Trampusch, *Ber.*, 1942, **75**, 1379.

Winstein, Buckles, *J. Am. Chem. Soc.*, 1942, **64**, 2792.

Snyder, Brooks, *Organic Syntheses*, Collective Vol. II, 171.

1 : 4-Dibromocyclohexane (p-Dibromohexahydrobenzene).

Cis-.

B.p. $114-5^\circ/15$ mm. D_4^{20} 1.7834. n_D^{20} 1.5531.

Trans-.

Cryst. from Et_2O . M.p. 113° .

Baeyer, *Ann.*, 1894, **278**, 94.

Palfrey, Rothstein, *Compt. rend.*, 1929, **189**, 701.

Rothstein, *Ann. chim.*, 1930, **14**, 557.

Olberg, Pines, Ipatieff, *J. Am. Chem. Soc.*, 1944, **66**, 1096.

Dibromocyclohexane-carboxylic Acid.

See Dibromohexahydrobenzoic Acid.

Dibromocyclohexane-dicarboxylic Acid.

See Dibromohexahydrophthalic Acid, Dibromohexahydroisophthalic Acid and Dibromohexahydroterephthalic Acid.

2 : 6-Dibromo-1 : 5-diaminoanthraquinone

1 : 5-Dibromodecane



$C_{10}H_{20}Br_2$ MW, 300

Pale yellow liq. with faint sweet taste. B.p. $152^\circ/11$ mm., $146-7^\circ/9$ mm.

Franke, Gomolka, *Monatsh.*, 1929, **53**, 583.

1 : 10-Dibromodecane (Decamethylene bromide)



$C_{10}H_{20}Br_2$ MW, 300

Plates from $EtOH$. M.p. 28° . B.p. $161.1-2.4^\circ/9$ mm., $127-30^\circ/4$ mm. Sol. Et_2O . Spar. sol. cold $EtOH$. Insol. H_2O . D^{30} 1.335. n_D^{25} 1.4927, n_D^{30} 1.49051.

Chuit, *Helv. Chim. Acta*, 1926, **9**, 266.

Stone, *J. Am. Chem. Soc.*, 1936, **58**, 488.

McEwen, *Organic Syntheses*, 1940, XX, 24.

Price *et al.*, *J. Org. Chem.*, 1946, **11**, 281.

Prelog, Wirth, Schönbaum, *Helv. Chim. Acta*, 1946, **29**, 1204.

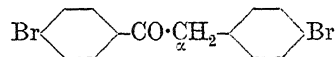
For other dibromodecanes of doubtful constitution see :

Grosjean, *Ber.*, 1892, **25**, 478.

Noorduyn, *Rec. trav. chim.*, 1919, **38**, 333.

Egorov, *Chem. Abstracts*, 1912, **6**, 223.

4 : 4'-Dibromodeoxybenzoin



$C_{14}H_{10}OBr_2$ MW, 354

Needles from $EtOH$. M.p. $141-2^\circ$ (137°).

Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 , $AcOH$.

Semicarbazone : m.p. $210-12^\circ$.

Biltz, *Ber.*, 1910, **43**, 1819.

Barber, Slack, *J. Chem. Soc.*, 1944, 612.

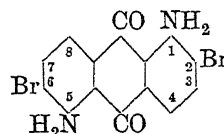
α : α -Dibromodeoxybenzoin.

Prisms from 85% $EtOH$. M.p. 112° . Sol. Et_2O , hot $EtOH$. Spar. sol. cold $EtOH$. Boiling $H_2O \rightarrow$ benzil + HBr . Alc. $AgNO_3 \rightarrow$ benzil (quantitative).

Limpricht, Schwanert, *Ann.*, 1870, **155**, 70.

Kao, Kung, *Chem. Abstracts*, 1935, **29**, 7315.

2 : 6-Dibromo-1 : 5-diaminoanthraquinone



$C_{14}H_8O_2N_2Br_2$ MW, 396

Steel-blue needles from $PhNO_2$. M.p. 274° . Sol. warm conc. H_2SO_4 .

1 : 5-Dibromo-2 : 6-diaminoanthraquinone 80

1 : 5-*N-Tetra-acetyl* : darkens above 240°.

Scholl, Berblinger, *Ber.*, 1904, 37, 4181.

Badische, D.R.P. 128, 573, (*Chem. Zentr.*, 1902, I, 550).

1 : 5-Dibromo-2 : 6-diaminoanthraquinone.

Orange powder. Spar. sol. PhNO_2 . H_2SO_4 (D 1.7) at 180° \longrightarrow 3 : 7-dibromo-2 : 6-diaminoanthraquinone.

Bayer, D.R.P. 275,299, (*Chem. Zentr.*, 1914, II, 98).

3 : 7-Dibromo-2 : 6-diaminoanthraquinone.

Yellow needles. Does not melt below 360°. Spar. sol. org. solvents.

Bayer, D.R.P. 275,299, (*Chem. Zentr.*, 1914, II, 98).

Badische, D.R.P. 261,270, (*Chem. Zentr.*, 1913, II, 194).

3 : 6-Dibromo-2 : 7-diaminoanthraquinone.

Brown cryst. from aniline. Sol. conc. H_2SO_4 with yellow col.

Badische, D.R.P. 261,271, (*Chem. Zentr.*, 1913, II, 194); D.R.P. 263,395, (*Chem. Zentr.*, 1913, II, 830).

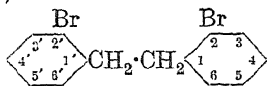
Dibromo-4 : 4'-diaminodiphenyl.

See Dibromobenzidine.

α : β -Dibromodibenzyl.

See Stilbene dibromide.

2 : 2'-Dibromodibenzyl (sym.-Di-o-bromophenylethane)



$\text{C}_{14}\text{H}_{12}\text{Br}_2$

MW, 340

Plates from EtOH. M.p. 84.5°.

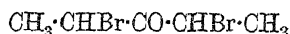
Kenner, Wilson, *J. Chem. Soc.*, 1927, 1111.

4 : 4'-Dibromodibenzyl.

Prisms from EtOH. M.p. 115°. Spar. sol. hot EtOH. $\text{CrO}_3 \longrightarrow$ *p*-bromobenzoic acid.

Smith, Natelson, *J. Am. Chem. Soc.*, 1931, 53, 3479.

1 : 1'-Dibromodiethyl Ketone (Di-1-bromoethyl ketone)



$\text{C}_5\text{H}_8\text{OBr}_2$

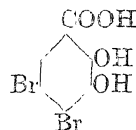
MW, 244

B.p. 194-5°/732 mm., 80°/12 mm. D^{18}_4 1.771. Reduces Fehling's. Does not form bisulphite comp.

Pauly, *Ber.*, 1901, 34, 1771.

3 : 6-Dibromo-1 : 2-dihydroxynaphthalene

4 : 5-Dibromo-2 : 3-dihydroxybenzoic Acid



$\text{C}_7\text{H}_4\text{O}_4\text{Br}_2$

MW, 312

Needles + $2\text{H}_2\text{O}$ from EtOH.Aq. M.p. 241° decomp. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. AcOH, C_6H_6 . $\text{FeCl}_3 \longrightarrow$ blue col.

Me ester : $\text{C}_8\text{H}_6\text{O}_4\text{Br}_2$. MW, 326. Needles from EtOH.Aq. M.p. 156-7°. Sol. hot AcOH, hot EtOH. $\text{FeCl}_3 \longrightarrow$ green col.

Hemmelmayr, *Monatsh.*, 1912, 33, 974.

3 : 5-Dibromo-2 : 4-dihydroxybenzoic Acid.

See 3 : 5-Dibromo- β -resorecylic Acid.

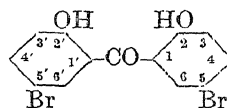
3 : 5-Dibromo-2 : 6-dihydroxybenzoic Acid.

See 3 : 5-Dibromo- γ -resorecylic Acid.

2 : 4-Dibromo-3 : 5-dihydroxybenzoic Acid.

See 2 : 4-Dibromo- α -resorecylic Acid.

5 : 5'-Dibromo-2 : 2'-dihydroxybenzophenone



$\text{C}_{13}\text{H}_8\text{O}_3\text{Br}_2$

MW, 372

Plates from pet. ether. M.p. 138.5°. Sol. Et_2O , AcOEt, C_6H_6 . Mod. sol. EtOH. Spar. sol. pet. ether. Sol. conc. H_2SO_4 and alkalis with yellow col.

2-*Me ether* : $\text{C}_{14}\text{H}_{10}\text{O}_3\text{Br}_2$. MW, 386. Needles from EtOH. M.p. 159°.

2 : 2'-*Di-Me ether* : $\text{C}_{15}\text{H}_{12}\text{O}_3\text{Br}_2$. MW, 400. Needles from EtOH. M.p. 123°.

2-*Et ether* : $\text{C}_{15}\text{H}_{12}\text{O}_3\text{Br}_2$. MW, 400. Yellow cryst. from EtOH. M.p. 114°. 2'-*Acetyl* : needles. M.p. 105-7°. *Oxime* : plates from EtOH. M.p. 181-2°.

2 : 2'-*Di-Et ether* : $\text{C}_{17}\text{H}_{16}\text{O}_3\text{Br}_2$. MW, 428. Plates from EtOH. M.p. 99-100°.

Diels, Rosenmund, *Ber.*, 1906, 39, 2364.

3 : 6-Dibromo-2 : 5-dihydroxy-*p*-benzoquinone.

See Bromanilic Acid.

3 : 6-Dibromo-1 : 2-dihydroxynaphthalene



$\text{C}_{10}\text{H}_6\text{O}_2\text{Br}_2$

MW, 318

2 : 4-Dibromo-1 : 3-dihydroxynaphthalene

81

Needles from H_2O . Decomp. without melting. $FeCl_3$ or $NaOH \rightarrow$ greenish-violet col.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 278.

Franzen, Stäuble, *J. prakt. Chem.*, 1920, 101, 58.

Claus, Jack, *J. prakt. Chem.*, 1898, 57, 13.

2 : 4-Dibromo-1 : 3-dihydroxynaphthalene.

Needles from $AcOH$. M.p. 128–9°. Sol. ord. org. solvents. Spar. sol. H_2O .

1-Acetyl: needles from $AcOH$. M.p. 148°.

1 : 3-Diacetyl: needles from $EtOH$. M.p. 125° (122°).

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 262.

Meyer, Wolfsleben, *Ber.*, 1911, 44, 1958.

2 : 3-Dibromo-1 : 4-dihydroxynaphthalene.

Needles. M.p. above 255°.

1 : 4-Diacetyl: m.p. 238°.

Meldola, Hughes, *J. Chem. Soc.*, 1890, 57, 810.

Meldola, Streatfeild, *J. Chem. Soc.*, 1895, 67, 909 (Footnote).

2 : 6-Dibromo-1 : 5-dihydroxynaphthalene.

Needles from $AcOH$. Darkens at 200°. M.p. above 300° (224° decomp.). Sol. Et_2O . Spar. sol. $CHCl_3$. Insol. CCl_4 .

Di-Me ether: $C_{12}H_{10}O_2Br_2$. MW, 346. Plates from $EtOH$. M.p. 161°. Sol. Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. pet. ether, cold $EtOH$.

Di-Et ether: $C_{14}H_{14}O_2Br_2$. MW, 374. Needles from $EtOH$. M.p. 148°. Sol. C_6H_6 . Spar. sol. $AcOH$. Insol. pet. ether.

1-Acetyl: m.p. 173°.

1 : 5-Diacetyl: m.p. 228°.

1-Acetyl-5-benzoyl: m.p. 164°.

1 : 5-Dibenzoyl: needles from Py . M.p. 262°.

Wheeler, Ergle, *J. Am. Chem. Soc.*, 1930, 52, 4873.

Carter, Race, Rowe, *J. Chem. Soc.*, 1942, 236.

4 : 8-Dibromo-1 : 5-dihydroxynaphthalene.

Pale yellow cryst. M.p. 147·5° decomp. Sol. hot ligroin. Spar. sol. C_6H_6 .

Acetyl: m.p. 165·5°.

1 : 5-Diacetyl: m.p. 131°.

Willstätter, Schuler, *Ber.*, 1928, 61, 366.

1 : 4-Dibromo-2 : 3-dihydroxynaphthalene.

Needles from $CHCl_3$. M.p. 178°. Sol. $EtOH$, $CHCl_3$, $AcOH$, C_6H_6 .

2 : 3-Diacetyl: m.p. 175°.

Zincke, Fries, *Ann.*, 1904, 334, 361.

Dict. of Org. Comp.—II.

1 : 3-Dibromo-2 : 3-dimethylbutane**6 : 7-Dibromo-2 : 3-dihydroxynaphthalene.**

Leaflets from C_6H_6 or needles from $EtOH$. M.p. 217°. Sol. $EtOH$, $AcOH$. Mod. sol. $CHCl_3$, C_6H_6 .

2 : 3-Diacetyl: m.p. 155°.

Zincke, Fries, *Ann.*, 1904, 334, 361.

1 : 5-Dibromo-2 : 6-dihydroxynaphthalene.

Needles from $EtOH$. M.p. 223°.

Di-Me ether: $C_{12}H_{10}O_2Br_2$. MW, 346. Leaflets from $PhNO_2$. M.p. 257°.

Chakravarti, Pasupati, *J. Chem. Soc.*, 1937, 1861.

3 : 6-Dibromo-2 : 7-dihydroxynaphthalene.

Needles from $EtOH$. Aq., m.p. 156–8° decomp. Needles from C_6H_6 , m.p. 144–6°.

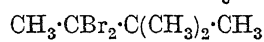
2 : 7-Dibenzoyl: needles from $AcOH$. M.p. 209°.

Scholl, Seer, Weitzenböck, *Monatsh.*, 1921, 42, 407.

Ioffe, Fedorowa, *Chem. Zentr.*, 1937, I, 726.

Dibromodimethylaniline.

See under Dibromoaniline.

3 : 3-Dibromo-2 : 2-dimethylbutane

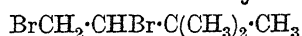
$C_6H_{12}Br_2$ MW, 244

Cryst. M.p. 191–1·5° (sealed tube). Alc. $KOH \rightarrow$ *tert.*-butylacetylene. $CaCO_3 + H_2O$ at 100° \rightarrow pinacolin.

Faworski, Welitschkowskaja, *J. prakt. Chem.*, 1913, 88, 673.

Couturier, *Ann. chim. phys.*, 1892, 26, 450.

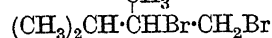
Delacré, *Chem. Zentr.*, 1906, II, 497.

3 : 4-Dibromo-2 : 2-dimethylbutane

$C_6H_{12}Br_2$ MW, 244

B.p. 203° slight decomp., 91–2°/14 mm. Sol. $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . Insol. H_2O . D^{20}_4 1·616.

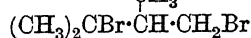
Claessens, *Bull. soc. chim.*, 1909, 5, 113.

1 : 2-Dibromo-2 : 3-dimethylbutane

$C_6H_{12}Br_2$ MW, 244

B.p. 80°/17 mm. D^{20}_4 1·6033. n^{20}_D 1·5105.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 760.

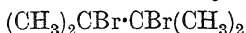
1 : 3-Dibromo-2 : 3-dimethylbutane

$C_6H_{12}Br_2$ MW, 244

B.p. 88-9°/16.5 mm. D^{20}_D 1.6065.

Bergmann, *Chem. Abstracts*, 1923, 17, 1420.

2 : 3-Dibromo-2 : 3-dimethylbutane



$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

Needles from Et_2O . M.p. 192° decomp. (169-70°, 177-177.5° sealed tube). Spar. sol. EtOH , C_6H_6 . Heat with $\text{H}_2\text{O} + \text{PbO}_2 \rightarrow$ pinacolin.

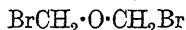
Couturier, *Ann. chim. phys.*, 1892, 26, 444.

Henry, *Chem. Zentr.*, 1906, II, 1109.

Grosse, Ipatieff, *J. Org. Chem.*, 1943, 8, 438.

Sweeting, Johnson, *J. Am. Chem. Soc.*, 1946, 68, 1057.

sym.-Dibromodimethyl Ether



$\text{C}_2\text{H}_4\text{OBr}_2$ MW, 204

Fuming, lachrymatory liq. F.p. -34°. B.p. 154-5° (149-152°). D^{20}_D 2.2013. $\text{H}_2\text{O} \rightarrow \text{H}\cdot\text{CHO} + \text{HBr}$. $\text{MeOH} \rightarrow$ methylal.

Henry, *Ber.*, 1894, 27B, 336.

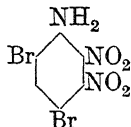
Tischtschenko, Rabzewitsch-Subkowski, *Chem. Zentr.*, 1915, I, 837.

Stephen, *J. Chem. Soc.*, 1920, 117, 510.

Dibromodimethylpropane.

See Dibromotetramethylmethane.

4 : 6-Dibromo-2 : 3-dinitroaniline



$\text{C}_6\text{H}_3\text{O}_4\text{N}_3\text{Br}_2$ MW, 341

M.p. 100°.

Blanksma, *Rec. trav. chim.*, 1909, 28, 101.

3 : 6-Dibromo-2 : 4-dinitroaniline.

M.p. 155°. Sol. hot EtOH , hot C_6H_6 . Insol. H_2O .

Sandoz, F.P. 798,141 (*Chem. Zentr.*, 1936, II, 2616).

5 : 6-Dibromo-2 : 4-dinitroaniline.

Yellow needles. M.p. 219°. Mod. sol. C_6H_6 . Spar. sol. EtOH , Et_2O , AcOEt .

Körner, Contardi, *Atti accad. Lincei*, 1906, 15, ii, 587.

4 : 6-Dibromo-2 : 5-dinitroaniline.

Orange-yellow needles from EtOH . M.p. 143° (140°).

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, ii, 630.

Blanksma, *Rec. trav. chim.*, 1909, 28, 101.

2 : 6-Dibromo-3 : 4-dinitroaniline.

Yellow cryst. M.p. 201°.

Blanksma, *Rec. trav. chim.*, 1909, 28, 102.

3 : 4-Dibromo-*o*-dinitrobenzene



$\text{C}_6\text{H}_2\text{O}_4\text{N}_2\text{Br}_2$ MW, 326

Pale greenish cryst. from CS_2 . M.p. 109°. Alc. $\text{NH}_3 \rightarrow$ 5 : 6-dibromo-*o*-nitroaniline.

Körner, Contardi, *Atti accad. Lincei*, 1907, 16, i, 844.

3 : 5-Dibromo-*o*-dinitrobenzene.

Needles. M.p. 86° (84-8°). Trimorphous. Alc. $\text{NH}_3 \rightarrow$ 4 : 6-dibromo-*o*-nitroaniline. Hot $\text{KOH}\cdot\text{Aq.} \rightarrow$ 4 : 6-dibromo-*o*-nitrophenol.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, ii, 626.

3 : 6-Dibromo-*o*-dinitrobenzene.

Cryst. from CS_2 . M.p. 160°. Sol. hot EtOH . Alc. $\text{NH}_3 \rightarrow$ 3 : 6-dibromo-*o*-nitroaniline. Hot $\text{NaOH}\cdot\text{Aq.} \rightarrow$ 3 : 6-dibromo-*o*-nitrophenol.

Austen, *Ber.*, 1876, 9, 622.

Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 451.

4 : 5-Dibromo-*o*-dinitrobenzene.

Needles from AcOH . M.p. 115°. Mod. sol. Et_2O , CHCl_3 , CS_2 . Spar. sol. EtOH , AcOH , pet. ether. Sublimes. Volatile in steam. Alc. $\text{NH}_3 \rightarrow$ 4 : 5-dibromo-*o*-nitroaniline.

Austen, *Ber.*, 1875, 8, 1182.

Schiff, *Monatsh.*, 1890, 11, 336.

2 : 4-Dibromo-*m*-dinitrobenzene.

Pale greenish-yellow cryst. or colourless needles from EtOH . M.p. 83°. Alc. $\text{NH}_3 \rightarrow$ 2 : 4-dinitro-*m*-phenylenediamine.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, ii, 628; 1908, 17, i, 472.

2 : 5-Dibromo-*m*-dinitrobenzene.

Needles from CS_2 . M.p. 99-100°. Sol. EtOH , AcOH , CS_2 . Alc. $\text{NH}_3 \rightarrow$ 4-bromo-2 : 6-dinitroaniline.

Austen, *Ber.*, 1876, 9, 918.

Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 451.

Heller, Meyer, *J. prakt. Chem.*, 1905, 72, 200.

4 : 5-Dibromo-*m*-dinitrobenzene.

Cryst. from CS_2 . M.p. 71°. Sol. EtOH , AcOH , CS_2 . Alc. $\text{NH}_3 \rightarrow$ 6-bromo-2 : 4-dinitroaniline.

Schiff, *Monatsh.*, 1890, 11, 337.

Körner, Contardi, *Atti accad. Lincei*, 1907, 16, i, 846.

4 : 6-Dibromo-*m*-dinitrobenzene.

Yellow cryst. M.p. 117°. Dimorphous. Mod. sol. Et₂O, hot EtOH. Volatile in steam. Alc. NH₃ → 5-bromo-2 : 4-dinitroaniline. Hot KOH.Aq. → 5-bromo-2 : 4-dinitrophenol.

Körner, *Gazz. chim. ital.*, 1874, 4, 363, 398.

2 : 3-Dibromo-*p*-dinitrobenzene.

Cryst. from CS₂. M.p. 156.5°. Spar. sol. EtOH, Et₂O, CS₂.

Körner, Contardi, *Atti accad. Lincei*, 1907, 16, i, 845.

2 : 5-Dibromo-*p*-dinitrobenzene.

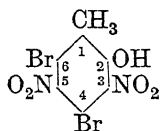
Yellowish prisms from C₆H₆-EtOH. M.p. 127°. Sol. CHCl₃, CS₂, C₆H₆. Spar. sol. EtOH, Et₂O. Insol. H₂O, ligroin. Alc. NH₃ → 2 : 5-dibromo-*p*-nitroaniline.

Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 456.

2 : 6-Dibromo-*p*-dinitrobenzene.

Yellow prisms from EtOH. M.p. 130°.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, ii, 631.

4 : 6-Dibromo-3 : 5-dinitro-*o*-cresol (4 : 6-Dibromo-3 : 5-dinitro-2-hydroxytoluene)

C₇H₄O₅N₂Br₂ MW, 356

Yellow needles from AcOH.Aq. M.p. 165°.

Me ether : C₈H₆O₅N₂Br₂. MW, 370. M.p. 111-12°.

Kohn, Rabinowitsch, *Monatsh.*, 1927, 48, 369.

4 : 5-Dibromo-3 : 6-dinitro-*o*-cresol (4 : 5-Dibromo-3 : 6-dinitro-2-hydroxytoluene).

Yellow cryst. from hot EtOH. M.p. 135°.

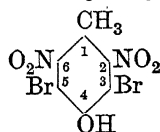
Kohn, Weissberg, *Monatsh.*, 1924, 45, 300.

3 : 5-Dibromo-4 : 6-dinitro-*o*-cresol (3 : 5-Dibromo-4 : 6-dinitro-2-hydroxytoluene).

Cryst. from EtOH.Aq. M.p. 188°.

Me ether : m.p. 149-51°.

Kohn, Segel, *Monatsh.*, 1925, 46, 665.

3 : 5-Dibromo-2 : 6-dinitro-*p*-cresol (3 : 5-Dibromo-2 : 6-dinitro-4-hydroxytoluene)

C₇H₄O₅N₂Br₂

MW, 356

Prisms from EtOH.Aq. M.p. 198°.

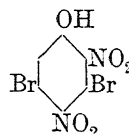
Me ether : C₈H₆O₅N₂Br₂. MW, 370. M.p. 172°.

Kohn, Segel, *Monatsh.*, 1925, 46, 665.

2 : 6-Dibromo-3 : 5-dinitro-*p*-cresol (2 : 6-Dibromo-3 : 5-dinitro-4-hydroxytoluene).

Pale yellow cryst. from EtOH.Aq. M.p. 152°.

Kohn, Weissberg, *Monatsh.*, 1924, 45, 300.

3 : 5-Dibromo-2 : 4-dinitrophenol

C₆H₂O₅N₂Br₂

MW, 342

Pale yellow needles from H₂O. M.p. 146-7°. *Benzoyl* : needles from EtOH. M.p. 134-5°.

Kohn, Heller, *Monatsh.*, 1925, 46, 93.

4 : 6-Dibromo-2 : 5-dinitrophenol.

Pale yellow needles from H₂O or EtOH.Aq. M.p. 137°.

Hodgson, Smith, *J. Chem. Soc.*, 1931, 2270.

3 : 5-Dibromo-2 : 6-dinitrophenol.

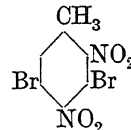
Yellow needles from EtOH.Aq. M.p. 147-8°. Sol. EtOH, Et₂O. Prac. insol. ligroin.

Jackson, Warren, *Am. Chem. J.*, 1894, 16, 33.

2 : 6-Dibromo-3 : 4-dinitrophenol.

Pale yellow needles from H₂O or EtOH.Aq. M.p. 142°.

Hodgson, Smith, *J. Chem. Soc.*, 1931, 2270.

3 : 5-Dibromo-2 : 4-dinitrotoluene

C₇H₄O₄N₂Br₂

MW, 340

Prisms from EtOH, leaflets from CS₂. M.p. 157-8°. D₁₅ 2.153. Alc. NH₃ → 2 : 4-dinitro-3 : 5-tolylenediamine.

Blanksma, *Rec. trav. chim.*, 1905, 24, 324.

Blanksma, *Chem. Zentr.*, 1909, II, 1220.

3 : 6-Dibromo-2 : 4-dinitrotoluene.

Yellowish needles or prisms from AcOH. M.p. 142-3°. Sublimes.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 507.

3 : 5-Dibromo-2 : 6-dinitrotoluene.

Plates from AcOEt, needles from EtOH. M.p. 120° (117°).

Körner, Contardi, *Atti accad. Lincei*, 1916, 25, ii, 343; *Gazz. chim. ital.*, 1917, 47, i, 232.

2 : 4-Dibromo-3 : 5-dinitrotoluene.

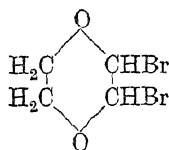
Yellowish prisms from AcOEt. M.p. 130° (127·5°). $\text{Zn} + \text{HCl} \rightarrow 3 : 5\text{-tolylenediamine}$.

Davies, *J. Chem. Soc.*, 1902, 81, 873.
Blanksma, *Chem. Zentr.*, 1913, I, 393.

2 : 6-Dibromo-3 : 5-dinitrotoluene.

Cryst. M.p. 161-2°.

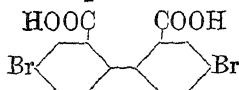
Blanksma, *Chem. Zentr.*, 1913, I, 393.

2 : 3-Dibromo-1 : 4-dioxan

$\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$ MW, 246

Cryst. from abs. Et_2O . M.p. 69-70°. Sol. H_2O , Et_2O , CCl_4 , dioxan. Spar. sol. pet. ether. HBr evolved on exposure to air.

Summerbell, Bauer, *J. Am. Chem. Soc.*, 1935, 57, 2367.

4 : 4'-Dibromodiphenic Acid

$\text{C}_{14}\text{H}_8\text{O}_4\text{Br}_2$ MW, 400

Yellowish leaflets from H_2O or EtOH.Aq. M.p. 277-S°. Sol. EtOH , Et_2O , AcOH . Spar. sol. H_2O , Me_2CO , CHCl_3 , CS_2 , C_6H_6 . Dist. with $\text{CaO} \rightarrow 2 : 7\text{-dibromofluorenone}$.

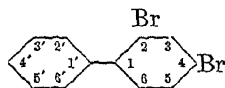
Di-Me ester: $\text{C}_{16}\text{H}_{12}\text{O}_4\text{Br}_2$ MW, 428. Leaflets from MeOH . M.p. 124°.

Di-Et ester: $\text{C}_{18}\text{H}_{16}\text{O}_4\text{Br}_2$ MW, 456. M.p. 105-6°.

Anhydride: $\text{C}_{14}\text{H}_6\text{O}_3\text{Br}_2$ MW, 382. Needles. M.p. 316° (304-5°).

Schmidt, Junghans, *Ber.*, 1904, 37, 3569.

Le Fèvre, Vine, *J. Chem. Soc.*, 1938, 970.

2 : 4-Dibromodiphenyl

$\text{C}_{12}\text{H}_8\text{Br}_2$ MW, 312

B.p. 235°/15 mm. (125°/2 mm.). $D_4^{25} 1.7197$. $n_D^{25} 1.6541$ $\text{CrO}_3 \rightarrow 2 : 4\text{-dibromobenzoic acid}$.

Blakey, Scarborough, *J. Chem. Soc.*, 1927, 3007.

Suter, Smith, *J. Am. Chem. Soc.*, 1939, 61, 167.

2 : 5-Dibromodiphenyl.

B.p. 209°/15 mm. $\text{CrO}_3 \rightarrow 2 : 5\text{-dibromobenzoic acid}$.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 89.

3 : 4-Dibromodiphenyl.

B.p. 235°/15 mm. (192°/5 mm.). $\text{CrO}_3 \rightarrow 3 : 4\text{-dibromobenzoic acid}$.

Blakey, Scarborough, *J. Chem. Soc.*, 1927, 3007.

Case, *J. Am. Chem. Soc.*, 1936, 58, 1249.

2 : 2'-Dibromodiphenyl.

Needles or prisms from EtOH.Aq. M.p. 81°. Sol. most ord. org. solvents. Stable to ox. agents, e.g. CrO_3 .

Dobbie, Fox, Gauge, *J. Chem. Soc.*, 1911, 99, 1618.

Schwechten, *Ber.*, 1932, 65, 1607.

2 : 4'-Dibromodiphenyl.

Pale yellow needles from pet. ether. M.p. 56°.

Finzi, Bellavita, *Gazz. chim. ital.*, 1934, 64, 340.

Case, *J. Am. Chem. Soc.*, 1938, 60, 426.

3 : 3'-Dibromodiphenyl.

Cryst from Et_2O . M.p. 53°.

Courtot, Chaix, *Compt. rend.*, 1931, 192, 1667.

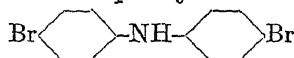
4 : 4'-Dibromodiphenyl.

Prisms from MeOH . M.p. 164°. B.p. 355-60°. Sol. C_6H_6 . Spar. sol. EtOH . CrO_3 in $\text{AcOH} \rightarrow p\text{-bromobenzoic acid}$.

Scholl, Neovius, *Ber.*, 1911, 44, 1087, (Footnote).

Courtot, Bastani, *Compt. rend.*, 1936, 203, 197.

Varma, Krishnamurti, *Chem. Abstracts*, 1937, 31, 7410.

4 : 4'-Dibromodiphenylamine

$\text{C}_{12}\text{H}_9\text{NBr}_2$ MW, 327

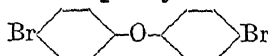
Prisms from EtOH . M.p. 107°. Sol. EtOH , AcOH .

Benzoyl: m.p. 141·5-42°.

Fischer, *Ber.*, 1912, 45, 1103.

Galatis, Megaloikonomos, *Chem. Abstracts*, 1935, 29, 6886.

Crounse, Raiford, *J. Am. Chem. Soc.*, 1945, 67, 875.

4 : 4'-Dibromodiphenyl Ether

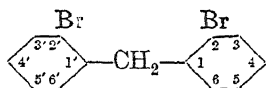
$\text{C}_{12}\text{H}_8\text{OBr}_2$ MW, 328

Plates from EtOH . M.p. 54° (58·5°). B.p. 338-40°. Sol. EtOH , AcOH , C_6H_6 .

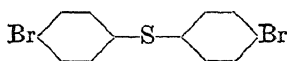
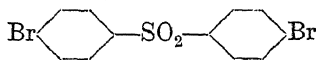
Mailhe, Murat, *Compt. rend.*, 1912, 154, 601.

Akchurin, *Chem. Abstracts*, 1946, 40, 557.

2 : 2'-Dibromodiphenylmethane

C₁₃H₁₀Br₂ MW, 326B.p. 234-5°/40 mm. D₄²⁰ 1.6197. n_D²⁰ 1.6300.Thorp, Wildman, *J. Am. Chem. Soc.*, 1915, 37, 376.

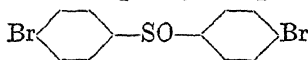
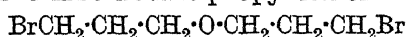
4 : 4'-Dibromodiphenylmethane.

Cryst. from ligroin. M.p. 64°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Spar. sol. ligroin.Goldthwaite, *Am. Chem. J.*, 1903, 30, 448.4 : 4'-Dibromodiphenyl sulphide (*Di-p-bromophenyl sulphide*)C₁₂H₈Br₂S MW, 344Leaflets from EtOH. M.p. 112°. B.p. 268-5°/40 mm., 243°/20 mm., 226°/11 mm. Sol. Et₂O, CHCl₃, CS₂, CCl₄. Spar. sol. EtOH. Insol. H₂O.Rosenmund, Harms, *Ber.*, 1920, 53, 2234.4 : 4'-Dibromodiphenyl sulphone (*pp'-Dibromosulphobenzide*)C₁₂H₈O₂Br₂S MW, 376

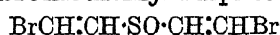
Prisms from AcOH or hot EtOH. M.p. 172°. Spar sol. EtOH.

Fouque, Lacroix, *Bull. soc. chim.*, 1923, 33, 180.

4 : 4'-Dibromodiphenyl sulfoxide

C₁₂H₈OBr₂S MW, 360Cryst. from EtOH. M.p. 153°. Sol. CHCl₃, C₆H₆.Fries, Vogt, *Ann.*, 1911, 381, 346.3 : 3'-Dibromodi-*n*-propyl EtherC₆H₁₂OBr₂ MW, 260B.p. 128°/19 mm. Sol. ord. org. solvents. Insol. H₂O. D₂₀²⁰ 1.574. Volatile in steam.Kamm, Newcomb, *J. Am. Chem. Soc.*, 1921, 43, 2229.

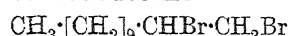
2 : 2'-Dibromodivinyl sulphoxide

C₄H₄OBr₂S MW, 260

M.p. 40.5-42°. B.p. 134°/11 mm.

Kretow, Kliger, *Chem. Zentr.*, 1933, I, 2801.

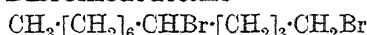
1 : 2-Dibromododecane

C₁₂H₂₄Br₂ MW, 328

M.p. -15°.

Krafft, *Ber.*, 1884, 17, 1371.

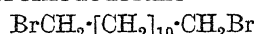
1 : 5-Dibromododecane

C₁₂H₂₄Br₂ MW, 328

B.p. 171°/9 mm.

Franke, Kroupa, *Monatsh.*, 1930, 56, 353.

1 : 12-Dibromododecane

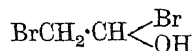
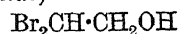
C₁₂H₂₄Br₂ MW, 328

Cryst. from EtOH. M.p. 40.5-41° (39°). B.p. 215°/15 mm., 177-80°/8 mm.

Müller, Schütz, *Ber.*, 1938, 71, 691.

Dibromoethane.

See Ethylene dibromide and Ethylidene bromide.

1 : 2-Dibromoethyl Alcohol (*Hydroxyethylene dibromide*)C₂H₄OBr₂ MW, 204B.p. 31°/17 mm. D₄²⁰ 2.1782. n_D²⁰ 1.5492.Acetyl: b.p. 84-5°/5 mm. D₄²⁰ 1.9185. n_D²⁰ 1.5052.Stepanow, Preobraschensky, Schtschukina, *Ber.*, 1926, 59, 2538.2 : 2 - Dibromoethyl Alcohol (2 - *Hydroxyethylidene bromide*)C₂H₄OBr₂ MW, 204B.p. 179-81°, 72°/10-11 mm. Sol. EtOH. Mod. sol. hot H₂O. D⁰ 2.35. Reduces NH₃. AgNO₃.

Urethane: m.p. 90-91°.

Demole, *Ber.*, 1876, 9, 49.

Dibromoethylarsine.

See Ethyldibromoarsine.

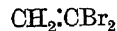
α : β-Dibromoethylbenzene.

See Styrene dibromide.

sym.-Dibromoethylene.

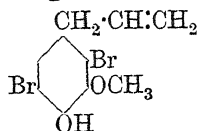
See Acetylene dibromide.

unsym.-Dibromoethylene (1 : 1-Dibromoethylene, vinylidene bromide)

C₂H₂Br₂ MW, 186B.p. 92°. Sol. EtOH, Et₂O. D₄²¹ 2.1780. Polymerises to an insoluble form. O → BrCH₂·COBr.Dimeride: C₄H₄Br₄. Yellow leaflets. M.p. 90°. Sublimes.Kaufmann, *Ber.*, 1922, 55, 257.Demole, *Bull. soc. chim.*, 1878, 29, 205.Gray, *J. Chem. Soc.*, 1897, 71, 1025.

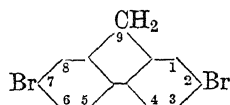
Di-1-bromoethyl Ketone.

See 1 : 1'-Dibromodiethyl Ketone.

2 : 5-Dibromoeugenol $C_{10}H_{10}O_2Br_2$

MW, 322

Prisms from EtOH. M.p. 59°.

Me ether: $C_{11}H_{12}O_2Br_2$. MW, 336. Plates from EtOH. M.p. 29·5°.*Et ether*: $C_{12}H_{14}O_2Br_2$. MW, 350. M.p. 20°.*Acetyl*: prisms from Et_2O . M.p. 66°.Chasanowitz, Hell, *Ber.*, 1885, 18, 824.**2 : 7-Dibromofluorene** $C_{13}H_8Br_2$

MW, 324

Plates from CS_2 . M.p. 166-7°. Sol. CS_2 , C_6H_6 , hot EtOH. Mod. sol. Et_2O . $CrO_3 \rightarrow$ 2 : 7-dibromofluorenone. Soda-lime \rightarrow diphenyl.*Benzylidene*: yellow rods. M.p. 98-9°.Pictet, Ramseyer, *Ber.*, 1911, 44, 2491.**2 : 9-Dibromofluorene.**

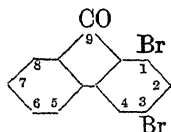
Needles. M.p. 107·5-8·5°.

Miller, Bachman, *J. Am. Chem. Soc.*, 1935, 57, 2448.**3 : 9-Dibromofluorene.**

Needles. M.p. 124-5°.

Miller, Bachman, *J. Am. Chem. Soc.*, 1935, 57, 2448.**4 : 9-Dibromofluorene.**

Needles. M.p. 194-5°.

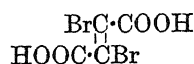
Miller, Bachman, *J. Am. Chem. Soc.*, 1935, 57, 2448.**9 : 9-Dibromofluorene.**Needles from Me_2CO . M.p. 114°.Staudinger, Gaule, *Ber.*, 1916, 49, 1956.**1 : 3-Dibromofluorenone** $C_{13}H_6OBr_2$

MW, 338

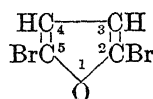
Needles from EtOH. M.p. 225°. B.p. about 430° decomp.

Montagne, van Charante, *Rec. trav. chim.*, 1913, 32, 173.**2 : 7-Dibromofluorenone.**Pale yellow needles. M.p. 202° (197°). Sol. EtOH, Et_2O , hot C_6H_6 .*Oxime*: m.p. 235° decomp.*p-Nitrophenylhydrazone*: m.p. 274°.Schmidt, Bauer, *Ber.*, 1905, 38, 3767.Courtot, Kronstein, *Chem. Abstracts*, 1943, 37, 2729.**3 : 6-Dibromofluorenone.**

M.p. 321°.

Oxime: m.p. 262-3°.Courtot, Kronstein, *Chem. Abstracts*, 1943, 37, 2729.**Dibromofumaric Acid** $C_4H_2O_4Br_2$

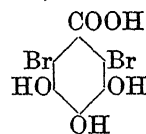
MW, 274

Cryst. from H_2O . M.p. 229° (222°). Sol. EtOH, Et_2O .*Di-Me ester*: $C_6H_8O_4Br_2$. MW, 302. M.p. 41·5°. B.p. 113-14°/5 mm.*Di-Et ester*: $C_8H_{10}O_4Br_2$. MW, 330. Prisms. M.p. 68°.*Me ester chloride*: $C_5H_3O_3ClBr_2$. MW, 306·5. B.p. 83-6°/3·5 mm.*Dichloride*: $C_4O_2Cl_2Br_2$. MW, 311. B.p. 92·5°/9·5 mm. D_4^{25} 2·1308.Lutz, *J. Am. Chem. Soc.*, 1930, 52, 3405.**2 : 5-Dibromofuran** $C_4H_2OBr_2$

MW, 226

F.p. 7-8°. M.p. 9-10°. B.p. 164-5° decomp., 63°/15 mm. Oxidises rapidly in air. $H_2O \rightarrow$ maleic acid. Dil. $HNO_3 \rightarrow$ fumaric acid.Hill, Hartshorn, *Ber.*, 1885, 18, 448.**3 : 4-Dibromofuran.**

B.p. 165-7°.

Canzoneri, Oliveri, *Gazz. chim. ital.*, 1885, 15, 115.**Dibromogallic Acid (2 : 6-Dibromo-3 : 4 : 5-trihydroxybenzoic acid)** $C_7H_4O_5Br_2$

MW, 328

Needles or leaflets + $1H_2O$ from H_2O . M.p. 139° decomp. Sol. H_2O , EtOH. $k = 1 \cdot 21 \times 10^{-2}$ at 25°. $FeCl_3 \rightarrow$ blue-black col. Aniline or $KCN \cdot AgCN \rightarrow$ gallic acid. Decarboxylates on heating with H_2O . NH_4 salt: m.p. 175° decomp.*Na salt*: m.p. 185° decomp.*Ba salt*, $5H_2O$: m.p. 195-200°.*Me ester*: $C_8H_6O_5Br_2$. MW, 342. Leaflets

+ $1\frac{1}{2}$ H₂O from H₂O. M.p. anhyd. 169°. $k = 1.1 \times 10^{-6}$ at 25°. *Triacetyl*: rhombohedra from EtOH. M.p. 150–2°.

Et ester: C₉H₈O₅Br₂. MW, 356. Prisms + $1\frac{1}{2}$ H₂O from H₂O. M.p. anhyd. 137°.

Amide: C₇H₅O₄NBr₂. MW, 327. Needles + $3\frac{1}{2}$ H₂O from H₂O. M.p. anhyd. 245°. FeCl₃ → intense blue col. 3 : 4 : 5-*Tetraacetyl*: cryst. from EtOH. M.p. 233°.

Tri-Me ether: C₁₀H₁₀O₅Br₂. MW, 370. Needles from H₂O. M.p. 145°.

Tri-Et ether: C₁₃H₁₆O₅Br₂. MW, 412. Prisms + 1C₆H₆ from C₆H₆. Loses solvent at 50°. M.p. 107°.

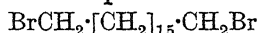
Triacetyl: needles from toluene. M.p. 168°.

Tribenzoyl: amorphous powder. M.p. 95–6°.

Biétrex, *Bull. soc. chim.*, 1892, 7, 412, 625; 1893, 9, 117, 696.

Fairclough, *J. Chem. Soc.*, 1938, 1189.

1 : 17-Dibromoheptadecane

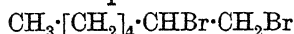


C₁₇H₃₄Br₂ MW, 398

Needles from EtOH. M.p. 38–8.4°. B.p. 208–10°/3 mm.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 854.

1 : 2-Dibromoheptane

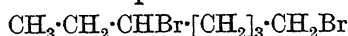


C₇H₁₄Br₂ MW, 258

B.p. 227–9° slight decomp., 116°/25 mm., 110.1–110.2°/19 mm., 106.2°/13 mm., 98–9°/12 mm. D₄²⁰ 1.5086. n_D²⁰ 1.4986.

Sherrill, Smith, Thompson, *J. Am. Chem. Soc.*, 1934, 56, 612.

1 : 5-Dibromoheptane



C₇H₁₄Br₂ MW, 258

B.p. 113–5°/11 mm. D₁₅¹⁵ 1.537. n_D¹⁵ 1.50411.

Paul, *Bull. soc. chim.*, 1935, 2, 311.

1 : 7-Dibromoheptane (*Heptamethylene bromide*)



C₇H₁₄Br₂ MW, 258

M.p. 41.7°. B.p. 263°, 158°/35 mm., 142–3°/25 mm., 138–40°/20 mm., 132°/11 mm. D⁰ 1.5451, D₁₅¹⁵ 1.5254. n_D¹⁵ 1.5033.

Dionneau, *Ann. chim.*, 1915, 3, 245, 255.

Müller, Rölz, *Monatsh.*, 1927, 48, 733.

Müller, Vanc, *Ber.*, 1944, 77, 669.

2 : 3-Dibromoheptane

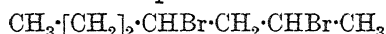


C₇H₁₄Br₂ MW, 258

B.p. 101.0–1.2°/17 mm., 96.2°/12 mm. D₄²⁰ 1.5139. n_D²⁰ 1.4992.

Sherrill, Smith, Thompson, *J. Am. Chem. Soc.*, 1934, 56, 612.

2 : 4-Dibromoheptane



C₇H₁₄Br₂ MW, 258

B.p. 99–100°/12.5 mm. D₄²⁴ 1.4959. n_D²⁴ 1.4941.

Lespieau, Wakeman, *Bull. soc. chim.*, 1932, 51, 384.

2 : 6-Dibromoheptane



C₇H₁₄Br₂ MW, 258

B.p. 100°/12 mm. Decomp. on exposure to air and light.

Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1360.

3 : 4-Dibromoheptane



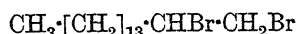
C₇H₁₄Br₂ MW, 258

B.p. 107.2–7.4°/24 mm., 98–9°/11 mm. D₄²⁰ 1.5182. n_D²⁰ 1.5010.

Sherrill, Smith, Thompson, *J. Am. Chem. Soc.*, 1934, 56, 612.

Tuot, *Bull. soc. chim.*, 1946, 363.

1 : 2-Dibromohexadecane



C₁₆H₃₂Br₂ MW, 384

Cryst. from EtOH. M.p. 13.5°. B.p. 225–7°/15 mm.

Krafft, Grosjean, *Ber.*, 1890, 23, 2352.

1 : 16-Dibromohexadecane



C₁₆H₃₂Br₂ MW, 384

Needles from EtOH. M.p. 56.2–56.7°. B.p. 204–5°/4 mm.

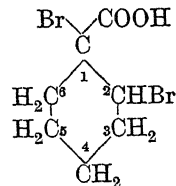
Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 852.

Dibromohexahydrobenzene.

See Dibromocyclohexane.

1 : 2 - Dibromohexahydrobenzoic Acid

(1 : 2-Dibromocyclohexane-carboxylic acid)



C₇H₁₀O₂Br₂ MW, 286

Prisms or plates from C₆H₆-ligroin. M.p. 147° (142°).

Aschan, *Ann.*, 1892, 271, 277.

Bucherer, Dahlem, *J. prakt. Chem.*, 1934, 140, 251.

2 : 3-Dibromohexahydrobenzoic Acid.

Prisms from C_6H_6 -ligroin. M.p. 166° . Sol. EtOH, $CHCl_3$.

Aschan, *Ann.*, 1892, 271, 246.

3 : 4-Dibromohexahydrobenzoic Acid.

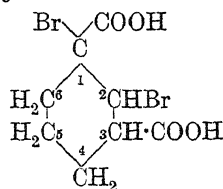
Plates from formic acid. M.p. 86° . Sol. EtOH, Et_2O . Spar. sol. pet. ether.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, 91, 490.

Perkin, *J. Chem. Soc.*, 1904, 85, 433.

1 : 2-Dibromohexahydroisophthalic Acid

(1 : 2-Dibromocyclohexane-1 : 3-dicarboxylic acid)



$C_8H_{10}O_4Br_2$

MW, 330

Cryst. from formic acid. M.p. $200-2^\circ$ decomp.

Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 305.

1 : 3-Dibromohexahydroisophthalic Acid.

Leaflets from formic acid. M.p. 181° . Sol. EtOH, Et_2O . Spar. sol. C_6H_6 , cold H_2O .

Goodwin, Perkin, *J. Chem. Soc.*, 1905, 87, 853.

1 : 6-Dibromohexahydroisophthalic Acid.

Prisms from formic acid. Decomp. at about 230° .

Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 309.

4 : 5-Dibromohexahydroisophthalic Acid.

Cis-.

Cryst. from formic acid. M.p. 220° .

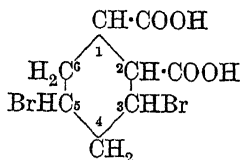
Trans-.

Cryst. from formic acid. Decomp. at $230-5^\circ$.

Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 311, 313.

3 : 5-Dibromohexahydrophthalic Acid

(3 : 5-Dibromocyclohexane-1 : 2-dicarboxylic acid)



$C_8H_{10}O_4Br_2$

MW, 330

Trans-.

Plates from Et_2O . M.p. $189-90^\circ$. $NaHg \longrightarrow trans$ -hexahydrophthalic acid.

Baeyer, *Ann.*, 1892, 269, 200.

3 : 6-Dibromohexahydrophthalic Acid.

α -Form :

Cubes from H_2O . M.p. $218-9^\circ$ decomp. $Zn + AcOH \longrightarrow trans$ -hexahydrophthalic acid.

β -Form :

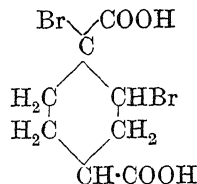
Cryst. from ligroin-AcOEt. M.p. 177° decomp.

Diels, Alder, *Ber.*, 1929, 62, 559.

Baeyer, *Ann.*, 1890, 258, 193.

1 : 2-Dibromohexahydroterephthalic Acid

(1 : 2-Dibromocyclohexane-1 : 4-dicarboxylic acid)



$C_8H_{10}O_4Br_2$

MW, 330

Cubes + $1H_2O$. Sol. Et_2O . Spar. sol. H_2O .

Di-Me ester : $C_{10}H_{14}O_4Br_2$. MW, 358. Needles from MeOH. M.p. 81° .

Baeyer, *Ber.*, 1886, 19, 1807; *Ann.*, 1888, 245, 163.

1 : 4-Dibromohexahydroterephthalic Acid.

Cis-.

Needles from H_2O . Sol. EtOH, Et_2O , Me_2CO , hot H_2O . Mod. sol. cold H_2O .

Di-Me ester : needles from ligroin. M.p. 68° .

Trans-.

Cubes. Sol. EtOH, Et_2O . Spar. sol. boiling H_2O . Insol. cold H_2O .

Di-Me ester : prisms from MeOH. M.p. 150° .

Baeyer, *Ann.*, 1888, 245, 175.

2 : 3-Dibromohexahydroterephthalic Acid.

Di-Me ester : exists in 3 stereoisomeric forms.

(α -). Needles from MeOH. M.p. 171° . (β -). Plates or prisms from ligroin. M.p. 51° . More sol. than α -form. (γ -). Cubes from MeOH or Me_2CO . M.p. 94° .

Baeyer, Herb, *Ann.*, 1890, 258, 35.

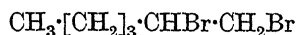
2 : 5-Dibromohexahydroterephthalic Acid.

Trans-.

Cryst. powder. Spar. sol. org. solvents. $Zn + AcOH \longrightarrow trans$ -hexahydroterephthalic acid.

Di-Me ester : plates from AcOEt. M.p. 166° .

Baeyer, *Ann.*, 1888, 245, 150.

1 : 2-Dibromohexane

$C_6H_{12}Br_2$

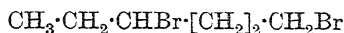
MW, 244

B.p. $103-5^\circ/36$ mm., $89-90^\circ/18$ mm., $82^\circ/12$ mm. D_4^{20} 1.5774 (1.6110). n_D^{20} 1.5024 (1.5061).

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 759.

Wilkinson, *J. Chem. Soc.*, 1931, 3060.

1 : 4-Dibromohexane

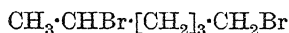


$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. $106-8^\circ/15$ mm., $98.2-98.4^\circ/12$ mm. D_4^{15} 1.602. n_D^{15} 1.5084.

van Romburgh, van der Burg, *Chem. Zentr.*, 1923, I, 1086.

1 : 5-Dibromohexane



$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. $153-4^\circ/100$ mm., $115-6^\circ/20$ mm., $105-8^\circ/15$ mm., $101-5^\circ/9$ mm. D_4^{20} 1.5989. n_D^{15} 1.50717.

v. Braun, Sobiecki, *Ber.*, 1911, 44, 1039.

1 : 6-Dibromohexane (*Hexamethylene bromide*)

$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

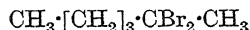
M.p. -2.3° . B.p. $239-41^\circ$ slight decomp., $140^\circ/35$ mm., $119.5-121^\circ/18$ mm., $115-6^\circ/12$ mm., $106^\circ/9$ mm. D^{15} 1.5948. n_D^{15} 1.5111.

Braun, Müller, *Ber.*, 1906, 39, 2020.

Müller, Sauerwald, *Monatsh.*, 1927, 48, 521.

Müller, Vanc, *Ber.*, 1944, 77, 669.

2 : 2-Dibromohexane



$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. $83.5-84^\circ/24$ mm. D^{22} 1.5463. n_D^{22} 1.4930.

Young, Vogt, Nieuwland, *J. Am. Chem. Soc.*, 1936, 58, 1808.

2 : 3-Dibromohexane

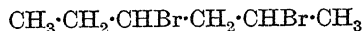


$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. $90^\circ/16$ mm. D_4^{20} 1.5812. n_D^{20} 1.5025.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 759.

2 : 4-Dibromohexane



$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. 201° decomp., $81.5-83^\circ/10$ mm. D_4^{22} 1.5736. n_D^{22} 1.4985.

Lespieau, Wakeman, *Bull. soc. chim.*, 1936, 51, 384.

2 : 5-Dibromohexane



$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

Meso.

Cryst. from 90% EtOH. M.p. 38.2° . B.p. 210° , $98-9^\circ/16-17$ mm. D^{56} 1.5315.

dl.

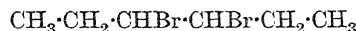
B.p. $94^\circ/13-14$ mm. $D^{11.9}$ 1.5822, D^{56} 1.5256.

Wislicenus, *Ber.*, 1901, 34, 2569, 2581.

Pace, *Chem. Abstracts*, 1927, 21, 1964.

Fried, Kleene, *J. Am. Chem. Soc.*, 1941, 63, 2691.

3 : 4-Dibromohexane

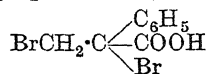


$\text{C}_6\text{H}_{12}\text{Br}_2$ MW, 244

B.p. $80-1^\circ/13$ mm., $73-4^\circ/10$ mm. D_4^{20} 1.6027. n_D^{20} 1.5045.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 759.

α : σ' -Dibromohydratropic Acid (1 : 2-Dibromo-1-phenylpropionic acid).

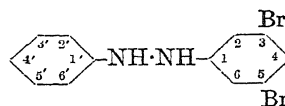


$\text{C}_9\text{H}_8\text{O}_2\text{Br}_2$ MW, 308

Needles from CS_2 . M.p. $115-16^\circ$. Sol. hot CHCl_3 , hot CS_2 .

Fittig, Würster, *Ann.*, 1879, 195, 159.

3 : 5-Dibromohydrazobenzene



$\text{C}_{12}\text{H}_{10}\text{N}_2\text{Br}_2$ MW, 342

Plates from pet. ether. M.p. 114° .

Burns, McCombie, Scarborough, *J. Chem. Soc.*, 1928, 2936.

2 : 2'-Dibromohydrazobenzene.

M.p. 82° .

Janowsky, Erb, *Ber.*, 1887, 20, 364.

3 : 3'-Dibromohydrazobenzene.

Prisms. M.p. $108-9^\circ$. Sol. Et_2O , hot EtOH.

Gabriel, *Ber.*, 1876, 9, 1406.

4 : 4'-Dibromohydrazobenzene.

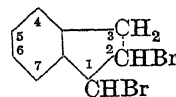
Needles. M.p. 130° . Decomp. at 160° . Sol. EtOH, Et_2O .

Werigo, *Ann.*, 1873, 165, 192.

Dibromohydrin.

See 1 : 3-Dibromoisopropyl Alcohol and 2 : 3-Dibromopropyl Alcohol.

1 : 2-Dibromohydrindene (*Indene dibromide*, 1 : 2-dibromoindane)



$\text{C}_9\text{H}_8\text{Br}_2$

MW, 276

Cryst. from pet. ether. M.p. 32°. B.p. 144°/10 mm.

Meyer, Meyer, *Ber.*, 1918, 51, 1581, 1583.
Jacobi, *J. prakt. Chem.*, 1931, 129, 81.
Bergmann, Bondi, *Ber.*, 1931, 64, 1480.

4 : 6-Dibromohydrindene.

B.p. 148°/15 mm.

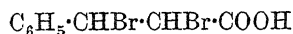
Borsche, Bodenstein, *Ber.*, 1926, 59, 1915.

5 : 6-Dibromohydrindene.

Plates from EtOH. M.p. 76–7°. B.p. 142–4°/10 mm.

Sidgwick, Springall, *J. Chem. Soc.*, 1936, 1537.

α : β -Dibromohydrocinnamic Acid (1 : 2-Dibromo-2-phenylpropionic acid, cinnamic acid dibromide, 2-phenyl-1 : 2-dibromopropionic acid)



$\text{C}_9\text{H}_8\text{O}_2\text{Br}_2$ MW, 308

I. High-melting form :

dl.

Prisms from CHCl_3 . M.p. 203–4° (195°). Decomp. near m.p. Sol. EtOH, Et_2O . Spar. sol. CS_2 . Decomp. by boiling H_2O .

Me ester : $\text{C}_{10}\text{H}_{10}\text{O}_2\text{Br}_2$. MW, 322. Plates from CS_2 . M.p. 117°.

Et ester : $\text{C}_{11}\text{H}_{12}\text{O}_2\text{Br}_2$. MW, 336. Plates from ligroin. M.p. 74–5°.

Propyl ester : $\text{C}_{12}\text{H}_{14}\text{O}_2\text{Br}_2$. MW, 350. M.p. 23°.

Isobutyl ester : $\text{C}_{13}\text{H}_{16}\text{O}_2\text{Br}_2$. MW, 364. Needles from pet. ether. M.p. 59–60°.

Phenyl ester : $\text{C}_{15}\text{H}_{18}\text{O}_2\text{Br}_2$. MW, 384. Needles from CS_2 . M.p. 127°.

Amide : $\text{C}_9\text{H}_9\text{ONBr}_2$. MW, 307. Needles from EtOH. M.p. 217°.

d.

$[\alpha]_D + 67.0$ to $+ 67.5^\circ$.

Me ester : m.p. 115°. $[\alpha]_D + 56.8^\circ$.

Et ester : m.p. 71°. $[\alpha]_D + 59.1^\circ$.

l.

$[\alpha]_D - 65.7^\circ$.

II. Low-melting form :

dl.

Needles. M.p. 91–3° (89–91°). Very sol. CS_2 , C_6H_6 . Insol. ligroin. Decomp. by boiling H_2O .

Me ester : cryst. from pet. ether. M.p. 52–3°.

Et ester : prisms. M.p. 29–30°.

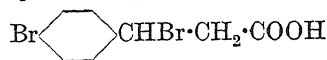
Liebermann, Hartmann, *Ber.*, 1893, 26, 829.

Michael, *Ber.*, 1901, 34, 3664.

Sudborough, Thompson, *J. Chem. Soc.*, 1903, 83, 669.

Abbott, Althausen, *Organic Syntheses*, 1932, XII, 36.

β : 4-Dibromohydrocinnamic Acid (2-*p*-Bromophenyl-2-bromopropionic acid)

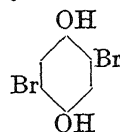


$\text{C}_9\text{H}_8\text{O}_2\text{Br}_2$ MW, 308

Cryst. from Me_2CO . Aq. M.p. 182°.

Braun, Nelles, *Ber.*, 1933, 66, 1468.

2 : 5-Dibromohydroquinone (2 : 5-Dibromo-1 : 4-dihydroxybenzene, 2 : 5-dibromoquinol)



$\text{C}_6\text{H}_4\text{O}_2\text{Br}_2$ MW, 268

Needles from EtOH. Aq. M.p. 186°. Sol. EtOH, Et_2O , AcOH, hot H_2O . Mod. sol. CHCl_3 , C_6H_6 , CS_2 . Ox. \longrightarrow 2 : 5-dibromo-*p*-benzoquinone.

Di-Me ether : $\text{C}_8\text{H}_8\text{O}_2\text{Br}_2$. MW, 296. M.p. 142°.

1 : 4-Diacetyl : needles. M.p. 162°.

Kohn, Guttman, *Monatsh.*, 1924, 45, 576.

2 : 6-Dibromohydroquinone.

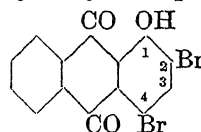
Leaflets from toluene. M.p. 164°. Sol. EtOH, Et_2O , AcOH, AcOEt. Spar. sol. cold H_2O , C_6H_6 , CHCl_3 . Insol. ligroin. Ox. \longrightarrow 2 : 6-dibromo-*p*-benzoquinone.

Di-Me ether : m.p. 56°.

1 : 4-Diacetyl : m.p. 116.5°.

Kohn, Guttman, *Monatsh.*, 1924, 45, 576.

2 : 4-Dibromo-1-hydroxyanthraquinone (2 : 4-Dibromoerythroxyanthraquinone)



$\text{C}_{14}\text{H}_6\text{O}_3\text{Br}_2$ MW, 382

Orange needles. M.p. 235° (233°). Red sol. in alkalis. Reddish-brown sol. in conc. H_2SO_4 .

Me ether : $\text{C}_{15}\text{H}_8\text{O}_3\text{Br}_2$. MW, 396. Cryst. from AcOH. M.p. 235°.

M.L.B., D.R.P. 293,694, (*Chem. Zentr.*, 1916, II, 533).

Fries, Schürmann, *Ber.*, 1919, 52, 2186.

1 : 3-Dibromo-2-hydroxyanthraquinone. Yellow needles from EtOH. M.p. 216–17° (207–8°). Spar. sol. EtOH.

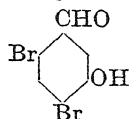
Me ether : $\text{C}_{15}\text{H}_8\text{O}_3\text{Br}_2$. MW, 396. M.p. 226–7°.

Acetyl : yellow needles. M.p. 195° (190°).

Hardacre, Perkin, *J. Chem. Soc.*, 1929, 185.

Dibromo-*o*-hydroxybenzaldehyde.

See Dibromosalicylaldehyde.

4 : 6-Dibromo-*m*-hydroxybenzaldehydeC₇H₄O₂Br₂ MW, 280

Cryst. from AcOH.Aq. M.p. 139°.

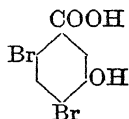
Oxime : m.p. 243°.

Me ether : C₈H₆O₂Br₂. MW, 294. M.p. 110°.Lock, *Monatsh.*, 1930, 55, 312; 1933, 62, 178.Hodgson, Beard, *J. Chem. Soc.*, 1925, 127, 875.2 : 3-Dibromo-*p*-hydroxybenzaldehyde. Needles. M.p. 192°.*p*-Nitrophenylhydrazone : m.p. 254° decomp.Hodgson, Jenkinson, *J. Chem. Soc.*, 1928, 2275.3 : 5-Dibromo-*p*-hydroxybenzaldehyde.Needles from EtOH.Aq. M.p. 181°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Very spar. sol. hot H₂O. Insol. ligroin. Alk. H₂O₂ → 2 : 6-dibromohydroquinone.

Oxime : needles. M.p. 199° (194°). Diacetyl : m.p. 122°.

Paal, *Ber.*, 1895, 28, 2408.Wentworth, Brady, *J. Chem. Soc.*, 1920, 117, 1042.Dibromo-*o*-hydroxybenzoic Acid.

See Dibromosalicylic Acid.

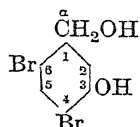
4 : 6-Dibromo-*m*-hydroxybenzoic AcidC₇H₄O₃Br₂ MW, 296Needles from H₂O. M.p. 201–2° (194–5°).Me ester : C₈H₆O₃Br₂. MW, 310. M.p. 145°.Me ether : C₈H₆O₃Br₂. MW, 310. M.p. 202–5°.Robertson, *J. Chem. Soc.*, 1902, 81, 1483.Lock, *Monatsh.*, 1933, 62, 178.3 : 5-Dibromo-*p*-hydroxybenzoic Acid.Needles from EtOH.Aq. M.p. 267–8° (270°) decomp. Sol. EtOH, Et₂O, Me₂CO. Very spar. sol. H₂O, AcOH, C₆H₆. Dist. → 2 : 6-dibromophenol. KOH → gallic acid.Me ester : C₈H₆O₃Br₂. MW, 310. Needles. M.p. 125°.Et ester : C₉H₈O₃Br₂. MW, 324. Needles. M.p. 108°.Butyl ester : C₁₁H₁₀O₃Br₂. MW, 352. Needles from AcOH. M.p. 88°.Chloride : C₇H₃O₂ClBr₂. MW, 314.5. M.p. 118–20°.Nitrile : C₇H₃ONBr₂. MW, 277. Needles. M.p. 187°. Acetyl : m.p. 150°.

4-Acetyl : m.p. 207°.

Me ether : see 3 : 5-Dibromoanisic Acid.

Robertson, *J. Chem. Soc.*, 1902, 81, 1482.Leulier, Pinet, *Bull. soc. chim.*, 1927, 41, 1369.Cavill, *J. Soc. Chem. Ind.*, 1945, 64, 212.3 : 5-Dibromo-*o*-hydroxybenzyl Alcohol.

See 3 : 5-Dibromosaligenin.

4 : 6-Dibromo-*m*-hydroxybenzyl AlcoholC₇H₆O₂Br₂ MW, 282Red needles from AcOH.Aq. or hot toluene. M.p. 161.5°. Sol. EtOH, Et₂O. Spar. sol. C₆H₆, CHCl₃.α-Me ether : C₈H₈O₂Br₂. MW, 296. Needles from MeOH. M.p. 138.5–139°.Lock, *Monatsh.*, 1930, 55, 313; 1933, 62, 178.2 : 6-Dibromo-*p*-hydroxybenzyl Alcohol.Cryst. from C₆H₆–EtOH. M.p. 180°.Kohn, Weissberg, *Monatsh.*, 1924, 45, 303.3 : 5-Dibromo-*p*-hydroxybenzyl Alcohol.Plates or leaflets from C₆H₆. M.p. 116–17°. Sol. EtOH, Et₂O. Spar. sol. CHCl₃, C₆H₆.

α-Me ether : m.p. 71–2°.

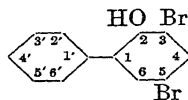
α-Et ether : C₉H₁₀O₂Br₂. MW, 310. M.p. 94°.

α-Acetyl : cryst. from ligroin. M.p. 115°.

α-4-Diacetyl : m.p. 68–70°.

Auwers, Daecke, *Ber.*, 1899, 32, 3377.

3 : 5-Dibromo-2-hydroxydiphenyl

C₁₂H₈OBr₂ MW, 328

Needles from pet. ether. M.p. 57° (59–60°).

Acetyl : light yellow needles from pet. ether. M.p. 73–4°.

Auwers, Wittig, *J. prakt. Chem.*, 1924, 108, 99.Hazlet, Kornberg, *J. Am. Chem. Soc.*, 1941, 63, 1890.

4 : 5-Dibromo-3-hydroxydiphenyl.

Needles from ligroin. M.p. 81°.

Benzoyl : needles from EtOH. M.p. 104°.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 1203.

3 : 4'-Dibromo-4-hydroxydiphenyl.

Stellate cryst. from CHCl_3 -pet. ether. M.p. 117°.

Benzoyl : m.p. 147.5-8.0°.

Bell, Robinson, *J. Chem. Soc.*, 1927, 1131.

Hazlet, Hensley, *J. Am. Chem. Soc.*, 1947, 69, 708.

3 : 5-Dibromo-4-hydroxydiphenyl.

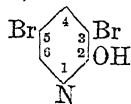
Needles from EtOH.Aq. or pet. ether. M.p. 94°.

Benzoyl : cryst. from EtOH- Me_2CO . M.p. 169-70°.

p-Toluenesulphonyl : needles from AcOH. M.p. 132°.

Hazlet, Alliger, Tiede, *J. Am. Chem. Soc.*, 1939, 61, 1448.

Bell, Robinson, *J. Chem. Soc.*, 1927, 1132.

3 : 5-Dibromo-2-hydroxypyridine (3 : 5-Dibromo- α -pyridone)

$\text{C}_5\text{H}_3\text{ONBr}_2$ MW, 253
Needles from H_2O or EtOH. M.p. 207-8°. Sol. NaOH.Aq.

Feer, Koenigs, *Ber.*, 1886, 19, 2433.

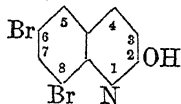
Tschitschibabin, Tjashelowa, *J. Russ. Phys. Chem. Soc.*, 1920, 50, 483.

3 : 5-Dibromo-4-hydroxypyridine (3 : 5-Dibromo- γ -pyridone).

Plates from AcOH-ligroin. Decomp. about 300°. Sol. NH_4OH , conc. HCl and NaOH.Aq. Spar. sol. EtOH, hot H_2O . Prac. insol. Et_2O . Heat with Zn dust \rightarrow pyridine.

Ost, *J. prakt. Chem.*, 1884, 29, 66.

Feist, Baum, *Ber.*, 1905, 38, 3568.

6 : 8-Dibromo-2-hydroxyquinoline (6 : 8-Dibromo- α -quinolone, 6 : 8-dibromocarbostyryl)

$\text{C}_9\text{H}_5\text{ONBr}_2$ MW, 303

Needles. M.p. 230°. Sol. hot EtOH.

Decker, *Ber.*, 1905, 38, 1154.

6 : 8-Dibromo-5-hydroxyquinoline.

Needles. Decomp. at 130-40° without melting. Sol. EtOH.

Claus, *J. prakt. Chem.*, 1896, 53, 336.

5 : 7-Dibromo-8-hydroxyquinoline.

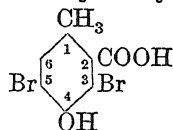
Needles from EtOH. M.p. 196° (190°). Sublimes. Sol. EtOH, AcOH, C_6H_6 , CHCl_3 . Spar. sol. Et_2O . Insol. cold H_2O and dil. acids. *B, HBr* : yellow needles. M.p. 250°.

Me ether : needles from EtOH.Aq. M.p. 99°.

Claus, Howitz, *J. prakt. Chem.*, 1891, 44, 444, 449.

Rosenmund, Döring, *Chem. Zentr.*, 1928, I, 2834.

Lapkina, *J. Gen. Chem. U.S.S.R.*, 1946, 16, 1737, (*Chem. Abstracts*, 1947, 41, 5883).

3 : 5-Dibromo-4-hydroxy-*o*-toluic Acid

$\text{C}_8\text{H}_6\text{O}_3\text{Br}_2$ MW, 310

Needles from H_2O or C_6H_6 . M.p. 141°. Sol. EtOH, hot C_6H_6 . Spar. sol. cold H_2O , pet. ether.

Me ester : $\text{C}_9\text{H}_5\text{O}_3\text{Br}_2$. MW, 324. Needles. M.p. 109°.

4-Acetyl : m.p. 125°.

Zincke, Fischer, *Ann.*, 1906, 350, 254.

4 : 6-Dibromo-5-hydroxy-*o*-toluic Acid.

Needles from AcOH. M.p. 232°. Sol. hot EtOH, hot AcOH. Spar. sol. Et_2O , C_6H_6 .

Auwers, Barrows, *Ber.*, 1899, 32, 3041.

2 : 6-Dibromo-3-hydroxy-*p*-toluic Acid (2 : 6-Dibromo-*m*-cresotic acid).

Needles from EtOH.Aq. M.p. 234°. Sol. EtOH, Me_2CO . Spar. sol. AcOH, C_6H_6 .

Me ether : $\text{C}_9\text{H}_5\text{O}_3\text{Br}_2$. MW, 324. M.p. 193-4°.

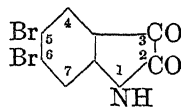
Errera, *Ber.*, 1899, 32, 2791.

Dibromiodomethane

CHBr₂I MW, 300

Plates from pet. ether. M.p. 22.5°. B.p. 101-4°/50 mm., 91°/42 mm. Spar. sol. cold pet. ether. Mod. stable to light in solid state, very unstable in solution. Br at 0° \rightarrow bromoform.

Auger, *Compt. rend.*, 1908, 146, 1038.

5 : 6-Dibromoisatin

$\text{C}_8\text{H}_3\text{O}_2\text{NBr}_2$ MW, 305

Red cryst. from AcOH. Does not melt below 290°.

Majima, Kotake, *Ber.*, 1930, 63, 2243.

5 : 7-Dibromoisatin.

Orange-red needles from EtOH. M.p. 248-50°.

N-Acetyl : yellow plates. M.p. 133°.

N-Benzoyl : yellow cryst. M.p. 161-2°.

2-Anilide : brown cryst. M.p. 189°.

2-Anil : m.p. 174-5°.

Dianil : m.p. 236-7°.

3-Oxime : decomp. at 272°.

2-Phenylhydrazone : m.p. 218°.

3-Phenylhydrazone : m.p. 297-8°.

Heller, *Ber.*, 1922, 55, 2686.

Lindwall, Bades, Weinberg, *J. Am. Chem. Soc.*, 1931, 53, 318.

Grandmougin, Seyder, *Ber.*, 1914, 47, 2373.

2 : 3-Dibromoisooamyl Alcohol (2 : 3-Dibromo-3-methylbutanol-1)

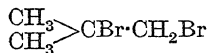


$\text{C}_5\text{H}_{10}\text{OBr}_2$ MW, 246

Needles from pet. ether. M.p. 37-8°. Sol. EtOH, Et₂O, C₆H₆.

Courtot, *Bull. soc. chim.*, 1906, 35, 662.

1 : 2-Dibromoisobutane (Isobutylene dibromide)



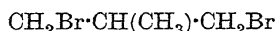
$\text{C}_4\text{H}_8\text{Br}_2$ MW, 216

M.p. 9-12°. B.p. 149-51°, 60-1°/36 mm., 54-6°/24 mm. D_4^{20} 1.7827. n_D^{20} 1.51186. Slowly hyd. by H₂O. H₂O at 150° → isobutyraldehyde. Zn + AcOH → isobutylene.

Krestinsky, *Ber.*, 1922, 55, 2757.

Kharasch, Hered, Mayo, *J. Org. Chem.*, 1941, 6, 818.

1 : 3-Dibromoisobutane

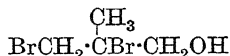


$\text{C}_4\text{H}_8\text{Br}_2$ MW, 216

B.p. 177-8°. D_4^{20} 1.8207.

Faworsky, Sokownin, *Ann.*, 1907, 354, 364.

2 : 3-Dibromoisobutyl Alcohol

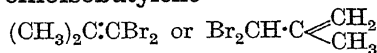


$\text{C}_4\text{H}_8\text{OBr}_2$ MW, 232

B.p. 100°/12 mm. D_4^{20} 1.9685.

Pogorshelski, *Chem. Zentr.*, 1905, I, 668.

Dibromoisobutylene



$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

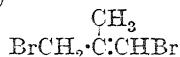
B.p. 156-7°. D_4^{20} 1.866. n_D^{20} 1.5300.

Farrell, Bachmann, *J. Am. Chem. Soc.*, 1935, 57, 1282.

Norton, Williams, *Am. Chem. J.*, 1887, 9, 89.

Pogorshelski, *Chem. Zentr.*, 1905, I, 798.

1 : 3-Dibromoisobutylene (1 : 3-Dibromo-2-methylpropylene)

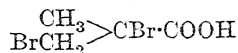


$\text{C}_4\text{H}_6\text{Br}_2$ MW, 214

B.p. 102°/100 mm. D_4^{20} 1.8942, D_4^{15} 1.8691. n_D^{15} 1.53958.

Mereshkowski, *Chem. Zentr.*, 1914, I, 2160.

1 : 2-Dibromoisobutyric Acid



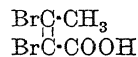
$\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$ MW, 246

Prisms from CS₂. M.p. 48°. Decomp. by boiling H₂O.

Faworski, *J. prakt. Chem.*, 1895, 51, 553.

Farrell, Bachman, *J. Am. Chem. Soc.*, 1935, 57, 1282.

1 : 2-Dibromoisocrotonic Acid



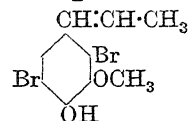
$\text{C}_4\text{H}_4\text{O}_2\text{Br}_2$ MW, 244

Cryst. M.p. 120°. Sol. EtOH, Et₂O. Mod. sol. C₆H₆, CHCl₃, ligroin.

Me ester : C₅H₆O₂Br₂. MW, 258. B.p. 102-4°/14 mm.

Michael, *Ber.*, 1901, 34, 4223.

2 : 5-Dibromoisoeugenol



$\text{C}_{10}\text{H}_{10}\text{O}_2\text{Br}_2$ MW, 322

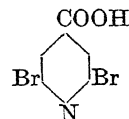
Needles from C₆H₆ or AcOH. M.p. 102°. Sol. common org. solvents, NaOH and Na₂CO₃.

Et ether : C₁₂H₁₄O₂Br₂. MW, 350. Needles from EtOH. M.p. 79.5°.

Acetyl : cryst. from EtOH or C₆H₆. M.p. 123°.

Zincke, Hahn, *Ann.*, 1903, 329, 25.

2 : 6-Dibromoisonicotinic Acid (2 : 6-Dibromopyridine-4-carboxylic acid)



$\text{C}_6\text{H}_3\text{O}_2\text{NBr}_2$ MW, 281

Needles from hot H₂O. M.p. 184-5° decomp. *Chloride* : C₆H₃ONClBr₂. MW, 299.5. M.p. 9-11°. B.p. 256-8°, 160°/21 mm.

Amide : C₆H₄ON₂Br₂. MW, 280. Needles from hot H₂O. M.p. 202-4°.

Nitrile: $C_6H_5N_2Br_2$. MW, 262. Needles. M.p. 139–40°.

Levelt, Wibaut, *Rec. trav. chim.*, 1929, 48, 470.

1 : 2-Dibromoisopentane (1 : 2-Dibromo-2-methylbutane)

$CH_3 \cdot CH_2 \cdot CBr(CH_3) \cdot CH_2Br$
 $C_5H_{10}Br_2$ MW, 230

B.p. 47.4–48°/8.5–9 mm. D_4^{20} 1.6711. n_D^{20} 1.5088.

Sherrill, Walter, *J. Am. Chem. Soc.*, 1936, 58, 742.

1 : 4-Dibromoisopentane (1 : 4-Dibromo-2-methylbutane)

$CH_2Br \cdot CH_2 \cdot CH(CH_3) \cdot CH_2Br$
 $C_5H_{10}Br_2$ MW, 230

d.
 B.p. 78–9°/12 mm. D_4^{17} 1.695. $[\alpha]_D^{17} + 4.21^\circ$.

Braun, Jostes, *Ber.*, 1926, 59, 1094.

2 : 3-Dibromoisopentane (2 : 3-Dibromo-2-methylbutane, β -isoamylene dibromide)

$CH_3 \cdot CHBr \cdot CBr(CH_3) \cdot CH_3$
 $C_5H_{10}Br_2$ MW, 230

M.p. 7° (14–16°). B.p. 61–4°/17 mm. D^{25} 1.5729. n_D^{20} 1.5090. Zn dust + EtOH \rightarrow trimethylethylene. Hot H_2O + PbO \rightarrow methyl isopropyl ketone.

Kronstein, *Ber.*, 1921, 54, 9.

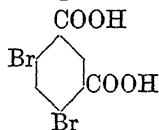
2 : 4-Dibromoisopentane (*Isoprene dihydrobromide*, 2 : 4-dibromo-2-methylbutane)

$CH_2Br \cdot CH_2 \cdot CBr(CH_3) \cdot CH_3$
 $C_5H_{10}Br_2$ MW, 230

B.p. 74–5°/16 mm., 67°/9 mm. D^0 1.6969. Alc. KOH \rightarrow isoprene. Zn dust + EtOH \rightarrow isopropylethylene.

Aschan, *Chem. Abstracts*, 1920, 14, 3655.

4 : 6-Dibromoisophthalic Acid



$C_8H_4O_4Br_2$ MW, 324

Needles from H_2O . M.p. 250–4°.

Di-Me ester: $C_{10}H_8O_4Br_2$. MW, 352. M.p. 134°.

Eckert, Seidel, *J. prakt. Chem.*, 1921, 102, 343.

1 : 3-Dibromoisopropyl Alcohol (*Glycerol* 1 : 3-dibromohydrin, α -dibromohydrin)

$BrCH_2 \cdot CH(OH) \cdot CH_2Br$
 $C_3H_6OBr_2$ MW, 218

B.p. 219° part. decomp., 124°/38 mm., 105°/16 mm. D_4^{25} 2.1202. n_D^{25} 1.5495.

Palmityl: m.p. 35–5°.

Benzoyl: b.p. 185°/16 mm. D^{25} 1.6324. n_D^{25} 1.5749.

p-Nitrobenzoyl: m.p. 77–8°.

Phenylurethane: m.p. 80–1° (73°).

Me ether: $C_4H_8OBr_2$. MW, 232. B.p. 83°/13 mm.

Et ether: $C_5H_{10}OBr_2$. MW, 246. B.p. 90.5°/17 mm.

Carré, *Bull. soc. chim.*, 1910, 7, 836.

Fairbourne, Cowdrey, *J. Chem. Soc.*, 1929, 129.

Braun, *Organic Syntheses*, 1934, XIV, 41.

1 : 2-Dibromoisovaleric Acid

$(CH_3)_2CBr \cdot CHBr \cdot COOH$
 $C_5H_8O_2Br_2$ MW, 260

Prisms from ligroin. M.p. 107–8°.

Me ester: $C_6H_{10}O_2Br_2$. MW, 274. B.p. 90–4°/12 mm.

Et ester: $C_7H_{12}O_2Br_2$. MW, 288. B.p. 127–8°/30 mm. D^{17} 1.1652.

Chloride: $C_5H_7OClBr_2$. MW, 278.5. B.p. 126–30°/20 mm.

Massot, *Ber.*, 1894, 27, 1226.

Farrell, Bachman, *J. Am. Chem. Soc.*, 1935, 57, 1282.

1 : 2-Dibromolevulinic Acid

$CH_3 \cdot CO \cdot CHBr \cdot CHBr \cdot COOH$
 $C_5H_6O_3Br_2$ MW, 274

Needles from CS_2 – C_6H_6 . M.p. 108° (112–13°). Sol. EtOH, Et_2O . Spar. sol. H_2O .

Wolff, *Ann.*, 1891, 264, 254.

2 : 4-Dibromolevulinic Acid

$BrCH_2 \cdot CO \cdot CHBr \cdot CH_2 \cdot COOH$
 $C_5H_6O_3Br_2$ MW, 274

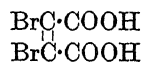
Prisms from Et_2O . M.p. 115°. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O , C_6H_6 , $CHCl_3$. Insol. ligroin.

Anhydride: $C_{10}H_{10}O_5Br_4$. MW, 530. M.p. 138°.

Wolff, *Ann.*, 1885, 229, 266 (*Footnote*).

Ciamician, Angeli, *Ber.*, 1891, 24, 1347.

Dibromomaleic Acid



$C_4H_2O_4Br_2$ MW, 274

Needles from Et_2O . M.p. 142° (123.5°). Sol. H_2O , EtOH, Et_2O , AcOH. Insol. CS_2 , $CHCl_3$, ligroin, C_6H_6 .

Me ester: $C_5H_4O_4Br_2$. MW, 288. M.p. 78–9°.

Di-Me ester: $C_6H_6O_4Br_2$. MW, 302. B.p. 158°/20 mm.

Et ester: $C_6H_6O_4Br_2$. MW, 302. M.p. 100°.

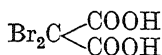
Di-Et ester: $C_8H_{10}O_4Br_2$. MW, 330. B.p.

170–5°/15 mm., 155–7°/11 mm. (162–4°/20 mm.).
D₂₅ 1.6978.

Anhydride: C₄O₃Br₂. MW, 256. Needles.
M.p. 118–19°. Sol. EtOH, Et₂O, CHCl₃, CS₂,
C₆H₆, ligroin. Sublimes.

Diels, Reinbeck, *Ber.*, 1910, 43, 1274
(*Bibl.*).

Dibromomalonic Acid



C₃H₂O₄Br₂ MW, 262

Needles or prisms. M.p. 147° decomp. (136–7°
decomp.). Sol. H₂O, EtOH, Et₂O. Spar. sol.
C₆H₆, pet. ether. Heat with H₂O or above m.p.
→ dibromoacetic acid. Baryta → mesoxalic
acid.

Di-Me ester: C₅H₆O₄Br₂. MW, 290. Needles.
M.p. 67° (64°). Mod. sol. EtOH.

Di-Et ester: C₇H₁₀O₄Br₂. MW, 318. B.p.
250–6° part decomp., 154°/28 mm.

Dichloride: C₃O₂Cl₂Br₂. MW, 299. B.p. 75–
7°/15 mm.

Dibromide: C₃O₂Br₄. MW, 388. B.p. 91–2°/
13 mm.

Diamide: C₃H₄O₂N₂Br₂. MW, 260. Needles.
M.p. 200° (206°) decomp. Spar. sol. EtOH, hot
H₂O.

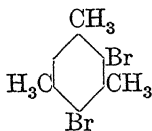
Di-nitrile: dibromodicyanomethane. C₃N₂Br₂.
MW, 224. M.p. 124°.

Amide-nitrile: dibromocyanoacetamide.
C₃H₂ON₂Br₂. MW, 242. M.p. 120° decomp.
D₂₅ 2.375.

Willstätter, *Ber.*, 1902, 35, 1375.

Behrend, Prüsse, *Ann.*, 1918, 416, 238.

2 : 4-Dibromomesitylene



C₉H₁₀Br₂ MW, 278

Needles from EtOH. M.p. 64° (60°). B.p.
285° (276–8°).

Varma, Subrahmanian, *J. Indian Chem.*
Soc., 1936, 13, 192.

Schramm, *Ber.*, 1886, 19, 212.

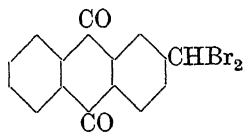
Dibromomethane.

See Methylene bromide.

Dibromomethylaniline.

See under Dibromoaniline.

2-Dibromomethyl-anthraquinone



C₁₅H₈O₂Br₂

MW, 380

Plates from toluene. M.p. 228–9° corr.
Sol. PhNO₂, Py, hot C₆H₆, hot AcOH, aniline.
Spar. sol. EtOH, Me₂CO. Insol. Et₂O, ligroin.
Heat with conc. H₂SO₄ → anthraquinone-2-
aldehyde.

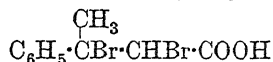
Badische, D.R.P. 216,715, (*Chem. Zentr.*,
1910, I, 213).

Ullmann, Klingenberg, *Ber.*, 1913, 46,
718.

2 : 3-Dibromo-3-methylbutanol-1.

See 2 : 3-Dibromoisoamyl Alcohol.

α : β - **Dibromo - β - methylhydrocinnamic
Acid** (1 : 2-Dibromo-2-phenylbutyric acid)



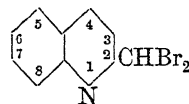
C₁₀H₁₀O₂Br₂ MW, 322

M.p. 128° decomp.

Me ester: C₁₁H₁₂O₂Br₂. MW, 336. Prisms
from pet. ether. M.p. 78–9°.

Schroeter, *Ber.*, 1907, 40, 1594.

2-Dibromomethyl-quinoline



C₁₀H₇NBr₂ MW, 301

Needles from ligroin. M.p. 120°.

Hammick, *J. Chem. Soc.*, 1926, 1302.

6-Dibromomethyl-quinoline.

Needles from EtOH. M.p. 159–60°.

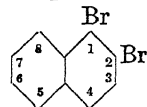
B₂H₂PtCl₆: orange cryst. M.p. 235°.

Howitz, Philipp, *Ann.*, 1913, 396, 25.

6 : 8-Dibromo-2-methylquinoline.

See 6 : 8-Dibromoquinaldine.

1 : 2-Dibromonaphthalene



C₁₀H₆Br₂ MW, 286.

Cryst. from EtOH. M.p. 68°.

Meldola, Streatfeild, *J. Chem. Soc.*, 1893,
63, 1054 (*Footnote*).

1 : 3-Dibromonaphthalene.

Needles from EtOH. M.p. 64°.

Picrate: yellow needles. M.p. 123°.

Meldola, *Ber.*, 1879, 12, 1963.

Armstrong, Rossiter, *Chem. News*, 1892,
65, 60.

1 : 4-Dibromonaphthalene.

Needles. M.p. 83° (81–2°). B.p. 310° decomp.
Sol. Et₂O, warm EtOH.

Salkind, Stetzuro, *Ber.*, 1931, 64, 954.

Zalkind, Faerman, *Chem. Abstracts*, 1931,
25, 2714.

1 : 5-Dibromonaphthalene.

Plates. M.p. 130-1°. B.p. 326°. Sol. Et₂O, hot EtOH. Spar. sol. AcOH. CrO₃ in AcOH → 3-bromophthalic acid.

Zalkind, Faerman, *Chem. Abstracts*, 1931, 25, 2714.

Hodgson, Whitehurst, *J. Chem. Soc.*, 1947, 80.

1 : 6-Dibromonaphthalene.

Needles from AcOH. M.p. 61° (56°). Sol. EtOH, Et₂O, CHCl₃, C₆H₆, pet. ether.

Claus, Philipson, *J. prakt. Chem.*, 1891, 43, 51.

Armstrong, Rossiter, *Chem. News*, 1892, 65, 58; *Proc. Chem. Soc.*, 1891, 182.

Fieser, Riegel, *J. Am. Chem. Soc.*, 1937, 59, 2563.

1 : 7-Dibromonaphthalene.

Needles from EtOH.Aq. M.p. 75°. Sol. Et₂O, CHCl₃. Mod. sol. hot EtOH.

Armstrong, Rossiter, *Chem. News*, 1892, 65, 58; *Proc. Chem. Soc.*, 1891, 182.

1 : 8-Dibromonaphthalene.

Cryst. from AcOH, plates from EtOH. M.p. 109-10°.

Meldola, Streatfeild, *J. Chem. Soc.*, 1893, 63, 1059.

Fieser, Seligman, *J. Am. Chem. Soc.*, 1939, 61, 139.

2 : 6-Dibromonaphthalene.

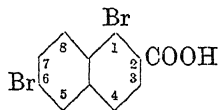
Plates from EtOH. M.p. 160°. Sol. Et₂O, CHCl₃, pet. ether. Spar. sol. cold EtOH.

Salkind, Stetzuero, *Ber.*, 1931, 64, 954.

2 : 7-Dibromonaphthalene.

Plates. M.p. 140.5°. Sol. Et₂O, CHCl₃, ligroin. Mod. sol. hot EtOH.

Jolin, *Bull. soc. chim.*, 1877, 28, 517.

1 : 6-Dibromo-2-naphthoic Acid (1 : 6-Dibromonaphthalene-2-carboxylic acid)

C₁₁H₆O₂Br₂ MW, 330

Needles from EtOH. M.p. 245°.

Me ester: C₁₂H₈O₂Br₂. MW, 344. M.p. 99-100°.

Nitrile: 1 : 6-dibromo-2-cyanonaphthalene. C₁₁H₅NBr₂. MW, 311. Needles. M.p. 178°. Sol. ord. org. solvents. Sublimes.

Claus, Philipson, *J. prakt. Chem.*, 1891, 43, 54.

5 : 8-Dibromo-2-naphthoic Acid.

Needles from AcOH. M.p. 287° corr. Sublimes.

Me ester: needles from AcOH. M.p. 152° corr.

Et ester: C₁₃H₁₀O₂Br₂. MW, 358. Needles from EtOH. M.p. 94° corr.

Amide: C₁₁H₇ONBr₂. MW, 329. Cryst. from EtOH. M.p. 242° corr.

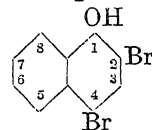
Chloride: C₁₁H₅OClBr₂. MW, 348.5. Pale yellow needles from C₆H₆. M.p. 133° corr.

Hydrazide: needles from EtOH. M.p. 231-5° corr.

Azide: powder. M.p. 112° corr.

Anilide: needles from EtOH. M.p. 217° corr.

Goldstein, Stern, *Helv. Chim. Acta*, 1940, 23, 811.

2 : 4-Dibromo-1-naphthol

C₁₀H₆OBr₂ MW, 302

Needles from EtOH. M.p. 105° (111°). Sol. EtOH, Et₂O, AcOH. Insol. H₂O. Alk. KMnO₄ → phthalic acid.

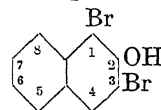
Acetyl: m.p. 92-3°.

sym.-Trinitrobenzene add. comp.: m.p. 97°.

Picrate: yellow needles. M.p. 97°.

Dahmer, *Ann.*, 1904, 333, 367.

Krynski, *Chem. Abstracts*, 1928, 122, 4120.

1 : 3-Dibromo-2-naphthol

C₁₀H₆OBr₂ MW, 302

Needles. M.p. 75°. Sol. ord. org. solvents.

Acetyl: m.p. 102°.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 264, 286.

1 : 6-Dibromo-2-naphthol.

Needles from AcOH. M.p. 106°. (Cryst. + 1AcOH. M.p. 84°). Sol. EtOH, Et₂O. Alk. KMnO₄ → 4-bromophthalic acid.

Me ether: C₁₁H₈OBr₂. MW, 316. M.p. 102° (100°).

Et ether: C₁₂H₁₀OBr₂. MW, 330. M.p. 94°.

Propyl ether: C₁₃H₁₂OBr₂. MW, 344. M.p. 78°.

Acetyl: m.p. 125°.

Franzen, Stäuble, *J. prakt. Chem.*, 1922, 103, 368.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 297.

3 : 6-Dibromo-2-naphthol.

Needles from AcOH. M.p. 127°.

Acetyl: m.p. 127°.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 273.

3 : 7-Dibromo-2-naphthol.

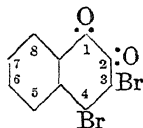
M.p. 185–6°.

Jakeš, *Chem. Abstracts*, 1929, 23, 4466.**4 : 6-Dibromo-2-naphthol.**

M.p. 134–5°.

Me ether : m.p. 103°.*Acetyl* : m.p. 128°.*Benzoyl* : m.p. 128–9°.Jakeš, *Chem. Abstracts*, 1929, 23, 4466.Franzen, Stäuble, *J. prakt. Chem.*, 1922, 103, 372.I.G., B.P. 380,563; U.S.P. 1,890,711, (*Chem. Zentr.*, 1933, II, 783).**5 : 8-Dibromo-2-naphthol.**

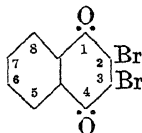
M.p. 147°.

Me ether : m.p. 83°.Goldstein, Viaud, *Helv. Chim. Acta*, 1944, 27, 883.**3 : 4-Dibromo-1 : 2-naphthoquinone (3 : 4-Dibromo-β-naphthoquinone)** $C_{10}H_4O_2Br_2$

MW, 316

Reddish leaflets from AcOH. M.p. 172–4°. Spar. sol. EtOH, Et₂O.Heller, *Z. angew. Chem.*, 1930, 43, 1137.Zincke, *Ber.*, 1886, 19, 2496.**3 : 6-Dibromo-1 : 2-naphthoquinone.**

Red prisms. M.p. 176°.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 273.**4 : 6-Dibromo-1 : 2-naphthoquinone.**Orange-red prisms from pet. ether. M.p. 153°. Sol. AcOH, C₆H₆. Spar. sol. EtOH.Fries, Schimmelschmidt, *Ann.*, 1930, 484, 273.**2 : 3-Dibromo-1 : 4-naphthoquinone (2 : 3-Dibromo-α-naphthoquinone)** $C_{10}H_4O_2Br_2$

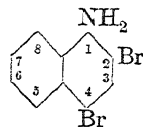
MW, 316

Yellow needles. M.p. 218°. Spar. sol. EtOH, Et₂O, AcOH, pet. ether.*Oxime* : m.p. 174–5°.Kohn, Schwarz, *Monatsh.*, 1925, 46, 351.**5 : 8-Dibromo-1 : 4-naphthoquinone.**

Yellow needles from EtOH. M.p. 171–3°. Spar. sol. EtOH. Volatile in steam.

Guareschi, *Ann.*, 1884, 222, 280.

Dict. of Org. Comp.—II.

2 : 4-Dibromo-1-naphthylamine $C_{10}H_7NBr_2$

MW, 301

Needles from EtOH.Aq. M.p. 118–19°. Sol. EtOH, Et₂O, C₆H₆, ligroin. Dil. HNO₃ → phthalic acid.*N-Acetyl* : m.p. 225°.Ruggli, Braun, *Helv. Chim. Acta*, 1933, 16, 863.Consden, Kenyon, *J. Chem. Soc.*, 1935, 1594.**1 : 3-Dibromo-2-naphthylamine (1 : 3-Dibromo-2-aminonaphthalene).**

Needles from EtOH. M.p. 119°.

N-Acetyl : needles. M.p. 201°.Bell, *J. Chem. Soc.*, 1932, 2733.**1 : 4-Dibromo-2-naphthylamine.**Needles from EtOH.Aq. M.p. 106–7°. Sol. EtOH, Et₂O, C₆H₆.*N-Acetyl* : m.p. 221–2°.Heller, *Z. angew. Chem.*, 1930, 43, 1133.**1 : 6-Dibromo-2-naphthylamine.**Needles from pet. ether. M.p. 121°. Sol. EtOH, C₆H₆. Spar. sol. H₂O.*N-Acetyl* : m.p. 212° (208°).*N-Diacetyl* : m.p. 180°.*Picrate* : red needles from EtOH. M.p. 165°.Michaelis, *Ber.*, 1893, 26, 2196.Franzen, Eidis, *J. prakt. Chem.*, 1913, 88, 755.**3 : 6-Dibromo-2-naphthylamine.**

Leaflets from EtOH. M.p. 187°. Spar. sol. hot EtOH.

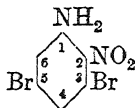
N-Acetyl : m.p. 195°.*N-Benzoyl* : m.p. 161–2°.Franzen, Stäuble, *J. prakt. Chem.*, 1920, 101, 72.**5 : 8-Dibromo-2-naphthylamine.**

Needles from EtOH. M.p. 105° corr. Volatile in steam.

N-Formyl : needles from EtOH.Aq. M.p. 226° corr.*N-Acetyl* : needles from EtOH. M.p. 215° corr.*N-Benzoyl* : needles from EtOH.Aq. M.p. 216° corr.*Picrate* : yellow cryst. from EtOH. M.p. 221–8° corr., decomp.Goldstein, Stern, *Helv. Chim. Acta*, 1940, 23, 816.**7 : 8-Dibromo-2-naphthylamine.**

Needles from EtOH.Aq. M.p. 103–4°.

Hodgson, Ward, *J. Chem. Soc.*, 1947, 327.

3 : 5-Dibromo-2-nitroaniline $C_6H_4O_2N_2Br_2$

MW, 296

M.p. 100°.

N-Acetyl: m.p. 185°.

Claus, Weil, *Ann.*, 1892, 269, 217.**3 : 6-Dibromo-2-nitroaniline.**

Red needles from EtOH.Aq. M.p. 75°.

Austen, *Ber.*, 1876, 9, 622.**4 : 5-Dibromo-2-nitroaniline.**Yellow needles from EtOH.Aq. M.p. 204–5°. Sol. EtOH, Et₂O, C₆H₆. Sublimes.Schiff, *Monatsh.*, 1890, 11, 341.Blanksma, *Rec. trav. chim.*, 1902, 21, 414.**4 : 6-Dibromo-2-nitroaniline.**

Yellow cryst. M.p. 127°.

N-Acetyl: yellow needles. M.p. 209°.

N-Diacetyl: prisms from pet. ether. M.p. 96–7°.

Jackson, Russe, *Am. Chem. J.*, 1906, 35, 149.**5 : 6-Dibromo-2-nitroaniline.**

Yellow needles from EtOH. M.p. 149°.

Körner, Contardi, *Chem. Zentr.*, 1907, I, 542.**2 : 4-Dibromo-3-nitroaniline.**Orange-yellow needles from EtOH. M.p. 89°. Sol. common org. solvents. Prac. insol. boiling H₂O.

N-Acetyl: prisms from EtOH. M.p. 150°.

Körner, Contardi, *Chem. Zentr.*, 1908, II, 45.**4 : 6-Dibromo-3-nitroaniline.**

Golden-yellow needles from EtOH. M.p. 114–5°.

N-Acetyl: greenish needles. M.p. 172°. Spar. sol. cold EtOH.

Fuchs, *Monatsh.*, 1915, 36, 139.Körner, Contardi, *Chem. Zentr.*, 1908, II, 45.**2 : 5-Dibromo-4-nitroaniline.**Brownish-yellow prisms. M.p. 174–5°. Spar. sol. cold C₆H₆.Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 462.**2 : 6-Dibromo-4-nitroaniline.**Yellow needles from EtOH or AcOH. M.p. 206–7° (202–3°). Sol. AcOH. Spar. sol. H₂O. N-Acetyl: yellowish prisms. M.p. 234°.

N-Diacetyl: needles or prisms from EtOH. M.p. 135°.

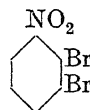
Körner, Contardi, *Chem. Zentr.*, 1914, I, 967.Losanitsch, *Ber.*, 1882, 15, 474.Claus, Wallbaum, *J. prakt. Chem.*, 1897, 56, 61.**3 : 5-Dibromo-4-nitroaniline.**

Sublimes in yellow needles. M.p. 186°.

N-Acetyl: cryst. from AcOH. M.p. 270–1°. Sublimes in plates.

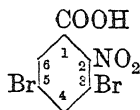
Claus, Weil, *Ann.*, 1892, 269, 217.**Dibromonitroanisole.**

See under Dibromonitrophenol.

2 : 3-Dibromonitrobenzene $C_6H_3O_2NBr_2$

MW, 281

Monoclinic prisms. M.p. 85°. Sol. CHCl₃, Me₂CO, hot AcOH. Mod. sol. Et₂O. Alc. NH₃ → 6-bromo-o-nitroaniline. Red. → 2 : 3-dibromoaniline.Holleman, Euwes, *Rec. trav. chim.*, 1908, 27, 155.**2 : 4-Dibromonitrobenzene.**Yellow prisms from EtOH. M.p. 62°. Sol. hot EtOH, CHCl₃, Me₂CO. Sublimes. Volatile in steam. D^s 2.356. Alc. NH₃ → 5-bromo-o-nitroaniline.Holleman, *Rec. trav. chim.*, 1906, 25, 193.**2 : 5-Dibromonitrobenzene.**Yellow plates from Me₂CO. M.p. 84° (85.4°). D^s 2.368. Mod. sol. Me₂CO. Alc. NH₃ → 4-bromo-o-nitroaniline.Scheufelen, *Ann.*, 1885, 231, 169.**2 : 6-Dibromonitrobenzene.**Prisms from EtOH. M.p. 83°. Mod. sol. hot EtOH, Me₂CO. D^s 2.211. Sublimes. Volatile in steam. Alc. NH₃ → 2-nitro-m-phenylenediamine. Red. → 2 : 6-dibromoaniline.Holleman, *Rec. trav. chim.*, 1906, 25, 197.**3 : 4-Dibromonitrobenzene.**Needles from EtOH or AcOH. M.p. 58–9°. B.p. 296°, 180°/20 mm. Sol. EtOH, AcOH. D^s 2.354. Sublimes. Volatile in steam. Alc. NH₃ → 2-bromo-p-nitroaniline.Holleman, *Rec. trav. chim.*, 1906, 25, 202.**3 : 5-Dibromonitrobenzene.**Leaflets from EtOH or Et₂O. M.p. 106°. D^s 2.363. Volatile in steam. Red. → 3 : 5-dibromoaniline.Holleman, *Rec. trav. chim.*, 1906, 25, 195.

3 : 5-Dibromo-*o*-nitrobenzoic Acid $C_7H_3O_4NBr_2$

MW, 325

Needles. M.p. 234°. Sol. Et_2O , hot EtOH. Spar. sol. cold C_6H_6 , cold AcOH. Prac. insol. cold H_2O . Sublimes.

Hübner, Hesemann, Köhler, *Ann.*, 1884, 222, 173.

4 : 5-Dibromo-*o*-nitrobenzoic Acid.

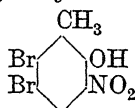
Needles from H_2O . M.p. 162°. Sol. EtOH, hot H_2O . Volatile in steam. $Sn + HCl \rightarrow$ 4 : 5-dibromoanthranilic acid.

Hübner, Angerstein, *Ann.*, 1871, 158, 13.
Hübner, Hesemann, Köhler, *Ann.*, 1884, 222, 188.

4 : 5-Dibromo-*m*-nitrobenzoic Acid.

Cryst. M.p. 183°. Sol. EtOH, boiling H_2O .

Blanksma, *Chem. Weekblad*, 1912, 9, 862.

5 : 6-Dibromo-3-nitro-*o*-cresol (5 : 6-Dibromo-3-nitro-2-hydroxytoluene) $C_7H_5O_3NBr_2$

MW, 311

Yellow needles from ligroin. M.p. 100°. Sol. Et_2O , C_6H_6 , AcOH.
Acetyl: m.p. 74°.

Janney, *Ann.*, 1913, 398, 371.

3 : 4-Dibromo-5-nitro-*o*-cresol.

Yellow needles from C_6H_6 -ligroin. M.p. 141°.

Janney, *Ann.*, 1913, 398, 371.

2 : 6-Dibromo-4-nitro-*m*-cresol (2 : 6-Dibromo-4-nitro-3-hydroxytoluene).

Deep yellow needles. M.p. 87°.

Benzenesulphonyl: cream col. M.p. 124-6°.

Raiford, Leavell, *J. Am. Chem. Soc.*, 1914, 36, 1502.

Bureš, Balada, *Chem. Abstracts*, 1928, 22, 3643.

2 : 4-Dibromo-6-nitro-*m*-cresol.

Pale yellow plates. M.p. 134°.

Raiford, *Am. Chem. J.*, 1911, 46, 427.

Bureš, Balada, *Chem. Abstracts*, 1928, 22, 3643.

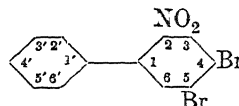
2 : 5-Dibromo-3-nitro-*p*-cresol (2 : 5-Dibromo-3-nitro-4-hydroxytoluene).

Yellow needles or leaflets from EtOH. M.p. 118° (124°). Sol. EtOH, Et_2O , C_6H_6 , AcOH.
Acetyl: m.p. 88-9°.

Zincke, Kempf, *Ber.*, 1911, 44, 423.

Kohn, Arm, *Monatsh.*, 1929, 53-54, 59.

4 : 5-Dibromo-2-nitrodiphenyl

 $C_{12}H_7O_2NBr_2$

MW, 357

Yellow prisms. M.p. 108°.

Bellavita, *Chem. Zentr.*, 1936, I, 2341.

4 : 4'-Dibromo-2-nitrodiphenyl.

Needles from EtOH or ligroin. M.p. 124°.

Shaw, Turner, *J. Chem. Soc.*, 1932, 293.

4 : 5-Dibromo-3-nitrodiphenyl.

Yellow needles from MeOH. M.p. 125°.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 1840.

4 : 2'-Dibromo-3-nitrodiphenyl.

Yellow needles. M.p. 90°.

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 1193.

4 : 4'-Dibromo-3-nitrodiphenyl.

Plates from EtOH. M.p. 101-2°.

Le Fèvre, Turner, *J. Chem. Soc.*, 1926, 2046.

2' : 5'-Dibromo-3-nitrodiphenyl.

Cryst. from EtOH. M.p. 97-8°.

Case, Schock, *J. Am. Chem. Soc.*, 1943, 65, 2137.

3' : 5'-Dibromo-3-nitrodiphenyl.

Cryst. from Me_2CO . M.p. 165-6°.

Case, *J. Am. Chem. Soc.*, 1939, 61, 770.

2 : 4'-Dibromo-4-nitrodiphenyl.

Yellow needles. M.p. 137°.

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 1193.

2' : 5'-Dibromo-4-nitrodiphenyl.

Cryst. from EtOH. M.p. 101-2°.

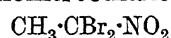
Case, *J. Am. Chem. Soc.*, 1945, 67, 116.

3' : 5'-Dibromo-4-nitrodiphenyl.

Yellow needles. M.p. 160°.

Bellavita, *Gazz. chim. ital.*, 1937, 67, 574.

1 : 1-Dibromonitroethane

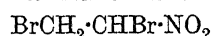
 $C_2H_3O_2NBr_2$

MW, 233

B.p. 165-7°. Insol. H_2O , KOH. Aq. hydroxylamine \rightarrow ethylnitrolic acid.

Meyer, *Ber.*, 1874, 7, 1313.

1 : 2-Dibromonitroethane

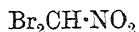
 $C_2H_3O_2NBr_2$

MW, 233

B.p. 97°/21 mm. Sol. dil. alkalis with orange-red col. and loss of HBr. Insol. H_2O . Misc. with most org. solvents.

Wieland, Sakellarios, *Ber.*, 1919, 52, 903.

Dibromonitromethane

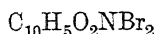
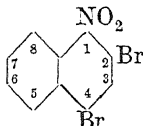


MW, 219

Liq. B.p. 58.5–60°/13 mm. Forms orange-red K salt, decomposing on heating \rightarrow KBr.

Scholl, *Ber.*, 1896, 29, 1825.

2 : 4-Dibromo-1-nitronaphthalene



MW, 331

Cryst. from MeOH. M.p. 102°. Volatile in steam.

Hodgson, Ward, *J. Chem. Soc.*, 1947, 127.

5 : 8-Dibromo-1-nitronaphthalene.

Yellow needles. M.p. 116–17°.

Jolin, *Bull. soc. chim.*, 1877, 28, 515.

1 : 4-Dibromo-2-nitronaphthalene.

Yellow needles. M.p. 117°.

Meldola, Streatfeild, *J. Chem. Soc.*, 1895, 67, 907.

5 : 6-Dibromo-2-nitronaphthalene.

Cream col. needles from Me_2CO . M.p. 110°.

Hodgson, Turner, *J. Chem. Soc.*, 1943, 391.

5 : 8-Dibromo-2-nitronaphthalene.

Cream col. needles from Me_2CO –MeOH. M.p. 175°.

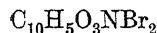
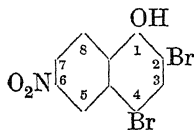
Hodgson, Turner, *J. Chem. Soc.*, 1943, 391.

7 : 8-Dibromo-2-nitronaphthalene.

Needles from Py.Aq. M.p. 147°.

Hodgson, Ward, *J. Chem. Soc.*, 1947, 327.

2 : 4-Dibromo-6-nitro-1-naphthol



MW, 347

Greenish-yellow cryst. from AcOH. M.p. 210°.

Hodgson, Turner, *J. Chem. Soc.*, 1944, 8.

3 : 6-Dibromo-1-nitro-2-naphthol.

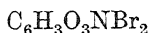
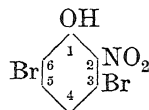
Yellow needles from EtOH. M.p. 147° decomp. (163°).

Franzen, Stäuble, *J. prakt. Chem.*, 1922, 103, 352.

Dibromonitrophenetole.

See under Dibromonitrophenol.

3 : 6-Dibromo-2-nitrophenol



MW, 297

Yellow needles. M.p. 77°. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Spar. sol. H_2O , ligroin.

Et ether: 3 : 6-dibromo-2-nitrophenetole. $\text{C}_8\text{H}_7\text{O}_3\text{NBr}_2$. MW, 325. Yellow cryst. M.p. 45°. Sol. EtOH, Et_2O , AcOH, CHCl_3 , C_6H_6 .

Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 472.

4 : 6-Dibromo-2-nitrophenol.

Yellow prisms from AcOH. M.p. 118°. Sol. Et_2O , C_6H_6 , CHCl_3 , AcOEt. Spar. sol. EtOH, AcOH, pet. ether, CS_2 . Sublimes. Volatile in steam.

Me ether: 4 : 6-dibromo-2-nitroanisole. $\text{C}_7\text{H}_5\text{O}_3\text{NBr}_2$. MW, 311. Yellowish needles. M.p. 76–7°.

Et ether: 4 : 6-dibromo-2-nitrophenetole. M.p. 46°. Sol. EtOH, Et_2O .

Acetyl: cryst. M.p. 89°.

p-Toluenesulphonyl: m.p. 140°.

Raiford, *J. Am. Chem. Soc.*, 1919, 41, 2075.

van Erp, *Rec. trav. chim.*, 1910, 29, 203 (*Bibl.*).

Phillips, *J. Chem. Soc.*, 1930, 2401.

5 : 6-Dibromo-2-nitrophenol.

Yellow cryst. M.p. 105°.

Hodgson, Walker, Nixon, *J. Chem. Soc.*, 1933, 1053.

4 : 6-Dibromo-3-nitrophenol.

Yellow needles from pet. ether. M.p. 77–8°, (after intensive drying, 84–6°).

Hydrate: $\text{C}_6\text{H}_3\text{O}_3\text{NBr}_2\cdot\text{H}_2\text{O}$. Yellow needles, from dil. Me_2CO . M.p. 92–4°.

Henley, Turner, *J. Chem. Soc.*, 1930, 932.

5 : 6-Dibromo-3-nitrophenol.

Yellow leaflets from C_6H_6 . M.p. 106°. Sol. EtOH, AcOH. Spar. sol. CHCl_3 , pet. ether.

Heller, *Ber.*, 1923, 56, 1873.

2 : 5-Dibromo-4-nitrophenol.

Yellow cryst. M.p. 110°.

Hodgson, Walker, Nixon, *J. Chem. Soc.*, 1933, 1053.

2 : 6-Dibromo-4-nitrophenol.

Yellow prisms from EtOH. M.p. 144°. Sol. Et_2O , CS_2 , AcOEt, CHCl_3 , warm EtOH. Spar. sol. AcOH, C_6H_6 , pet. ether. Prac. insol. H_2O . Decomp. above m.p. Volatile in steam.

Me ether: 2 : 6-dibromo-4-nitroanisole. $\text{C}_7\text{H}_5\text{O}_3\text{NBr}_2$. MW, 311. Needles. M.p. 122–3° (126–7°). Spar. sol. cold EtOH, Et_2O .

Et ether : 2 : 6-dibromo-4-nitrophenetole.
 $C_8H_7O_3NBr_2$. MW, 325. M.p. 59° . Sol.
 Et_2O , $CHCl_3$.

Acetyl : needles. M.p. 181° .

p-Toluenesulphonyl : m.p. $128-9^\circ$.

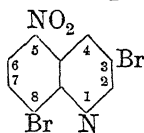
van Erp, *Rec. trav. chim.*, 1910, 29, 227
 (Bibl.).

Pope, Wood, *J. Chem. Soc.*, 1912, 101,
 1828.

Möhlau, Uhlmann, *Ann.*, 1896, 289, 94.

Hartman, Dickey, *Organic Syntheses*,
 1935, XV, 6.

3 : 8-Dibromo-5-nitroquinoline



$C_9H_4O_2N_2Br_2$ MW, 332

Yellow needles from EtOH. Sol. Et_2O ,
 $CHCl_3$. Spar. sol. EtOH.

$B_2H_2PtCl_6$: prisms from conc. HCl. M.p.
 about 280° .

Claus, Welter, *J. prakt. Chem.*, 1890, 42,
 236.

6 : 8-Dibromo-5-nitroquinoline.

Needles from EtOH. M.p. 159° . Sublimes
 undecomp.

$B_2H_2PtCl_6$: yellow cryst. Blackens at 281° .

Claus, Caroselli, *J. prakt. Chem.*, 1895,
 51, 478.

5 : 8-Dibromo-6-nitroquinoline.

Needles. M.p. 155° . Sol. hot EtOH. Spar.
 sol. H_2O , cold EtOH.

$B_2H_2PtCl_6$: m.p. 228° .

$B_2H_2PtCl_6$: orange needles from alc. HCl.
 Decomp. above 300° without melting.

Claus, Wolf, *J. prakt. Chem.*, 1895, 51,
 491.

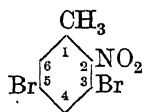
5 : 7-Dibromo-8-nitroquinoline.

Prisms or plates from EtOH. M.p. 198°
 (180°). Spar. sol. EtOH, Et_2O .

$B_2H_2PtCl_6$: yellow plates. M.p. 291° (265°)
 decomp.

Claus, Ammelburg, *J. prakt. Chem.*, 1894,
 50, 32.

3 : 5-Dibromo-*o*-nitrotoluene



$C_7H_5O_2NBr_2$ MW, 295

Cryst. from pet. ether. M.p. 67° . Sol. EtOH.
 Spar. sol. pet. ether.

Blanksma, *Chem. Zentr.*, 1909, II, 1220.

4 : 5-Dibromo-*o*-nitrotoluene.

Needles from EtOH. Aq. M.p. $90.5-91.5^\circ$
 ($86-7^\circ$). Red. \rightarrow 4 : 5-dibromo-*o*-toluidine.

Wroblewski, *Ann.*, 1873, 168, 184.

Qvist et al., *Chem. Abstracts*, 1944, 38,
 5206.

2 : 5-Dibromo-*m*-nitrotoluene.

M.p. 70° . Red. \rightarrow 2 : 5-dibromo-*m*-tolu-
 idine.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 150,
 501.

2 : 6-Dibromo-*m*-nitrotoluene.

Pale yellow cryst. from EtOH. M.p. 51° .

Blanksma, *Chem. Zentr.*, 1913, I, 393.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105,
 502.

4 : 5-Dibromo-*m*-nitrotoluene.

Leaflets. M.p. $63-5^\circ$. Red. \rightarrow 4 : 5-di-
 bromo-*m*-toluidine.

Nevile, Winther, *Ber.*, 1880, 13, 974.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105,
 510.

4 : 6-Dibromo-*m*-nitrotoluene.

Needles from EtOH. M.p. $81-2^\circ$ (85°). Red.
 \rightarrow 4 : 6-dibromo-*m*-toluidine.

Davies, *J. Chem. Soc.*, 1902, 81, 872.

Blanksma, *Chem. Zentr.*, 1913, I, 393.

5 : 6-Dibromo-*m*-nitrotoluene.

M.p. $105-6^\circ$. Red. \rightarrow 5 : 6-dibromo-*m*-
 toluidine.

Nevile, Winther, *Ber.*, 1880, 13, 965.

2 : 5-Dibromo-*p*-nitrotoluene.

Needles from EtOH. M.p. $88-9^\circ$. Sol. EtOH.
 Red. \rightarrow 2 : 5-dibromo-*p*-toluidine.

Wroblewski, *Ann.*, 1873, 168, 185.

Nevile, Winther, *Ber.*, 1880, 13, 973.

2 : 6-Dibromo-*p*-nitrotoluene.

Needles. M.p. $57-8^\circ$. Sol. Et_2O , CS_2 , hot
 EtOH. Red. \rightarrow 2 : 6-dibromo-*p*-toluidine.

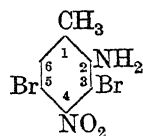
Scheufelen, *Ann.*, 1885, 231, 178.

3 : 5-Dibromo-*p*-nitrotoluene.

Cryst. from pet. ether. M.p. 84° . Sol. EtOH.
 Insol. H_2O .

Blanksma, *Chem. Zentr.*, 1909, II, 1220.

3 : 5-Dibromo-4-nitro-*o*-toluidine



$C_7H_6O_2N_2Br_2$ MW, 310

Yellow cryst. from EtOH. M.p. 104° (103°).
N-Acetyl : m.p. 201° .

N-Diacetyl : m.p. 159° .

Morgan, Clayton, *J. Chem. Soc.*, 1905, 87,
 951.

3 : 5-Dibromo-6-nitro-*o*-toluidine.

Cryst. from EtOH. M.p. 105°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Blanksma, *Chem. Zentr.*, 1914, I, 971.

2 : 6-Dibromo-4-nitro-*m*-toluidine.

Yellow needles from EtOH. M.p. 130–3°.

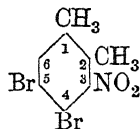
Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 513.

3 : 5-Dibromo-2-nitro-*p*-toluidine.

Yellow cryst. M.p. 82°.

N-Acetyl: needles from EtOH. M.p. 238°.

Blanksma, *Chem. Zentr.*, 1909, II, 1219.

4 : 5-Dibromo-3-nitro-*o*-xylene

C₈H₇O₂NBr₂ MW, 309

Needles from EtOH. M.p. 143–4°.

Crossley, Smith, *J. Chem. Soc.*, 1913, 103, 990.

4 : 6-Dibromo-2-nitro-*m*-xylene.

Needles from EtOH. M.p. 108°. Spar. sol. cold EtOH.

Auwers, Traun, *Ber.*, 1899, 32, 3313.

3 : 5-Dibromo-2-nitro-*p*-xylene.

Cryst. from EtOH. M.p. 83° (69°). Sol. C₆H₆, hot EtOH.

Blanksma, *Chem. Zentr.*, 1913, I, 1108.

Bureš, Smetana, *Chem. Zentr.*, 1930, II, 1692.

3 : 6-Dibromo-2-nitro-*p*-xylene.

Cryst. from EtOH. M.p. 106° (111–2°). B.p. 199°/20 mm.

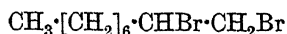
Auwers, Baum, *Ber.*, 1896, 29, 2343.

5 : 6-Dibromo-2-nitro-*p*-xylene.

Cryst. from EtOH. Aq. M.p. 99°. Sol. Et₂O, C₆H₆.

Blanksma, *Chem. Zentr.*, 1913, I, 1108.

Fries, Noll, *Ann.*, 1912, 389, 372.

1 : 2-Dibromononane

C₉H₁₈Br₂ MW, 286

B.p. 141.5°/20 mm., 133.5°/12 mm. D₄²⁰ 1.3980. n_D²⁰ 1.4942.

Wilkinson, *J. Chem. Soc.*, 1931, 3058.

Adamson, Kenner, *J. Chem. Soc.*, 1934, 838.

1 : 4-Dibromononane

C₉H₁₈Br₂ MW, 286

B.p. 139–40°/11 mm.

Paul, *Bull. soc. chim.*, 1938, 5, 1053.

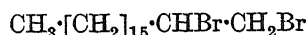
1 : 9-Dibromononane (Nonamethylene bromide)

C₉H₁₈Br₂ MW, 286

M.p. –2.3°. B.p. 285–8° decomp., 154–5°/10 mm., 147–9°/9 mm., 121°/2 mm. D₁₅ 1.415, D₃₀ 1.403.

Braun, Danziger, *Ber.*, 1912, 45, 1974.

Chuit, *Helv. Chim. Acta*, 1926, 9, 265.

1 : 2-Dibromo-octadecane

C₁₈H₃₆Br₂ MW, 412

Glistening plates from EtOH. M.p. 24°. Spar. sol. EtOH.

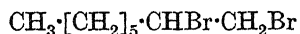
Krafft, *Ber.*, 1884, 17, 1373.

1 : 18-Dibromo-octadecane

C₁₈H₃₆Br₂ MW, 412

Needles from EtOH. M.p. 63.5–64°. B.p. 205–7°/1.5 mm.

Chuit, Hauser, *Helv. Chim. Acta*, 1929, 12, 854.

1 : 2-Dibromo-octane

C₈H₁₆Br₂ MW, 272

B.p. 240–2°, 118.5°/15 mm. D₄²⁰ 1.4580. n_D²⁰ 1.4970.

Wilkinson, *J. Chem. Soc.*, 1931, 3057.

1 : 4-Dibromo-octane

C₈H₁₆Br₂ MW, 272

B.p. 125–6°/11 mm. D₁₅¹⁵ 1.466. n_D¹⁵ 1.50027.

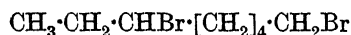
Paul, *Bull. soc. chim.*, 1938, 5, 1053.

1 : 5-Dibromo-octane

C₈H₁₆Br₂ MW, 272

B.p. 127–8°/11 mm. D₁₅¹⁵ 1.448. n_D¹⁵ 1.49677.

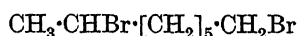
Paul, *Bull. soc. chim.*, 1935, 2, 311.

1 : 6-Dibromo-octane

C₈H₁₆Br₂ MW, 272

B.p. 125–6°/12 mm.

Braun, Pohl, *Ber.*, 1924, 57, 480.

1 : 7-Dibromo-octane

C₈H₁₆Br₂ MW, 272

B.p. 137–8°/15 mm. D₁₅ 1.449.

Chuit, Boelsing, Hauser, Malet, Stoll, *Helv. Chim. Acta*, 1927, 10, 186.

1 : 8-Dibromo-octane (*Octamethylene bromide*)

$\text{BrCH}_2 \cdot [\text{CH}_2]_6 \cdot \text{CH}_2\text{Br}$
 $\text{C}_8\text{H}_{16}\text{Br}_2$ MW, 272
 M.p. 15–16°. B.p. 270–2° slight decomp., 173°/35 mm., 150–61°/20–25 mm. D_4^{15} 1.4678. n_D^{15} 1.5011.

Dionneau, *Ann. chim.*, 1915, 3, 242, 255.

4 : 5-Dibromo-octane

$\text{CH}_3 \cdot [\text{CH}_2]_2 \cdot \text{CHBr} \cdot \text{CHBr} \cdot [\text{CH}_2]_2 \cdot \text{CH}_3$
 $\text{C}_8\text{H}_{16}\text{Br}_2$ MW, 272
dl.
 B.p. 84–84.5°/4.3 mm. D_4^{20} 1.4569. n_D^{20} 1.4981.

Meso.

B.p. 79–80°/4.3 mm. D_4^{20} 1.4525. n_D^{24} 1.4967.

Young, Jasaitis, Levanas, *J. Am. Chem. Soc.*, 1937, 59, 405.

1 : 2-Dibromopalmitic Acid

$\text{CH}_3 \cdot [\text{CH}_2]_{12} \cdot \text{CHBr} \cdot \text{CHBr} \cdot \text{COOH}$
 $\text{C}_{16}\text{H}_{30}\text{O}_2\text{Br}_2$ MW, 414
 Prisms from pet. ether. M.p. 66°. Readily sol. cold org. solvents except pet. ether.
 Ponzio, *Gazz. chim. ital.*, 1905, 35, 134.

1 : 14-Dibromopentadecane

$\text{CH}_3 \cdot \text{CHBr} \cdot [\text{CH}_2]_{12} \cdot \text{CH}_2\text{Br}$
 $\text{C}_{15}\text{H}_{30}\text{Br}_2$ MW, 370
 B.p. 180–5°/3 mm. D^{15} 1.170.
 Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 129.

1 : 15-Dibromopentadecane

$\text{BrCH}_2 \cdot [\text{CH}_2]_{13} \cdot \text{CH}_2\text{Br}$
 $\text{C}_{15}\text{H}_{30}\text{Br}_2$ MW, 370
 M.p. 27.2–7.5°. B.p. 215–225°/15 mm., 192°/2 mm., 148–50°/0.03 mm.
 Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 852.

1 : 2-Dibromo-*n*-pentane (*α -Amylene dibromide*)

$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CHBr} \cdot \text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 184° (190–91°), 84–5°/32 mm., 68°/12 mm. D^{18} 1.668.
 Dykstra, Lewis, Boord, *J. Am. Chem. Soc.*, 1930, 52, 3400.
 Wilkinson, *J. Chem. Soc.*, 1931, 3057.
 Lucas, Schlatter, Jones, *J. Am. Chem. Soc.*, 1941, 63, 22.

1 : 3-Dibromo-*n*-pentane

$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CHBr} \cdot \text{CH}_2 \cdot \text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 190–5°/750 mm. D_4^{20} 1.6721. n_D^{20} 1.5048.
 Rozanov, *Chem. Abstracts*, 1917, 11, 454.
 Rozanov, *Chem. Zentr.*, 1923, I, 1490.

1 : 4-Dibromo-*n*-pentane

$\text{CH}_3 \cdot \text{CHBr} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 145–7°/150 mm. slight decomp., 99°/14 mm. Primary amines \rightarrow pyrrolidines. Secondary amines \rightarrow cyclic quaternary bromides. D_4^{20} 1.6222.

Froebe, Hochstetter, *Monatsh.*, 1902, 23, 1087.

Scholtz, Friemehl, *Ber.*, 1899, 32, 848.

Grishkewitch-Trochimowski, Nekritsch, *Chem. Zentr.*, 1923, I, 1502.

1 : 5-Dibromo-*n*-pentane (*Pentamethylene bromide*)

$\text{BrCH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 F.p. –39.5°. B.p. 222.3°, 111–12°/20 mm., 99°/12 mm. D^{18} 1.706. n_D^{15} 1.5146. Zn dust + EtOH \rightarrow cyclopentane.

Braun, *Organic Syntheses*, Collective Vol. I, 419.

Johnson, *J. Chem. Soc.*, 1933, 1531.

Andrus, *Organic Syntheses*, 1943, XXIII, 67.

2 : 2-Dibromo-*n*-pentane

$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CBr}_2 \cdot \text{CH}_3$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 62–3°/18 mm. D^{16} 1.6452.
 Bouis, *Ann. chim.*, 1928, 9, 457.

2 : 3-Dibromo-*n*-pentane (*β -Amylene dibromide*)

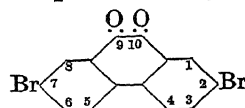
$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CHBr} \cdot \text{CHBr} \cdot \text{CH}_3$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 178°, 74°/17 mm. D_4^{14} 1.6868. n_D^{20} 1.5087.
 Hot H_2O or $\text{K}_2\text{CO}_3 \cdot \text{Aq.}$ \rightarrow methyl propyl ketone or diethyl ketone and *sym.*-methylethyl-ethylene glycol.

Froebe, Hochstetter, *Monatsh.*, 1902, 23, 1083.

Harris, *Ann.*, 1913, 395, 244.

2 : 4-Dibromo-*n*-pentane

$\text{CH}_3 \cdot \text{CHBr} \cdot \text{CH}_2 \cdot \text{CHBr} \cdot \text{CH}_3$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. 60°/12 mm. D_4^{20} 1.6659. n_D^{20} 1.4987.
 Zelinsky, Ujedinoff, *J. prakt. Chem.*, 1911, 84, 546.
 Ostling, *J. Chem. Soc.*, 1912, 101, 467.

2 : 7-Dibromophenanthraquinone

$\text{C}_{14}\text{H}_6\text{O}_2\text{Br}_2$ MW, 366
 M.p. 295°.

Ghatak, *Chem. Zentr.*, 1933, II, 2391.

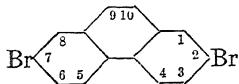
Schmidt, Bürkert, *Ber.*, 1927, 60, 1356.

3 : 6-Dibromophenanthraquinone.

M.p. 286-7°.

Courtot, Kronstein, *Chem. Zentr.*, 1942, 1, 194.

2 : 7-Dibromophenanthrene



$C_{14}H_8Br_2$

MW, 336

Needles. M.p. 200°. Sol. $CHCl_3$, CS_2 , C_6H_6 . Mod. sol. Et_2O , AcOH. Spar. sol. EtOH. $CrO_3 \rightarrow$ 2 : 7-dibromophenanthraquinone.

Schmidt, Mezger, *Ber.*, 1907, 40, 4562.

3 : 6-Dibromophenanthrene.

White cryst. from petrol. M.p. 188-91°. Sublimes *in vacuo*.

Barber, Stickings, *J. Chem. Soc.*, 1945, 167.

3 : 9-Dibromophenanthrene.

Yellow needles or flat prisms from C_6H_6 -EtOH. M.p. 143-143.5°. Sol. C_6H_6 . Spar. sol. EtOH, AcOH.

Sandqvist, *Ber.*, 1920, 53, 170.

Schmidt, Ladner, *Ber.*, 1904, 37, 3571.

9 : 10-Dibromophenanthrene.

Needles. M.p. 181-2°. Sol. $CHCl_3$, CS_2 , C_6H_6 . Mod. sol. EtOH, AcOH.

Schmidt, Ladner, *Ber.*, 1904, 37, 4404.

Henstock, *J. Chem. Soc.*, 1921, 119, 55.

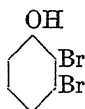
Dibromophenetidine.

See under Dibromoaminophenol.

Dibromophenetole.

See under Dibromophenol.

2 : 3-Dibromophenol



$C_6H_4OBr_2$

MW, 252

Prisms. M.p. 68-9°. Mod. sol. pet. ether.

Henley, Turner, *J. Chem. Soc.*, 1930, 938.

Pope, Wood, *J. Chem. Soc.*, 1912, 101, 1827.

2 : 4-Dibromophenol.

Colourless needles. M.p. 40°. B.p. 238-9°, 177°/17 mm., 154°/11 mm. Sol. EtOH, Et_2O , CS_2 , C_6H_6 , hot H_2O , alkalis. Cold $HNO_3 \rightarrow$ 6-nitro deriv.

Me ether : 2 : 4-dibromoanisole. $C_7H_6OBr_2$. MW, 266. Prisms. M.p. 61.3°. B.p. 272°.

Et ether : 2 : 4-dibromophenetole. $C_8H_8OBr_2$. MW, 280. Plates. M.p. 53.3°. Sol. EtOH, Et_2O .

Acetyl : needles. M.p. 36°.

Benzoyl : needles. M.p. 97.5°.

p-Nitrobenzoyl : needles. M.p. 183.5°.

p-Toluenesulphonyl : plates. M.p. 120°.

Pope, Wood, *J. Chem. Soc.*, 1912, 101, 1824.

Chien, Chung, *Chem. Zentr.*, 1937, I, 68.

2 : 5-Dibromophenol.

M.p. 73-4°. B.p. 256-7°/755 mm.

p-Toluenesulphonyl : m.p. 109-10°.

Henley, Turner, *J. Chem. Soc.*, 1930, 939.

2 : 6-Dibromophenol.

Needles. M.p. 56-7°. B.p. 162°/21 mm. Sol. EtOH, Et_2O . Cryst. from hot H_2O . Sublimes.

Me ether : 2 : 6-dibromoanisole. M.p. about 13°. B.p. 143-5°/34 mm.

Et ether : 2 : 6-dibromophenetole. M.p. 40.6°.

Pope, Wood, *J. Chem. Soc.*, 1912, 101, 1826.

3 : 4-Dibromophenol.

Needles from hot H_2O . M.p. 79-80°. Sol. EtOH, Et_2O . $FeCl_3 \rightarrow$ violet col.

Schiff, *Monatsh.*, 1890, 11, 347.

3 : 5-Dibromophenol.

M.p. 81°. Sol. EtOH, Et_2O . Spar. sol. ligroin, cold H_2O . $FeCl_3 \rightarrow$ violet col.

Me ether : 3 : 5-dibromoanisole. Prisms. M.p. 40°.

Et ether : 3 : 5-dibromophenetole. B.p. 268°.

Acetyl : m.p. 53°.

Benzoyl : m.p. 77°.

Blanksma, *Rec. trav. chim.*, 1908, 27, 30.

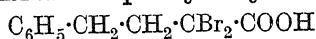
Dibromo-phenylarsine.

See Phenyltribromoarsine.

1 : 2-Dibromo-2-phenylbutyric Acid.

See α : β -Dibromo- β -methylhydrocinnamic Acid.

1 : 1-Dibromo-3-phenylbutyric Acid



$C_{10}H_{10}O_2Br_2$ MW, 322

M.p. 134°. Sol. EtOH, Et_2O . Insol. H_2O . Forms insol. Na salt.

Amide : $C_{10}H_{11}ONBr_2$. MW, 321. M.p. 139°.

Bougault, *Compt. rend.*, 1916, 163, 481.

2 : 3-Dibromo-3-phenylbutyric Acid



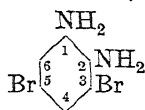
$C_{10}H_{10}O_2Br_2$ MW, 322

dl.
Prisms from CS_2 . M.p. 138°.

d.
[α]_D + 88.3° in EtOH.

Meyer, Stein, *Ber.*, 1894, 27, 891.

Fittig, Obermüller, Schiffer, *Ann.*, 1892, 268, 71.

3 : 5-Dibromo-*o*-phenylenediamine (3 : 5-Dibromo-1 : 2-diaminobenzene) $C_6H_6N_2Br_2$

MW, 266

Prisms from EtOH.Aq. M.p. 83°. Sol. EtOH, C_6H_6 , $CHCl_3$, AcOH. Spar. sol. hot H_2O . Volatile in steam.

1-*N*-Acetyl : needles. M.p. 189°.1 : 2-*N*-Diacetyl : needles. M.p. 227-8°.

Jackson, Russe, *Am. Chem. J.*, 1906, 35, 150.

3 : 6-Dibromo-*o*-phenylenediamine.

Needles from H_2O . M.p. 95°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. cold H_2O .

3 : 6-*N*-Diacetyl : m.p. 265-9° decomp.

Calhane, Wheeler, *Am. Chem. J.*, 1899, 22, 452.

4 : 5-Dibromo-*o*-phenylenediamine.

Needles from EtOH.Aq. M.p. 137° decomp. Sol. EtOH, Et_2O , $CHCl_3$. Insol. H_2O .

Schiff, *Monatsh.*, 1890, 11, 338.

4 : 6-Dibromo-*m*-phenylenediamine (4 : 6-Dibromo-1 : 3-diaminobenzene).

Needles. M.p. 135°. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. CS_2 , ligroin.

1 : 3-*N*-Diacetyl : prisms from EtOH. M.p. 259-60° decomp.

Jackson, Cohoe, *Am. Chem. J.*, 1885, 26, 3.

2 : 5-Dibromo-*p*-phenylenediamine (2 : 5-Dibromo-1 : 4-diaminobenzene).

Plates. M.p. 184°. Sol. Et_2O , Me_2CO . Spar. sol. cold EtOH, cold AcOH, cold C_6H_6 . CrO_3

→ 2 : 5-dibromo-*p*-benzoquinone.

Jackson, Calhane, *Am. Chem. J.*, 1902, 28, 458.

2 : 6-Dibromo-*p*-phenylenediamine.

Silky needles from hot H_2O . M.p. 138°.

1-*N*-Acetyl : needles. M.p. 239° decomp.

1 : 4-*N*-Diacetyl : leaflets from EtOH.Aq. M.p. 108° decomp.

Hewitt, Walker, *J. Chem. Soc.*, 1907, 91, 1141.

2 : 3-Dibromophenylhydrazine $C_6H_6N_2Br_2$

MW, 266

M.p. 112°.

Benzaldehyde-hydrazone : m.p. 106°.

Votoček, Lukes, *Bull. soc. chim.*, 1924, 35, 870.

2 : 4-Dibromophenylhydrazine.

Needles from ligroin. M.p. 91-2°.

β -*N*-Acetyl : m.p. 146° decomp.

Humphries, Evans, *J. Chem. Soc.*, 1925, 127, 1676.

2 : 5-Dibromophenylhydrazine.

Needles from ligroin. M.p. 96-7°. Sol. EtOH, Et_2O , C_6H_6 .

Acetone-hydrazone : m.p. 93°.

Benzaldehyde-hydrazone : m.p. 79°.

Votoček, Lukes, *Bull. soc. chim.*, 1924, 35, 868.

2 : 6-Dibromophenylhydrazine.

Plates. M.p. 110°.

Benzaldehyde-hydrazone : m.p. 51-2°.

Votoček, Lukes, *Bull. soc. chim.*, 1924, 35, 868.

3 : 4-Dibromophenylhydrazine.

M.p. 75°. Sol. EtOH, $CHCl_3$, ligroin.

 β -*N*-Acetyl : m.p. 181-2°.

Benzaldehyde-hydrazone : m.p. 128°.

Picrate : m.p. 154-6°.

Votoček, Jirř, *Bull. soc. chim.*, 1923, 33, 919.

3 : 5-Dibromophenylhydrazine.

Plates from EtOH. M.p. 95-5°.

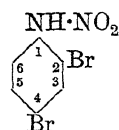
 β -*N*-Acetyl : prisms. M.p. 198-5°. β -*N*-Benzoyl : plates. M.p. 206°.

Acetone-hydrazone : m.p. 85-6°.

Benzaldehyde-hydrazone : m.p. 106-7°.

Chattaway, Ellington, *J. Chem. Soc.*, 1916, 109, 587.

Votoček, Lukes, *Bull. soc. chim.*, 1924, 35, 869.

2 : 4-Dibromophenylnitramine (2 : 4-Dibromo-*N*-nitroaniline) $C_6H_4O_2N_2Br_2$

MW, 296

Plates from pet. ether. M.p. 77°. Sol. common org. solvents. Spar. sol. cold H_2O .

Bradfield, Orton, *J. Chem. Soc.*, 1929, 918.

2 : 6-Dibromophenylnitramine (2 : 6-Dibromo-*N*-nitroaniline).

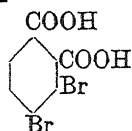
Needles from H_2O . M. p. 108°.

Orton, Smith, *J. Chem. Soc.*, 1905, 87, 397.

Dibromophenylpropionic Acid.

See Dibromohydrocinnamic Acid and dibromohydratropic Acid.

3 : 4-Dibromophthalic Acid



$C_8H_4O_4Br_2$ MW, 324
M.p. 196°. Sol. H_2O , EtOH, AcOH. Spar. sol. C_6H_6 .

Di-Me ester: m.p. 79°.

Anhydride: $C_8H_2O_3Br_2$. MW, 306. M.p. 148.5°.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 261.

3 : 5-Dibromophthalic Acid.

Needles. M.p. 198° (rapid heat.).

Anhydride: m.p. 121.5°.

Ullmann, Kopetschni, *Ber.*, 1911, 44, 427.

3 : 6-Dibromophthalic Acid.

M.p. 135° \rightarrow anhydride. Sol. EtOH, hot H_2O .

Anhydride: needles. M.p. 208°. Sol. EtOH. Spar. sol. Et_2O . Sublimes.

Guarachi, *Ann.*, 1884, 222, 274.

4 : 5-Dibromophthalic Acid.

Needles. M.p. 209–10° \rightarrow anhydride. Sol. EtOH, Et_2O , hot H_2O .

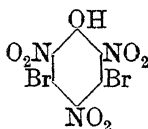
Di-Me ester: $C_{10}H_8O_4Br_2$. MW, 352. Needles. M.p. 82–3°.

Di-Et ester: $C_{12}H_{12}O_4Br_2$. MW, 380. Needles. M.p. 63–4°.

Imide: 4:5-dibromophthalimide. $C_8H_3O_2NBr_2$. MW, 305. M.p. 246°.

Zincke, Fries, *Ann.*, 1904, 334, 365.

Dibromopicric Acid (3 : 5-Dibromo-2 : 4 : 6-trinitrophenol)



$C_6HO_7N_3Br_2$ MW, 387
Cryst. from $CHCl_3$ or CCl_4 . M.p. 173° (165°).

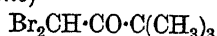
Explosive. Bitter taste. Aqueous NaOH, ammonia or aniline \rightarrow trinitrophenol.

Me ether: 3 : 5-dibromo-2 : 4 : 6-trinitroanisole. $C_7H_3O_7N_3Br_2$. MW 401. Cryst. from EtOH. M.p. 146°.

Blanksma, *Rec. trav. chim.*, 1908, 27, 37.

Willstaedt, Reuter, *J. prakt. Chem.*, 1932, 135, 211.

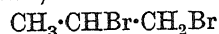
4 : 4-Dibromopinacol (Dibromomethyl tert.-butyl ketone)



$C_6H_{10}OBr_2$ MW, 258

Cryst. from pet. ether. M.p. 76.5°. B.p. 96.5–97°/12 mm. Sublimes.

Hill, Kropa, *J. Am. Chem. Soc.*, 1933, 55, 2511.

1 : 2-Dibromopropane (*Propylene dibromide, propylene bromide*)

$C_3H_6Br_2$ MW, 202

B.p. 141.6°. D_4^{20} 1.9333. Isomerises partly to the 2 : 2- and 1 : 3-comps. on heating. Zn + AcOH or EtOH \rightarrow propylene. Boiling H_2O converts it slowly to propylene glycol.

Mouneyrat, *Compt. rend.*, 1898, 127, 274.

Kharasch, McNab, McNab, *J. Am. Chem. Soc.*, 1935, 57, 2463.

Nutting, Petrie, U.S.P. 2,120,675, (*Chem. Zentr.*, 1938, II, 2840).

1 : 3-Dibromopropane (*Trimethylene bromide*)

$C_3H_6Br_2$ MW, 202

B.p. 165°. D_4^{17} 1.9736. Decomp. on continued heating. Zn + AcOH \rightarrow cyclopropane. Boiling H_2O \rightarrow trimethylene glycol. Alc. NH_3 \rightarrow 1 : 3-diaminopropane.

Kamm, Marvel, *Organic Syntheses*, Collective Vol. I, 28.

2 : 2-Dibromopropane (*Isopropylidene bromide, bromacetol*)

$C_3H_6Br_2$ MW, 220

B.p. 114–15°/740 mm. D_4^{20} 1.7825. H_2O at 160° \rightarrow acetone. Zn + AcOH \rightarrow propane.

Linnemann, *Ann.*, 1866, 138, 125.

Kharasch, McNab, McNab, *J. Am. Chem. Soc.*, 1935, 57, 2463.

1 : 1-Dibromopropionaldehyde



$C_3H_4OBr_2$ MW, 216

B.p. 137°. D^{15} 1.899.

Hydrate: $C_3H_4OBr_2 \cdot 2H_2O$. M.p. 42°.

Etard, *Compt. rend.*, 1892, 114, 753.

1 : 2-Dibromopropionaldehyde (*Acrolein dibromide*)

$C_3H_4OBr_2$ MW, 216

Pale yellowish fuming liq. B.p. 86°/18 mm. D^{15} 2.198. H_2O \rightarrow glyceraldehyde. HNO_3 \rightarrow 1 : 2-dibromopropionic acid. HCl \rightarrow polymer [m.p. 70° (slow heat.), 82–84° (rapid heat.)]. Reduces Fehling's.

Schlotterbeck, *Ber.*, 1909, 42, 2563.

Groll, Hearn, Can. P. 363,198, (*Chem. Abstracts*, 1937, 31, 1426).

1 : 1-Dibromopropionic Acid



$C_3H_4O_2Br_2$ MW, 232

M.p. 61°. B.p. 221° slight decomp., 126°/20 mm. $k = 3.3 \times 10^{-2}$ at 25°. Alc. KOH at

boil \rightarrow 1-bromoacrylic acid. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow$ propionic acid.

Me ester: $\text{C}_4\text{H}_6\text{O}_2\text{Br}_2$. MW, 246. B.p. 175–9°. D_4^{20} 1.9043.

Et ester: $\text{C}_5\text{H}_8\text{O}_2\text{Br}_2$. MW, 260. B.p. 191°. D_4^{20} 1.7728.

Philippi, Tollens, *Ann.*, 1874, 171, 315.

1 : 2-Dibromopropionic Acid



$\text{C}_3\text{H}_4\text{O}_2\text{Br}_2$ MW, 232

dl.

Two cryst. modifications. Stable form: plates, m.p. 66.5–67°. Labile form: prisms, m.p. 51°. B.p. 220–40° decomp., 160°/20 mm., 141–1.5°/16 mm. Sol. H_2O , EtOH, C_6H_6 , CS_2 . Mod. sol. Et_2O . $k = 6.7 \times 10^{-3}$ at 25°. Alc. KOH \rightarrow 1-bromoacrylic acid. Zn or $\text{Mg} + \text{H}_2\text{O} \rightarrow$ acrylic acid.

Me ester: b.p. 206°, 96–8°/22 mm. D_4^{20} 1.9777, D_{17}^{20} 1.9499. n_D^{20} 1.5127.

Et ester: b.p. 214–15°, 112°/23 mm. D_4^{20} 1.8279, D_{18}^{20} 1.7882. n_D^{20} 1.5007. $\text{Zn} + \text{EtOH} \rightarrow$ ethyl acrylate.

n-Propyl ester: $\text{C}_6\text{H}_{10}\text{O}_2\text{Br}_2$. MW, 274. B.p. 221–4°, 149–50°/60 mm. D_4^{20} 1.6799. n_D^{20} 1.4950.

Isopropyl ester: b.p. 210–14°, 143–6°/60 mm. D_4^{20} 1.6459. n_D^{20} 1.4903.

n-Butyl ester: $\text{C}_7\text{H}_{12}\text{O}_2\text{Br}_2$. MW, 288. B.p. 236–9°, 163–4°/60 mm. D_4^{20} 1.6107. n_D^{20} 1.4890.

Isobutyl ester: b.p. 230–2°, 155–6°/60 mm. D_4^{20} 1.5783. n_D^{20} 1.4882.

tert.-Butyl ester: b.p. 130–5°/26 mm. D_{20}^{20} 1.591. n_D^{20} 1.4855.

Cyclohexyl ester: $\text{C}_9\text{H}_{14}\text{O}_2\text{Br}_2$. MW, 314. B.p. 130–2°/2 mm. n_D^{20} 1.5139.

Phenyl ester: $\text{C}_9\text{H}_8\text{O}_2\text{Br}_2$. MW, 308. B.p. 132–3°/2 mm. n_D^{20} 1.5598.

Chloride: $\text{C}_3\text{H}_3\text{OClBr}_2$. MW, 250.5. B.p. 192–3° part. decomp., 98°/37 mm., 81–4°/18 mm., 71–3°/12 mm.

Amide: $\text{C}_3\text{H}_5\text{ONBr}_2$. MW, 231. M.p. 130–3°.

Nitrile: $\text{C}_3\text{H}_3\text{NBr}_2$. MW, 213. B.p. 126–9°/55 mm. D_4^{20} 2.161.

dl.

B.p. 129°/9 mm. $[\alpha]_D^{18} + 13.76^\circ$ in H_2O , $+ 6.42^\circ$ in EtOH.

Et ester: $[\alpha]_D^{18} + 9.77^\circ$ in EtOH.

l.

$[\alpha]_D^{18} - 2.44^\circ$ in H_2O .

Münder, Tollens, *Ann.*, 1873, 167, 226.

Abderhalden, Eichwald, *Ber.*, 1915, 48, 114.

Karrer, Klarer, *Helv. Chim. Acta*, 1924, 7, 929.

Marvel, Dec, Cooke, Cowan, *J. Am. Chem. Soc.*, 1940, 62, 3496.

Ipatov, *J. Gen. Chem. U.S.S.R.*, 1945, 15, 187.

2 : 2-Dibromopropionic Acid



$\text{C}_3\text{H}_4\text{O}_2\text{Br}_2$ MW, 232

Prisms. M.p. 71°. Alc. KOH \rightarrow 2-bromoacrylic acid.

Thomas-Mamert, *Compt. rend.*, 1894, 118, 652.

2 : 3-Dibromopropyl Alcohol (*Glycerol 1 : 2-dibromohydrin, β -dibromohydrin, allyl alcohol dibromide*)



$\text{C}_3\text{H}_6\text{OBr}_2$ MW, 218

B.p. 219° slight decomp., 118°/17 mm., 101°/12 mm. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Spar. sol. H_2O . D_4^{20} 2.1197. n_D^{25} 1.5577.

Phenylurethane: m.p. 83–4° (77–9°).

Read, Hurst, *J. Chem. Soc.*, 1922, 121, 995.

Kohler, *Am. Chem. J.*, 1909, 42, 381.

1 : 2-Dibromopropylene (*Allylene dibromide*)

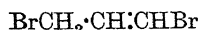


$\text{C}_3\text{H}_4\text{Br}_2$ MW, 200

B.p. 131–2°. D_4^{20} 2.00768. Na \rightarrow allylene.

Linnemann, *Ann.*, 1865, 136, 56.

1 : 3-Dibromopropylene (*3-Bromoallyl bromide*)



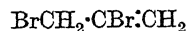
$\text{C}_3\text{H}_4\text{Br}_2$ MW, 200

B.p. 156°, 91°/105 mm. D_4^{20} 2.097. n_D^{25} 1.5378. Zn dust + EtOH \rightarrow propylene.

Lespieau, *Ann. chim.*, 1897, 11, 238.

Braun, Kuhn, *Ber.*, 1925, 58, 2168.

2 : 3-Dibromopropylene (*2-Bromoallyl bromide*)

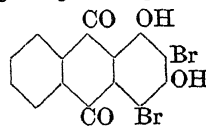


$\text{C}_3\text{H}_4\text{Br}_2$ MW, 200

B.p. 139–40°, 73–6°/75 mm. H_2O at 130° \rightarrow $\text{CH}_2\cdot\text{CBr}\cdot\text{CH}_2\text{OH}$. Zn dust + EtOH \rightarrow allene.

Lespieau, Bourguel, *Organic Syntheses*, Collective Vol. I, 203.

2 : 4-Dibromopurpuroxanthin (*2 : 4-Dibromo-1 : 3-dihydroxyanthraquinone*)



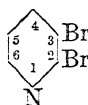
$\text{C}_{14}\text{H}_6\text{O}_4\text{Br}_2$ MW, 398

Orange needles from AcOH. M.p. 227–30°. Sol. AcOH. Spar. sol. EtOH.

Heller, *Ber.*, 1895, 28, 315.

Plath, *Ber.*, 1876, 9, 1205.

2 : 3-Dibromopyridine

 $C_5H_3NBr_2$

MW, 237

M.p. 58–9°.

Wibaut, Kooyman, Boer, *Rec. trav. chim.*, 1945, 64, 85.

2 : 5-Dibromopyridine.

M.p. 94–5°. Sublimes.

Tschitschibabin, Tyazhelova, *Chem. Abstracts*, 1924, 18, 1495.den Hertog, Wibaut, *Rec. trav. chim.*, 1932, 51, 381.

2 : 6-Dibromopyridine.

M.p. 118–19°. B.p. 249°.

Levelt, Wibaut, *Rec. trav. chim.*, 1929, 48, 473.den Hertog, Wibaut, *Rec. trav. chim.*, 1932, 51, 381.

3 : 4-Dibromopyridine.

M.p. 71–2°.

McElvain, Goese, *J. Am. Chem. Soc.*, 1943, 65, 2227.Wibaut, Kooyman, Boer, *Rec. trav. chim.*, 1945, 64, 85.

3 : 5-Dibromopyridine.

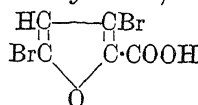
M.p. 112°. B.p. 222°. Sol. Et_2O , hot $EtOH$, conc. H_2SO_4 . Spar. sol. cold $EtOH$, hot H_2O . Sublimes at 100°. Volatile in steam. B_2HCl : dissociates at 180–200°. Hyd. by H_2O .

Methiodide: m.p. 273–4°.

Me-p-toluenesulphonate: m.p. 219–21°.

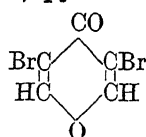
Englert, McElvain, *J. Am. Chem. Soc.*, 1929, 51, 865.den Hertog, Wibaut, *Rec. trav. chim.*, 1932, 51, 381.

3 : 5-Dibromopyromucic Acid (3 : 5-Dibromofuran-2-carboxylic acid)

 $C_4H_2O_3Br_2$

MW, 258

M.p. 168–8.5°. Decarboxylated on heating to 174°.

Gilman, Janney, Bradley, *Chem. Abstracts*, 1934, 28, 763.3 : 5-Dibromo- γ -pyrone $C_5H_2O_2Br_2$

MW, 254

Prisms from Et_2O . M.p. 157.5°.Feist, Baum, *Ber.*, 1905, 38, 3567.

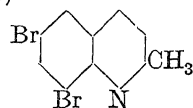
Dibromopyruvic Acid

 $Br_2CH \cdot CO \cdot COOH$ $C_3H_2O_3Br_2$

MW, 246

Prisms + $2H_2O$. Anhydrous, needles. M.p. anhyd. 93° (91°). Sol. H_2O , most ord. org. solvents.Wislicenus, *Ann.*, 1868, 148, 208.Ponzio, Paolini, *Gazz. chim. ital.*, 1926, 56, 251.Bottinger, *Ber.*, 1881, 14, 1236.

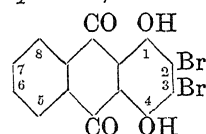
6 : 8-Dibromoquinaldine (6 : 8-Dibromo-2-methylquinoline)

 $C_{10}H_7NBr_2$

MW, 301

Needles from $MeOH$. M.p. 100°. Sol. C_6H_6 . Mod. sol. $EtOH$. Spar. sol. H_2O . Sol. dil. min. acids.Picrate: orange-yellow needles from $MeOH$. M.p. 155°.Lawson, Perkin, Robinson, *J. Chem. Soc.*, 1924, 656.

2 : 3-Dibromoquinizarin (2 : 3-Dibromo-1 : 4-dihydroxyanthraquinone)

 $C_{14}H_6O_4Br_2$

MW, 398

Reddish needles. Sublimes in vacuo at 350°. Sol. alkalis to blue sols. Spar sol. ord. org. solvents. Red sol. in conc. H_2SO_4 .

Diacetyl: m.p. 242° (not sharp).

Liebermann, Riiber, *Ber.*, 1900, 33, 1658.

5 : 6-Dibromoquinizarin.

Reddish-brown needles from chlorobenzene. M.p. 227°.

Allen, Frame, Wilson, *J. Org. Chem.*, 1941, 6, 732.

5 : 8-Dibromoquinizarin.

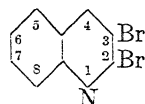
Red needles from $AcOH$. M.p. 245°.Allen, Frame, Wilson, *J. Org. Chem.*, 1941, 6, 732.

6 : 7-Dibromoquinizarin.

Red needles from xylene. M.p. 296–8°.

Allen, Frame, Wilson, *J. Org. Chem.*, 1941, 6, 732.

2 : 3-Dibromoquinoline

 $C_9H_5NBr_2$

MW, 287

Prisms from EtOH. M.p. 97°. Sol. EtOH, Et₂O, AcOH, CHCl₃, C₆H₆. Sublimes. Volatile in steam.

Decker, *J. prakt. Chem.*, 1892, 45, 50.

2 : 4-Dibromoquinoline.

Needles. M.p. 265°.

Meyer, Heimann, *Compt. rend.*, 1936, 203, 264.

2 : 5-Dibromoquinoline.

Needles from EtOH. M.p. 86°. Sol. EtOH.

Welter, *J. prakt. Chem.*, 1891, 43, 503.

2 : 6-Dibromoquinoline.

Leaflets from EtOH. M.p. 167°. Sol. EtOH. Volatile in steam.

Welter, *J. prakt. Chem.*, 1891, 43, 503.

2 : 7-Dibromoquinoline.

Plates or leaflets from EtOH.Aq. M.p. 134°. Sol. EtOH. Volatile in steam.

Welter, *J. prakt. Chem.*, 1891, 43, 503.

3 : 4-Dibromoquinoline.

Needles from EtOH.Aq. M.p. 82°. Sol. EtOH. Volatile in steam.

Claus, Howitz, *J. prakt. Chem.*, 1894, 50, 235.

Riegel *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 1229.

3 : 5-Dibromoquinoline.

Needles from EtOH. M.p. 86°. Sol. EtOH, Et₂O, CHCl₃. Sublimes.

B, HCl : yellow cryst. M.p. 183°.

B, HNO_3 : m.p. 147°.

Methiodide: m.p. 253°.

Claus, Welter, *J. prakt. Chem.*, 1889, 40, 391.

3 : 6-Dibromoquinoline.

Needles. M.p. 130°. Volatile in steam.

B, HCl : m.p. 185°.

B, HNO_3 : m.p. 158°.

B_2, H_2PtCl_6 : m.p. above 300°.

Claus, Welter, *J. prakt. Chem.*, 1889, 40, 391.

3 : 7-Dibromoquinoline.

Prisms from Et₂O. M.p. 127°. Sublimes.

B, HNO_3 : m.p. 178°.

B_2, H_2PtCl_6 : m.p. above 310°.

Methiodide: m.p. 271°.

Claus, Welter, *J. prakt. Chem.*, 1889, 40, 399.

3 : 8-Dibromoquinoline.

Needles from EtOH. M.p. 102°. Volatile in steam.

B, HCl : m.p. 141-2°.

B_2, H_2SO_4 : m.p. 206°.

B_2, H_2PtCl_6 : m.p. above 280°.

Claus, Tornier, *Ber.*, 1887, 20, 2878.

Claus, Welter, *J. prakt. Chem.*, 1890, 42, 233.

4 : 5-Dibromoquinoline.

Needles. M.p. 108°.

Claus, Tornier, *Ber.*, 1887, 20, 2882.

5 : 6-Dibromoquinoline.

Needles from Et₂O. M.p. 81° (135°).

B, HCl : m.p. 144°.

B_2, H_2PtCl_6 : m.p. above 360°.

Methiodide: m.p. 250° (302° decomp.).

Claus, Geisler, *J. prakt. Chem.*, 1889, 40, 381.

5 : 7-Dibromoquinoline.

Needles from EtOH. M.p. 112°. Sol. EtOH, Et₂O.

B, HCl : m.p. 158°.

B, HBr : m.p. 288°.

B_2, H_2PtCl_6 : m.p. 240°.

Methochloride: m.p. 236°.

Methiodide: m.p. 287°.

Claus, Geisler, *J. prakt. Chem.*, 1889, 40, 381.

5 : 8-Dibromoquinoline.

Needles. M.p. 127-8°. Sol. EtOH, Et₂O, C₆H₆, ligroin. Insol. H₂O. Volatile in steam.

B, HCl : m.p. 191-2°.

Methiodide: red needles. Decomp. at 166°.

Metzger, *Ber.*, 1884, 17, 187.

6 : 7-Dibromoquinoline.

Prisms. M.p. 68-9°. Sol. EtOH, Et₂O.

B_2, H_2PtCl_6 : decomp. at 295°.

Methiodide: yellow needles. M.p. 255-60° decomp.

Claus, Geisler, *J. prakt. Chem.*, 1889, 40, 381.

6 : 8-Dibromoquinoline.

Needles from EtOH. M.p. 101-2°. Sublimes. Volatile in steam.

B, HCl : m.p. 202°.

B_2, H_2PtCl_6 : decomp. at 289°.

Methiodide: decomp. at 178°.

Claus, Günther, *J. prakt. Chem.*, 1897, 55, 104.

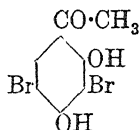
7 : 8-Dibromoquinoline.

Needles. M.p. 112°. Sol. EtOH, Et₂O.

Claus, Vis, *J. prakt. Chem.*, 1889, 40, 383.

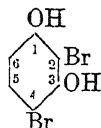
Dibromoquinolone.

See Dibromo-2-hydroxyquinoline.

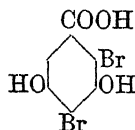
3 : 5-Dibromoresacetophenone (3 : 5-Dibromo-2 : 4-dihydroxyacetophenone) $C_8H_6O_3Br_2$

MW, 310

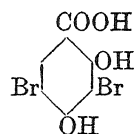
Needles from EtOH or AcOH. M.p. 173-4°.

Di-Et ether: $C_{12}H_{14}O_3Br_2$. MW, 366. Cryst. from AcOH. M.p. 51-2°.*Diacetyl*: needles from AcOH. M.p. 104-5°.*Phenyldiazone*: needles from EtOH. M.p. 162°.Dahse, *Ber.*, 1908, 41, 1621.Wechsler, *Monatsh.*, 1894, 15, 243.**2 : 4-Dibromoresorcinol** $C_6H_4O_2Br_2$

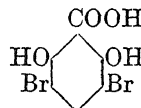
MW, 268

Needles from hot H_2O . M.p. 91-2°. Sol. EtOH, Et_2O , C_6H_6 . Mod. sol. hot H_2O . $FeCl_3 \rightarrow$ violet col. then brown ppt. Phthalic anhydride + $ZnCl_2 \rightarrow$ eosin.Meyer, Conzetti, *Ber.*, 1899, 32, 2106.**4 : 6-Dibromoresorcinol.**Cryst. + $1H_2O$ from H_2O . M.p. anhyd. 115°. Sol. EtOH, Et_2O , hot H_2O . $FeCl_3 \rightarrow$ blue col.*Di-Me ether*: m.p. 141°.*Di-Et ether*: $C_{10}H_{12}O_2Br_2$. MW, 324. M.p. 100-1°.*Diacetyl*: m.p. 94°.Kohn, Pfeifer, *Monatsh.*, 1927, 48, 228.Zehnter, *Monatsh.*, 1887, 8, 296.Likhoshesterov, *Chem. Abstracts*, 1934, 28, 1676.**2 : 4-Dibromo- α -resorcylic Acid** (2 : 4-Dibromo-3 : 5-dihydroxybenzoic acid) $C_7H_4O_4Br_2$

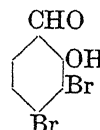
MW, 312

Plates + $3H_2O$ from H_2O . M.p. 192°. Sol. EtOH, Et_2O , AcOH, hot H_2O . Prac. insol. C_6H_6 . Stable towards boiling H_2O . $FeCl_3 \rightarrow$ blue col.*Diacetyl*: cryst. from AcOH. M.p. 182-3°. Easily hyd. by dil. NH_3 .Hemmelmayer, *Monatsh.*, 1912, 33, 994.**3 : 5-Dibromo- β -resorcylic Acid** (3 : 5-Dibromo-2 : 4-dihydroxybenzoic acid) $C_7H_4O_4Br_2$

MW, 312

Needles + $1H_2O$ from H_2O . Loses H_2O at 100°. M.p. anhyd. 220° (214°), with evolution of CO_2 . Sol. EtOH, Et_2O . Spar. sol. cold H_2O . Insol. C_6H_6 . Aq. sol. + $FeCl_3 \rightarrow$ violet col. Boiling with $H_2O \rightarrow$ 2 : 4-dibromoresorcinol.*Monoacetyl deriv.*: needles from H_2O . M.p. 195°.*Diacetyl*: prisms from EtOH.Aq. M.p. 165°.Dahse, *Ber.*, 1908, 41, 1623.Hemmelmayer, *Monatsh.*, 1912, 33, 977.**3 : 5-Dibromo- γ -resorcylic Acid** (3 : 5-Dibromo-2 : 6-dihydroxybenzoic acid) $C_7H_4O_4Br_2$

MW, 312

Needles + $1H_2O$ from H_2O . Decomp. at 210°. Evolves CO_2 on long boiling in water. $FeCl_3 \rightarrow$ blue col.Hemmelmayer, *Monatsh.*, 1912, 33, 988.**3 : 4-Dibromosalicylaldehyde** (3 : 4-Dibromo-2-hydroxybenzaldehyde) $C_7H_4O_2Br_2$

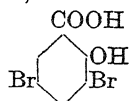
MW, 280

Needles. M.p. 129°. Volatile in steam.

p-Nitrophenylhydrazone: decomp. above 220°.Hodgson, Jenkinson, *J. Chem. Soc.*, 1928, 2275.**3 : 5-Dibromosalicylaldehyde.**Yellowish prisms. M.p. 85°. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O . Sublimes. Reduces $NH_3.AgNO_3$. Alk. $H_2O_2 \rightarrow$ 3 : 5-dibromocatechol.*Acetyl*: m.p. 90°.*Oxime*: m.p. 218-20°. *Acetyl deriv.*: m.p. 146°. *Diacetyl deriv.*: m.p. 150°.Lindemann, Thiele, *Ann.*, 1926, 449, 73.**4 : 5-Dibromosalicylaldehyde.**

Needles. M.p. 132°.

p-Nitrophenylhydrazone: m.p. 266° decomp.Hodgson, Jenkinson, *J. Chem. Soc.*, 1928, 2278.

3 : 5-Dibromosalicylic Acid (3 : 5-Dibromo-o-hydroxybenzoic acid)

$C_7H_4O_3Br_2$ MW, 296

Needles from EtOH. M.p. 228°. Sol. EtOH, Et₂O. Spar. sol. cold H₂O. FeCl₃ → violet col. Soda lime or hot BaO → 2 : 4-dibromophenol.

Me ester: $C_8H_6O_3Br_2$. MW, 310. Needles. M.p. 149° (156°). B.p. 181°/12 mm. Sol. Et₂O.

Et ester: $C_9H_8O_3Br_2$. MW, 324. Rhombic plates. M.p. 101°. B.p. 184°/16 mm.

Phenyl ester: 3 : 5-dibromosalol. $C_{13}H_8O_3Br_2$. MW, 372. Needles. M.p. 128°.

α-Naphthyl ester: $C_{17}H_{10}O_3Br_2$. MW, 422. Needles. M.p. 155°. Sol. EtOH, AcOH, CS₂.

β-Naphthyl ester: needles. M.p. 191°. Sol. EtOH, Et₂O, AcOH, CS₂.

Chloride: $C_7H_3O_2ClBr_2$. MW, 314.5. M.p. 86–7°. Unstable.

Amide: $C_7H_5O_2NBr_2$. MW, 295. Needles. M.p. 183° decomp. (170°). Sol. EtOH, Et₂O.

Nitrile: $C_7H_3ONBr_2$. MW, 277. M.p. 167–8°.

2-Acetyl: 3 : 5-dibromoaspirin. Cryst. from EtOH. M.p. 163°. Sol. ord. org. solvents. Spar. sol. H₂O, pet. ether.

Me ether: 3 : 5-dibromo-o-methoxybenzoic acid. $C_8H_6O_3Br_2$. MW, 310. Needles from EtOH.Aq. M.p. 193–4°. *Me ester*: $C_9H_8O_3Br_2$. MW, 324. Needles. M.p. 53°.

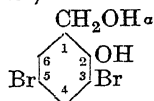
Et ether: 3 : 5-dibromo-o-ethoxybenzoic acid. $C_9H_8O_3Br_2$. MW, 324. Needles from EtOH.Aq. M.p. 155–6°. *Me ester*: $C_{10}H_{10}O_3Br_2$. MW, 338. Needles. M.p. 43–4°.

Leulier, Pinet, *Bull. soc. chim.*, 1927, 41, 1367.

4 : 5-Dibromosalicylic Acid.

Needles. M.p. 218°. Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ → violet col.

Lesser, Weiss, *Ber.*, 1913, 46, 3944.

3 : 5-Dibromosaligenin (3 : 5-Dibromo-o-hydroxybenzyl alcohol)

$C_7H_6O_2Br_2$ MW, 282

Needles from ligroin- C_6H_6 . M.p. 88–9°. Sol. EtOH, Et₂O, AcOH, CHCl₃, C_6H_6 .

α-Acetyl: m.p. 110–12°. FeCl₃ → violet-blue col.

α : 2-Diacetyl: m.p. 70–1°.

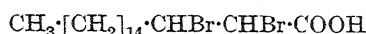
Benzoyl deriv.: m.p. 154°.

p-Nitrobenzoyl deriv.: m.p. 153°.

Auwers, Büttner, *Ann.*, 1898, 302, 139.

3 : 5-Dibromosalol.

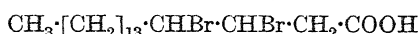
See under 3 : 5-Dibromosalicylic Acid.

1 : 2-Dibromostearic Acid

$C_{18}H_{34}O_2Br_2$ MW, 442

Prisms from pet. ether. M.p. 72°.

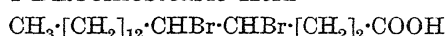
Ponzio, *Gazz. chim. ital.*, 1905, 35, ii, 570.

2 : 3-Dibromostearic Acid

$C_{18}H_{34}O_2Br_2$ MW, 442

Leaflets from ligroin. M.p. 67°. Sol. EtOH. Turns yellow in light.

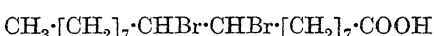
Eckert, Halla, *Monatsh.*, 1913, 34, 1819.

3 : 4-Dibromostearic Acid

$C_{18}H_{34}O_2Br_2$ MW, 442

Leaflets. M.p. 62°. Turns yellow in light.

Eckert, Halla, *Monatsh.*, 1913, 34, 1822.

8 : 9-Dibromostearic Acid

$C_{18}H_{34}O_2Br_2$ MW, 442

I. *Cis*-. (Oleo-dibromostearic acid, oleic acid dibromide).

dl-.
Zn + HCl → oleic acid.

p-Benzeneazoanilide:

$C_{17}H_{33}CONH \cdot C_6H_4 \cdot N \cdot N \cdot C_6H_5$. M.p. 90–1.5°.

l-.
[α]_D – 27.75°.

Strychnine salt: [α]_D – 128°.

Overbeck, *Ann.*, 1866, 140, 42.

Inoue, Suzuki, *Proc. Imper. Acad. Tokyo*, 1931, 7, 261, (*Chem. Zentr.*, 1931, II, 2594).

Maruyama, Suzuki, *Proc. Imper. Acad. Tokyo*, 1931, 7, 375, (*Chem. Zentr.*, 1932, I, 2307).

II. *Trans*-. (Elaido-dibromostearic acid, elaidic acid dibromide).

dl-.
M.p. 27°. Zn + HCl → elaidic acid.

p-Benzeneazoanilide: m.p. 132–3°.

l-.
[α]_D – 18.5°.

Strychnine salt: [α]_D – 122°.

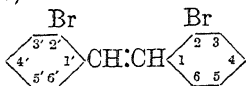
Overbeck, *Ann.*, 1866, 140, 42.

Inoue, Suzuki, *Proc. Imper. Acad. Tokyo*, 1931, 7, 261, (*Chem. Zentr.*, 1931, II, 2594).

Maruyama, Suzuki, *Proc. Imper. Acad. Tokyo*, 1931, 7, 375, (*Chem. Zentr.*, 1932, I, 2307).

α : β -Dibromostilbene.

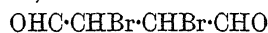
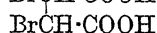
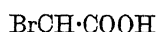
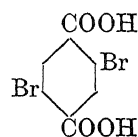
See Tolane dibromide.

2 : 2'-Dibromostilbene (sym.-*Di-o-bromophenylethylene*) $C_{14}H_{10}Br_2$ MW, 338

Exists in two forms. (1) Leaflets from hot EtOH. M.p. 206-8°. (2) Needles from EtOH.Aq. M.p. 86°.

Wislicenus, Fischer, *Ber.*, 1910, **43**, 2239.
Kato, *Chem. Zentr.*, 1932, II, 1127.**2 : 4'-Dibromostilbene.**

Cryst. from EtOH. M.p. 84-5°. B.p. 185°/2 mm.

Bance, Barber, Woolman, *J. Chem. Soc.*, 1943, 1.**4 : 4'-Dibromostilbene.**Leaflets from EtOH. M.p. 208-10°. Sol. C_6H_6 . Spar. sol. EtOH.Wislicenus, Elvert, *Ber.*, 1908, **41**, 4130. α : β -Dibromostyrene (*Phenylacetylene dibromide*) $C_8H_6Br_2$ MW, 262M.p. -11°. B.p. 132-5°/15 mm. Zn dust + EtOH \rightarrow phenylacetylene.Nef, *Ann.*, 1899, **308**, 273.Dufraisse, *Compt. rend.*, 1914, **158**, 1694. β : β -Dibromostyrene $C_8H_6Br_2$ MW, 262B.p. 144°/24 mm., 135-6°/17 mm. D²⁰ 1.819. Passed over heated Cu \rightarrow phenylacetylene.Nef, *Ann.*, 1899, **308**, 310.**sym.-Dibromosuccindialdehyde** (2 : 3-*Di-bromobutandial*) $C_4H_4O_2Br_2$ MW, 244M.p. 75° (sinters at 50°). Very sol. MeOH, EtOH, Et₂O, CHCl₃, AcOEt, C_6H_6 . Insol. H₂O, pet. ether. Heat \rightarrow yellow viscous modification.*Di-dimethylacetal* : $C_8H_{16}O_4Br_2$. MW, 336. D₄^{17.5} 1.764. $n_D^{17.5}$ 1.50326. Decomp. on dist. Very sol. EtOH, Et₂O. Insol. H₂O.Harries, Krützfeld, *Ber.*, 1906, **39**, 3675.**1 : 2-Dibromosuccinic Acid** $C_4H_4O_4Br_2$ MW, 276*dl.*M.p. 157-8°. [α]_D²⁴ +147.8° in AcOEt.*l.*Needles from C_6H_6 . M.p. 157-8° decomp. (152-4°). Sol. H₂O, MeOH, EtOH, Me₂CO, AcOEt. Spar. sol. CHCl₃, CCl₄, pet. ether. [α]_D¹⁵ -148° in AcOEt.*dl.*Isodibromosuccinic acid, allodibromosuccinic acid. M.p. 166-7°. *k* (first) = about 3.7×10^{-2} at 25° : (second) = about 4.3×10^{-4} at 25°. At 180° \rightarrow bromofumaric acid + HBr.*Di-Me ester* : $C_6H_5O_4Br_2$. MW, 304. M.p. 43°.*Di-Et ester* : $C_8H_{12}O_4Br_2$. MW, 332. B.p. 137-8°/11 mm.*Meso.*M.p. (in sealed tube) 255-6° decomp. Sublimes without melting when heated in the open. Sol. EtOH, Et₂O, hot H₂O. *k* (first) = 3.7×10^{-2} at 25° : (second) = 1.4×10^{-3} at 25°. Heat \rightarrow bromomaleic acid + HBr.*Di-Me ester* : prisms. M.p. 65°.*Di-Et ester* : needles. M.p. 58°. Decomp. above 130° \rightarrow bromomaleic di-Et ester.*Anil* : needles. M.p. 177°. Sol. Me₂CO.Eichelberger, *J. Am. Chem. Soc.*, 1926, **48**, 1321.Ing, Perkin, *J. Chem. Soc.*, 1924, **125**, 1822.Bocker, van der Zanden, *Rec. trav. chim.*, 1928, **47**, 777.Holmberg, *Chem. Zentr.*, 1911, II, 1432.McKenzie, *J. Chem. Soc.*, 1912, **101**, 1196.Rhinesmith, *Organic Syntheses*, 1938, XVIII, 17.Musante, *Gazz. chim. ital.*, 1935, **65**, 199.Holmberg, *Chem. Abstracts*, 1941, **35**, 5465.**2 : 5-Dibromoterephthalic Acid** $C_8H_4O_4Br_2$ MW, 324Leaflets from AcOH. M.p. 316-17° part. sublimes. Sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O, C_6H_6 , ligroin. Soda-lime \rightarrow *p*-dibromobenzene.*Di-Et ester* : $C_{12}H_{10}O_4Br_2$. MW, 380. Leaflets. M.p. 124-5° (121°). B.p. 335°.*Dichloride* : $C_8H_2O_2Cl_2Br_2$. MW, 361. M.p. 80-1°.*Diamide* : $C_8H_6O_2N_2Br_2$. MW, 322. Decomp. about 300°.Marzin, *J. prakt. Chem.*, 1933, **138**, 103.I.G., F.P. 663,791, (*Chem. Abstracts*, 1930, **24**, 628).Schultz, *Ber.*, 1885, **18**, 1762.

1 : 2-Dibromotetradecane

$\text{CH}_3[\text{CH}_2]_{11}\cdot\text{CHBr}\cdot\text{CH}_2\text{Br}$
 $\text{C}_{14}\text{H}_{28}\text{Br}_2$ MW, 356
 M.p. 0° .

Krafft, *Ber.*, 1884, 17, 1372.

1 : 14-Dibromotetradecane

$\text{BrCH}_2\cdot[\text{CH}_2]_{12}\cdot\text{CH}_2\text{Br}$
 $\text{C}_{14}\text{H}_{28}\text{Br}_2$ MW, 356
 Cryst. from EtOH. M.p. 50.4° . B.p. $190-2^\circ/8$ mm., $135^\circ/0.05$ mm.

Chuit, *Helv. Chim. Acta*, 1926, 9, 268, 272.
 Müller, Schütz, *Ber.*, 1938, 71, 691.

1 : 1-Dibromotetramethylmethane (1 : 1-Dibromo-2 : 2-dimethylpropane)

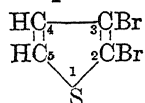
$(\text{CH}_3)_3\text{C}\cdot\text{CHBr}_2$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. $64-5^\circ/43$ mm. D_4^{20} 1.7883, $D_4^{19.9}$ 1.7614.
 n_D^{20} 1.50848.

Poni, *Chem. Zentr.*, 1906, I, 442.

1 : 3-Dibromotetramethylmethane (1 : 3-Dibromo-2 : 2-dimethylpropane)

$\text{BrCH}_2\cdot\text{C}(\text{CH}_3)_2\cdot\text{CH}_2\text{Br}$
 $\text{C}_5\text{H}_{10}\text{Br}_2$ MW, 230
 B.p. $185-90^\circ$ decomp., $80-2^\circ/26$ mm., $77^\circ/19$ mm., $64-9^\circ/11$ mm. D_4^{20} 1.7052, $D_4^{20.3}$ 1.6766.
 n_D^{20} 1.50903. Slowly hyd. by boiling Na_2CO_3 . Aq.
 Owen, Ramage, Simonsen, *J. Chem. Soc.*, 1938, 1213.
 Komppa, Sevón, *Chem. Abstracts*, 1933, 27, 3914.
 Franke, *Monatsh.*, 1913, 34, 1896.
 Poni, *Chem. Zentr.*, 1906, I, 442.

2 : 3-Dibromothiophene



$\text{C}_4\text{H}_2\text{Br}_2\text{S}$ MW, 242
 M.p. -17.5° . B.p. $218.6-19.6^\circ$. $n_D^{22.8}$ 1.63039.
 5-Chloromercuri deriv.: cryst. from ethyl benzoate. M.p. $257-9^\circ$.

Steinkopf, Köhler, *Ann.*, 1937, 532, 281.

2 : 4-Dibromothiophene.

M.p. -30 to -25° . B.p. 210° .

Steinkopf, Jacob, Penz, *Ann.*, 1934, 512, 156.

2 : 5-Dibromothiophene.

B.p. $210.5-211^\circ$ corr. D_{23}^{23} 2.147. Volatile in steam.

Meyer, *Ber.*, 1883, 16, 1469.

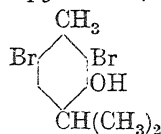
3 : 4-Dibromothiophene.

M.p. 4.5° . B.p. $221-2^\circ$.

Steinkopf, Jacob, Penz, *Ann.*, 1934, 512, 151.

Dict. of Org. Comp.—II.

2 : 6-Dibromothymol (2 : 6-Dibromo-3-hydroxy-1-methyl-4-isopropylbenzene)

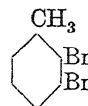


$\text{C}_{10}\text{H}_{12}\text{OBr}_2$ MW, 308
 F.p. -13° . M.p. $3.5-4^\circ$. B.p. $188^\circ/34$ mm., $160-1^\circ/16$ mm. D_4^{25} 1.6588. Sol. alkalis.
 3-Acetyl: m.p. $54-5^\circ$.
 3-Benzoyl: m.p. $88-90^\circ$.

Dahmer, *Ann.*, 1904, 333, 354.

Jost, Richter, *Ber.*, 1923, 56, 119.

2 : 3-Dibromotoluene



$\text{C}_7\text{H}_6\text{Br}_2$ MW, 250
 M.p. $30-1^\circ$. Hot dil. $\text{HNO}_3 \rightarrow$ 2 : 3-dibromobenzoic acid.

Vecchiotti, Copertini, *Gazz. chim. ital.*, 1929, 59, 525.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 504.

Shoosmith, Slater, *J. Chem. Soc.*, 1926, 214.

2 : 4-Dibromotoluene.

F.p. below -20° . $\text{HNO}_3 \rightarrow$ 2 : 4-dibromobenzoic acid.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 504.

2 : 5-Dibromotoluene.

F.p. below -20° . B.p. 236° . D^{19} 1.8127.
 Hot dil. $\text{HNO}_3 \rightarrow$ 2 : 5-dibromobenzoic acid.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 505.

2 : 6-Dibromotoluene.

Cryst. M.p. $5-6^\circ$. B.p. 246° , $122^\circ/23$ mm. D^{22} 1.812.

Blanksma, *Chem. Zentr.*, 1913, I, 393.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 505.

3 : 4-Dibromotoluene.

F.p. below -20° . B.p. $240-1^\circ$. D^{19} 1.812.
 CrO_3 in AcOH \rightarrow 3 : 4-dibromobenzoic acid.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1916, 38, 2548.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 505.

3 : 5-Dibromotoluene.

Needles. M.p. 39° . B.p. 246° . CrO_3 in AcOH \rightarrow 3 : 5-dibromobenzoic acid.

Neville, Winther, *Ber.*, 1880, 13, 966.

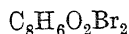
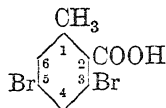
Cohen, Dutt, *J. Chem. Soc.*, 1914, 105, 505.

ω -Dibromotoluene.

See Benzylidene bromide.

Dibromotoluene.

See also Bromobenzyl bromide.

3 : 5-Dibromo-*o*-toluic Acid

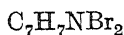
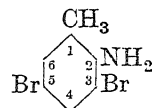
MW, 294

Needles. M.p. 157°. Sol. EtOH, Et₂O, CHCl₃, hot H₂O.Amide : $C_8H_7ONBr_2$. MW, 293. M.p. 198°.Nitrile : $C_8H_5NBr_2$. MW, 275. Needles. M.p. 86°. Sublimes. Volatile in steam.Claus, Beck, *Ann.*, 1892, 269, 213.4 : 5-Dibromo-*o*-toluic Acid.Needles from EtOH.Aq. M.p. 210°. Sol. EtOH, Et₂O, CHCl₃, hot H₂O. Sublimes.Bruck, *Ber.*, 1901, 34, 2747.4 : 6-Dibromo-*m*-toluic Acid.

Needles from EtOH.Aq. M.p. 185-6° (174°). Sol. hot EtOH.

Me ester : $C_9H_8O_2Br_2$. MW, 308. M.p. 43°. B.p. 203-6°.Amide : $C_8H_7ONBr_2$. MW, 293. M.p. 188°.Eckert, Seidel, *J. prakt. Chem.*, 1921, 102, 341.2 : 5-Dibromo-*p*-toluic Acid.Needles from EtOH. M.p. 200°. Sol. EtOH, Et₂O. Spar. sol. CHCl₃, hot H₂O.Et ester : $C_{10}H_{10}O_2Br_2$. MW, 322. Needles. M.p. 49°.Chloride : $C_8H_5OClBr_2$. MW, 312.5. Needles. M.p. 60°.Marzin, *J. prakt. Chem.*, 1933, 138, 103.Fileti, Crosa, *Gazz. chim. ital.*, 1888, 18, 308.2 : 6-Dibromo-*p*-toluic Acid.Needles from EtOH. M.p. 235-6°. Sol. EtOH, Et₂O, CHCl₃.Me ester : $C_9H_8O_2Br_2$. MW, 308. M.p. 48°.

Et ester : needles. M.p. 80°.

Chloride : needles from Et₂O. M.p. 80°.Amide : $C_8H_7ONBr_2$. MW, 293. Needles from Et₂O. M.p. 117°.Nitrile : $C_8H_5NBr_2$. MW, 275. Needles from EtOH. M.p. 49°. Sol. Et₂O, CHCl₃, hot H₂O. Volatile in steam.Claus, Seibert, *Ann.*, 1891, 265, 378.3 : 5-Dibromo-*p*-toluic Acid.Needles. M.p. 182°. Sol. EtOH, Et₂O, CHCl₃. Sublimes. Non-volatile in steam.Amide : leaflets. M.p. 148°. Sol. EtOH, Et₂O, CHCl₃.Nitrile : needles. M.p. 156°. Sol. Et₂O, CHCl₃, C₆H₆. Volatile in steam.Claus, Herbabny, *Ann.*, 1891, 265, 377.3 : 5-Dibromo-*o*-toluidine

MW, 265

Needles. M.p. 50°. Sol. EtOH. Volatile in steam. Forms add. comps. with metallic salts.

N-Acetyl : 3 : 5-dibromo-*o*-acet-toluidide. M.p. 205°.

N-Diacetyl : m.p. 88°.

 B_2HgCl_2 : colourless needles. M.p. 120°. B_2ZnCl_2 : m.p. 211°.Bureš, *Chem. Abstracts*, 1928, 22, 63.Fries, *Ann.*, 1906, 346, 165.Claus, Herbabny, *Ann.*, 1891, 265, 377.3 : 6-Dibromo-*o*-toluidine.

Cryst. from EtOH. M.p. 56-7°.

Cohen, Dutt, *J. Chem. Soc.*, 1914, 105 513.4 : 5-Dibromo-*o*-toluidine.

Leaflets. M.p. 97-8°. Sol. EtOH.

Nevile, Winther, *Ber.*, 1880, 13, 970.5 : 6-Dibromo-*o*-toluidine.

Needles from EtOH. M.p. 44-5°.

 $BHCl$: m.p. 170-1°.N-Acetyl : 5 : 6-dibromo-*o*-acet-toluidide. M.p. 198-9°.Verda, *Gazz. chim. ital.*, 1902, 32, ii, 20.Vecchiotti, Copertini, *Gazz. chim. ital.*, 1929, 59, 525.2 : 5-Dibromo-*m*-toluidine.

Needles. M.p. 73°.

N-Acetyl : 2 : 5-dibromo-*m*-acet-toluidide. M.p. 144-5°.Nevile, Winther, *Ber.*, 1880, 13, 962.2 : 6-Dibromo-*m*-toluidine.

M.p. 66.5-67°.

N-Acetyl : 2 : 6-dibromo-*m*-acet-toluidide. M.p. 117-28°.Olivier, *Rec. trav. chim.*, 1925, 44, 1109.4 : 5-Dibromo-*m*-toluidine.

Needles or prisms. M.p. 59°.

N-Acetyl : 4 : 5-dibromo-*m*-acet-toluidide. M.p. 162-3°.Nevile, Winther, *Ber.*, 1880, 13, 962.4 : 6-Dibromo-*m*-toluidine.

Needles. M.p. 75°.

N-Acetyl : 4 : 6-dibromo-*m*-acet-toluidide. M.p. 168° (171.5-2.5°).Nevile, Winther, *Ber.*, 1880, 13, 962.5 : 6-Dibromo-*m*-toluidine.

M.p. 86.4°.

N-Acetyl : 5 : 6-dibromo-*m*-acet-toluidide. M.p. 204-5°.Nevile, Winther, *Ber.*, 1880, 13, 962.

2 : 5-Dibromo-*p*-toluidine.

Prisms or leaflets. M.p. 85°. Sol. EtOH.

Neville, Winther, *Ber.*, 1880, 13, 962.**2 : 6-Dibromo-*p*-toluidine.**

Cryst. from EtOH.Aq. M.p. 90-1°.

Neville, Winther, *Ber.*, 1880, 13, 973.Qvist *et al.*, *Chem. Abstracts*, 1942, 36, 5790.**3 : 5-Dibromo-*p*-toluidine.**Needles from EtOH or Et₂O. M.p. 79° (73°).

Sublimes. Volatile in steam.

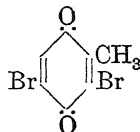
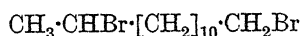
N-Acetyl : 3 : 5-dibromo-*p*-acet-toluidide.

Flat prisms. M.p. 200° (183°).

N-Diacetyl : m.p. 101.5°.

Fries, *Ann.*, 1906, 346, 166.**ω-Dibromotolunitrile.**

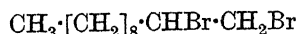
See Cyanobenzylidene bromide.

3 : 5-Dibromo-*p*-toluquinone (3 : 5-Dibromo-2-methyl-1 : 4-benzoquinone)C₇H₄O₂Br₂ MW, 280Golden-yellow cryst. M.p. 117°. Sublimes at 80°. Sol. EtOH, Et₂O, CHCl₃. Readily volatile in steam.Claus, Dreher, *J. prakt. Chem.*, 1889, 39, 370.Raiford, *Am. Chem. J.*, 1911, 46, 430.**1 : 12-Dibromotridecane**C₁₃H₂₆Br₂ MW, 342B.p. 185°/8 mm. D₄¹⁵ 1.217.Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1927, 10, 120.**1 : 13-Dibromotridecane**C₁₃H₂₆Br₂ MW, 342M.p. 8-10°. B.p. 188-92°/13 mm., 185-7°/9 mm. D₄¹⁵ 1.276.Chuit, *Helv. Chim. Acta*, 1926, 9, 271.Müller, *Ber.*, 1934, 67, 297.**Dibromotrinitroanisole.**

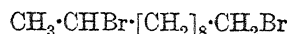
See under Dibromopicric Acid.

Dibromotrinitrophenol.

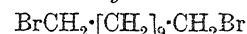
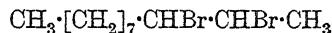
See Dibromopicric Acid.

1 : 2-Dibromo-undecane (1 : 2-Dibromohendecane)C₁₁H₂₂Br₂ MW, 314

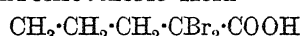
B.p. 161°/18 mm.

Jeffreys, *Am. Chem. J.*, 1899, 22, 40.**1 : 10-Dibromo-undecane (1 : 10-Dibromohendecane)**C₁₁H₂₂Br₂ MW, 314

B.p. 160-70°/8 mm.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, 9, 1076.**1 : 11-Dibromo-undecane (1 : 11-Dibromohendecane, undecamethylene bromide)**C₁₁H₂₂Br₂ MW, 314M.p. -10.6°. B.p. 170-5°/15 mm. (179°/12 mm.). D₄¹⁵ 1.332.Chuit, *Helv. Chim. Acta*, 1926, 9, 267.Braun, Danziger, *Ber.*, 1912, 45, 1977.**2 : 3-Dibromo-undecane (2 : 3-Dibromohendecane)**C₁₁H₂₂Br₂ MW, 314

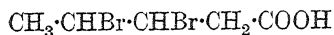
B.p. 145-6°/9 mm.

Mannich, *Ber.*, 1902, 35, 2145.**1 : 1-Dibromovaleric Acid**C₅H₈O₂Br₂ MW, 260

B.p. 118-128°/10 mm. Loses HBr readily.

Favorskiĭ, Mokhnach, *Chem. Abstracts*, 1936, 30, 3405.**1 : 2-Dibromovaleric Acid**C₅H₈O₂Br₂ MW, 260Prisms from ligroin. M.p. 57°. B.p. 104-6°/13 mm. Very sol. C₆H₆, CS₂.Et ester : C₇H₁₂O₂Br₂. MW, 288. B.p. 117-7.5°/14 mm. D₄¹⁵ 1.6199. n_D¹⁵ 1.49527.Amide : C₅H₉ONBr₂. MW, 259. Needles from EtOH.Aq. M.p. 168° decomp.Nitrile : C₅H₇NBr₂. MW, 241. B.p. 110-111°/10 mm. D₄^{17.6} 1.7598. n_D^{17.6} 1.51766.Schjånberg, *Ber.*, 1938, 71, 572.Auwers, Meissner, Seydel, Wissebach, *Ann.*, 1923, 432, 65.**1 : 4-Dibromovaleric Acid**C₅H₈O₂Br₂ MW, 260B.p. 171-4°/13-15 mm., 150-2°/5 mm. D₄²⁵ 1.8629. n_D²⁵ 1.5347.Et ester : b.p. 133-5°/14 mm. D₄²⁵ 1.6289. n_D²⁵ 1.4947.Chloride : C₅H₇OClBr₂. MW, 278.5. B.p. 138-45°/15 mm.Frankel, Kuk, *Biochem. Z.*, 1930, 226, 221.Merchant, Wickert, Marvel, *J. Am. Chem. Soc.*, 1927, 49, 1828.

2 : 3-Dibromovaleric Acid


 $\text{C}_5\text{H}_8\text{O}_2\text{Br}_2$ MW, 260

Prisms from ligroin. M.p. 65–65.5°.

Schjånberg, *Ber.*, 1938, 71, 571.

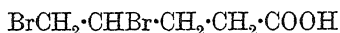
3 : 3-Dibromovaleric Acid


 $\text{C}_5\text{H}_8\text{O}_2\text{Br}_2$ MW, 260

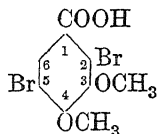
Plates from pet. ether. M.p. 52–3°.

Perkin, Simonsen, *J. Chem. Soc.*, 1907, 91, 828.

3 : 4-Dibromovaleric Acid


 $\text{C}_5\text{H}_8\text{O}_2\text{Br}_2$ MW, 260
Leaflets from CS_2 . M.p. 57–8°. Very sol. CHCl_3 , C_6H_6 , CS_2 .Schjånberg, *Ber.*, 1938, 71, 569.

2 : 5-Dibromoveratric Acid


 $\text{C}_9\text{H}_8\text{O}_4\text{Br}_2$ MW, 340

Needles from EtOH.Aq. M.p. 186–7°.

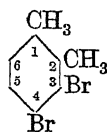
Raiford, Perry, *J. Org. Chem.*, 1942, 7, 354.

2 : 6-Dibromoveratric Acid.

Granules from EtOH. M.p. 122–3°.

Raiford, Perry, *J. Org. Chem.*, 1942, 7, 354.

5 : 6-Dibromoveratric Acid.

Needles from ligroin. M.p. 183–4°. Sol. EtOH, AcOH, ligroin. Spar. sol. H_2O , Et_2O .Boyen, *Ber.*, 1888, 21, 1396.Raiford, Perry, *J. Org. Chem.*, 1942, 7, 354.3 : 4-Dibromo-*o*-xylene
 $\text{C}_8\text{H}_8\text{Br}_2$ MW, 264
M.p. 7°. B.p. 277°. Sol. EtOH. D_{15}^{25} 1.784.Jacobsen, *Ber.*, 1884, 17, 2377.4 : 5-Dibromo-*o*-xylene.

Leaflets from hot EtOH. M.p. 88°. B.p. 278°. Sol. hot EtOH, hot AcOH. Sublimes.

Mills, Nixon, *J. Chem. Soc.*, 1930, 2524.Jacobsen, *Ber.*, 1884, 17, 2377.2 : 4-Dibromo-*m*-xylene.

M.p. –8°. B.p. 269°.

Jacobsen, *Ber.*, 1888, 21, 2824.2 : 5-Dibromo-*m*-xylene.

M.p. 28°.

Blanksma, *Rec. trav. chim.*, 1906, 25, 176.4 : 5-Dibromo-*m*-xylene.

M.p. 11°. B.p. 256°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 360.Bureš, Mandel-Borgmannová, *Chem. Abstracts*, 1928, 22, 4503.4 : 6-Dibromo-*m*-xylene.

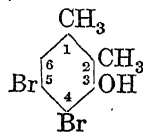
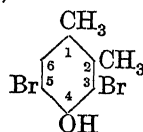
M.p. 72° (68°). B.p. 255–6°. Sol. hot EtOH.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1916, 38, 2550.Auwers, Traun, *Ber.*, 1899, 32, 3312.2 : 5-Dibromo-*p*-xylene.

Monoclinic cryst. M.p. 75°. B.p. 261°, 150°/21 mm.

Marzin, *J. prakt. Chem.*, 1933, 138, 103.Jannasch, *Ber.*, 1877, 10, 1357.Datta, Chatterjee, *J. Am. Chem. Soc.*, 1916, 38, 2550.2 : 6-Dibromo-*p*-xylene.Pearly plates. M.p. 36°. Sol. Et_2O , C_6H_6 . Spar. sol. EtOH.Blanksma, *Chem. Abstracts*, 1913, 7, 1493.Bureš, Meškan, *Chem. Zentr.*, 1937, II, 3743. ω -Dibromoxylene.

See Xylylene dibromide.

4 : 5-Dibromo-*o*-3-xyleneol (4 : 5-Dibromo-3-hydroxy-*o*-xylene)
 $\text{C}_8\text{H}_8\text{OBr}_2$ MW, 280
Needles from EtOH.Aq. M.p. 97°. Sol. Et_2O , C_6H_6 , Me_2CO , CHCl_3 .*Acetyl*: prisms from pet. ether. M.p. 78°.*Benzoyl*: cryst. from EtOH. M.p. 153°.Crossley, Smith, *J. Chem. Soc.*, 1913, 103, 991.3 : 5-Dibromo-*o*-4-xyleneol (3 : 5-Dibromo-4-hydroxy-*o*-xylene)
 $\text{C}_8\text{H}_8\text{OBr}_2$

MW, 280

Needles from pet. ether. M.p. 40°. B.p. about 300°. Sol. most ord. org. solvents.
Benzoyl : m.p. 125-6°.

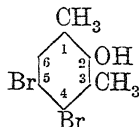
Auwers, *Ann.*, 1906, 344, 172.

3 : 6-Dibromo-*o*-4-xenol.

Cryst. from AcOH. M.p. 106°. Sol. EtOH. Insol. H₂O. Part decomp. by H₂O.

Datta, Bhounik, *J. Am. Chem. Soc.*, 1921, 43, 307.

4 : 5-Dibromo-*m*-2-xenol (4 : 5-Dibromo-2-hydroxy-*m*-xylene, 4 : 5-dibromo-vicinal-*m*-xenol)



C₈H₈OBr₂ MW, 280
Needles from pet. ether. M.p. 86-7°. Sol. most ord. org. solvents.

Auwers, Markovits, *Ber.*, 1908, 41, 2336.

4 : 6-Dibromo-*m*-2-xenol.

Needles from ligroin. M.p. 133°. Sol. most ord. org. solvents.

Acetyl : leaflets. M.p. 80°.

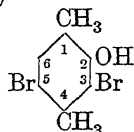
Auwers, Traun, *Ber.*, 1899, 32, 3314.

2 : 4-Dibromo-*m*-5-xenol (2 : 4-Dibromo-5-hydroxy-*m*-xylene).

Cryst. from pet. ether. M.p. 73-4°. Sol. ord. org. solvents.

Auwers, Borsche, *Ber.*, 1915, 48, 1716.

3 : 5-Dibromo-*p*-xenol (3 : 5-Dibromo-2-hydroxy-*p*-xylene)



C₈H₈OBr₂ MW, 280
Needles from AcOH. M.p. 82°. Sol. most ord. org. solvents.

Me ether : m.p. 39-40°.

Auwers, Erckientz, *Ann.*, 1898, 302, 114.
Bureš, Meškan, *Chem. Zentr.*, 1937, II, 3743.

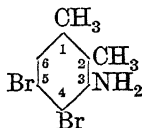
3 : 6-Dibromo-*p*-xenol.

Needles from ligroin. M.p. 91°. Sol. most ord. org. solvents.

Benzoyl : m.p. 133-5°.

Auwers, Baum, *Ber.*, 1896, 29, 2345.

4 : 5-Dibromo-*o*-3-xyldine (4 : 5-Dibromo-3-amino-*o*-xylene)



C₈H₉NBr₂

MW, 279

Needles from EtOH. M.p. 103°. Sol. EtOH, AcOH, Et₂O.

Töhl, *Ber.*, 1885, 18, 2562.

4 : 6-Dibromo-*o*-3-xyldine.

Needles from EtOH-Et₂O. M.p. 56°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 353.

3 : 5-Dibromo-*o*-4-xyldine (3 : 5-Dibromo-4-amino-*o*-xylene).

Needles from EtOH-Et₂O. M.p. 63°.

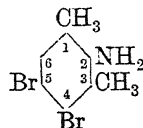
Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 353.

3 : 6-Dibromo-*o*-4-xyldine.

M.p. 65°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 353.

4 : 5-Dibromo-*m*-2-xyldine (4 : 5-Dibromo-2-amino-*m*-xylene, 4 : 5-dibromo-vicinal-*m*-xyldine)



C₈H₉NBr₂

MW, 279

M.p. 51°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 361.

4 : 6-Dibromo-*m*-2-xyldine.

Needles from EtOH. M.p. 100° (120°). Sol. C₆H₆, Et₂O, hot EtOH. Mod. sol. AcOH, ligroin.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 356.

Auwers, Traun, *Ber.*, 1899, 32, 3313.

2 : 6-Dibromo-*m*-4-xyldine (2 : 6-Dibromo-4-amino-*m*-xylene).

Needles from EtOH. M.p. 65°. Spar. sol. hot H₂O.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 356.

5 : 6-Dibromo-*m*-4-xyldine.

Needles from pet. ether. M.p. 40° (36°). Sol. ord. org. solvents.

N-Acetyl : needles. M.p. 192°.

N-Diacetyl : prisms. M.p. 183°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 352.

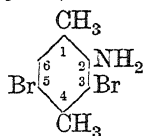
Fries, *Ann.*, 1906, 346, 168.

2 : 4-Dibromo-*m*-5-xyldine (2 : 4-Dibromo-5-amino-*m*-xylene).

M.p. 81-2°.

I.G., F.P. 663,683, (*Chem. Abstracts*, 1930, 24, 730).

3 : 5-Dibromo-*p*-xylidine (3 : 5-Dibromo-2-amino-*p*-xylene)



$C_8H_9NBr_2$ MW, 279

Needles from ligroin. M.p. 67–8°. Sol. EtOH, Et₂O, AcOH, ligroin. Volatile in steam.

N-Acetyl : m.p. 163° (193°).

N-Diacetyl : m.p. 56°.

N-Benzoyl : cryst. from EtOH–Et₂O. M.p. 192°.

Jaeger, Blanksma, *Rec. trav. chim.*, 1906, 25, 362.

Bureš, Smetana, *Chem. Abstracts*, 1930, 24, 5732.

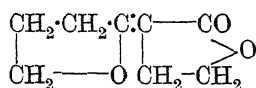
Bureš, Meškan, *Chem. Zentr.*, 1937, II, 3743.

3 : 6-Dibromo-*p*-xylidine.

Needles from EtOH. M.p. 91–2°. Sol. EtOH, Et₂O.

Auwers, Baum, *Ber.*, 1896, 29, 2344.

Dibutylactone



$C_8H_{10}O_3$ MW, 154

Colourless cryst. from Et₂O. M.p. 86.5°. Sol. H₂O, EtOH, C₆H₆.

Fittig, *Ann.*, 1892, 267, 194.

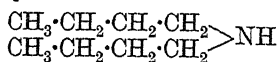
Di-*sec*.-butyl.

See 3 : 4-Dimethyl-*n*-hexane.

Di-*tert*.-butyl.

See 2 : 2 : 3 : 3-Tetramethylbutane.

Di-*n*-butylamine



$C_8H_{19}N$ MW, 129

B.p. 159°. Sol. H₂O, EtOH.

N-Benzenesulphonyl : b.p. 211°/17 mm.

N-*p*-Bromobenzenesulphonyl : m.p. 60.5°.

Phenylureido : m.p. 85.4°.

Phenylthioureido : m.p. 85.5°.

α-Naphthylureido : m.p. 73.6°.

B₂H₄·AuCl₄ : golden needles. M.p. 170°.

Picrate : m.p. 59° (98–9°).

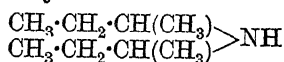
Werner, *J. Chem. Soc.*, 1919, 115, 1010.

Vliet, *J. Am. Chem. Soc.*, 1924, 46, 1307.

Skita, Keil, *Monatsh.*, 1929, 53–54, 759.

Suggitt, Wright, *J. Am. Chem. Soc.*, 1947, 69, 2073.

Di-*sec*.-butylamine



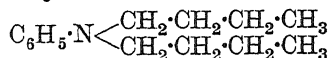
$C_8H_{19}N$ MW, 129

B.p. 132°. Sol. H₂O. D₄⁰ 0.783.

Oxalate : m.p. 104°.

Sabatier, Mailhe, *Ann. chim.*, 1909, 16, 104.

Di-*n*-butylaniline



$C_{14}H_{23}N$ MW, 205

B.p. 271°, 148.5°/4 mm. Sol. EtOH, Et₂O.

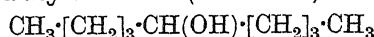
Insol. H₂O.

Picrate : m.p. 125°.

Reilly, Hickinbottom, *J. Chem. Soc.*, 1918, 113, 99.

Slotta, Franke, *Ber.*, 1930, 63, 687.

Di-*n*-butylcarbinol (Nonanol-5)



$C_9H_{20}O$ MW, 144

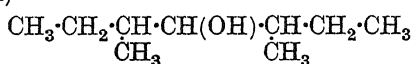
B.p. 194°, 97°/20 mm. Insol. H₂O. D₁₈⁰ 0.823.

n_D²⁰ 1.4289.

Vavon, Ivanoff, *Compt. rend.*, 1923, 177, 453.

Coleman, Craig, *Organic Syntheses*, 1935, XV, 11.

Di-*sec*.-butylcarbinol (3 : 5-Dimethylheptanol-4)

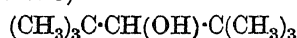


$C_9H_{20}O$ MW, 144

B.p. 171°. D₁₈⁰ 0.836. n_D¹⁸ 1.4330.

Vavon, Ivanoff, *Compt. rend.*, 1923, 177, 453.

Di-*tert*.-butylcarbinol (2 : 2 : 4 : 4-Tetramethylpentanol-3)



$C_9H_{20}O$ MW, 144

Cryst. with pepper-like odour. M.p. 50°.

B.p. 165–6°, 117–8°/166 mm.

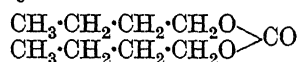
Phenylurethane : m.p. 118–19°.

Haller, Bauer, *Ann. chim.*, 1913, 29, 320.

Conant, Blatt, *J. Am. Chem. Soc.*, 1929, 51, 1236.

Whitmore, Stahly, *J. Am. Chem. Soc.*, 1933, 55, 4156.

Di-*n*-butyl carbonate

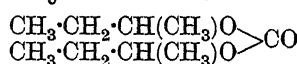


$C_9H_{18}O_3$ MW, 174

B.p. 207°/740 mm. D₄²⁰ 0.9238. n_D²⁰ 1.4117.

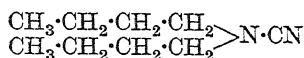
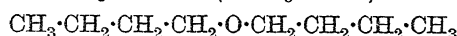
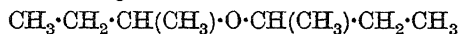
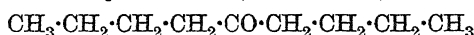
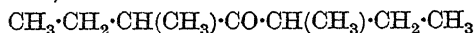
Lieben, Rossi, *Ann.*, 1873, 165, 112.

Di-*sec*.-butyl carbonate

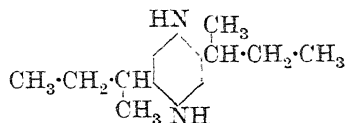
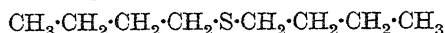


$C_9H_{18}O$ MW, 174

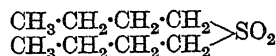
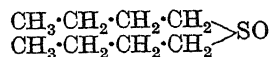
B.p. 173–80°.

Bayer, D.R.P. 120,864, (*Chem. Zentr.*, 1901, I, 1302).Di-*n*-butylcyanamide $\text{C}_9\text{H}_{18}\text{N}_2$ MW, 154B.p. 187–91°/190 mm., 147–51°/35 mm. Sol. ord. org. solvents. Insol. H_2O .Vliet, *J. Am. Chem. Soc.*, 1924, **46**, 1306.Di-*n*-butyl Ether (*Dibutyl oxide*) $\text{C}_8\text{H}_{18}\text{O}$ MW, 130M.p. –98°. B.p. 142°. D_4^{20} 0.7841.Batafsche Petroleum Maatschappij, B.P. 332,756, (*Chem. Abstracts*, 1931, **25**, 302).Senderens, *Compt. rend.*, 1925, **181**, 698.Hennion, Hinton, Nieuwland, *Chem. Abstracts*, 1933, **27**, 5716.Di-*sec*.-butyl Ether $\text{C}_8\text{H}_{18}\text{O}$ MW, 130B.p. 102–6°/750 mm. (121°). D^{21}_4 0.756. n_D^{25} 1.393.Senderens, *Compt. rend.*, 1925, **181**, 698.Di-*n*-butyl Ketone (*Nonanone-5*) $\text{C}_9\text{H}_{18}\text{O}$ MW, 142B.p. 186–7° (181–2°), 88°/22 mm. D^{15}_4 0.818. n_D^{15} 1.421.*Oxime*: m.p. –6.7°. B.p. 124.5°/15 mm.*Semicarbazone*: plates. M.p. 90°.Ivanoff, *Bull. soc. chim.*, 1928, **43**, 441.Vavon, Ivanoff, *Compt. rend.*, 1923, **177**, 453.Braun, Anton, Fischer, Keller, Manz, *Ber.*, 1934, **67**, 221.Briese, McElvain, *J. Am. Chem. Soc.*, 1933, **55**, 1697.Di-*sec*.-butyl Ketone (3:5-Dimethylheptanone-4) $\text{C}_9\text{H}_{18}\text{O}$ MW, 142B.p. 162° (170–3°). D^{14}_4 0.826. n_D^{14} 1.4193.*Semicarbazone*: m.p. 83–4°.Ivanoff, *Bull. soc. chim.*, 1928, **43**, 447.Vavon, Ivanoff, *Compt. rend.*, 1923, **177**, 453.Nasarov, *Ber.*, 1937, **70**, 598.Di-*tert*.-butyl Ketone.

See Pivalone.

Di-*sec*.-butylpiperazine $\text{C}_{12}\text{H}_{26}\text{N}_2$ MW, 198*B,2HCl*: cryst. from $\text{MeOH-Et}_2\text{O}$. Darkens at 260°. $[\alpha]_D^{20}$ 0.6°.*B,2HNO_3*: m.p. 227° decomp.*Dipicrate*: darkens at 220–8°. M.p. 238–40° decomp.*Dibenzoyl*: sinters at 178°. M.p. 188–90° decomp. $[\alpha]_D^{25}$ –7.5° in EtOH .*Dinitroso deriv.*: m.p. 128° decomp.Dutcher, *J. Biol. Chem.*, 1947, **171**, 341.Di-*n*-butyl sulphide $\text{C}_8\text{H}_{18}\text{S}$ MW, 146

Exists in two forms.

(α). B.p. 182°. D_4^{15} 0.8386. Insol. H_2O .(β). B.p. 190–230° decomp. Sol. ord. org. solvents. Insol. H_2O . $2\text{C}_8\text{H}_{18}\text{S}, \text{PtCl}_2$: 3 forms. (α). M.p. 40°. (β). M.p. 77°. (γ). M.p. 17–20°. $2\text{C}_8\text{H}_{18}\text{S}, \text{PtBr}_2$: m.p. 65°. $2\text{C}_8\text{H}_{18}\text{S}, \text{PtI}_2$: m.p. 67°. $2\text{C}_8\text{H}_{18}\text{S}, \text{Pt}(\text{NO}_2)_2$: m.p. 193°. $2\text{C}_8\text{H}_{18}\text{S}, \text{PtCl}_4$: m.p. 84°.Hinsberg, *Ber.*, 1929, **62**, 2168.Di-*n*-butyl sulphone $\text{C}_8\text{H}_{18}\text{O}_2\text{S}$ MW, 178Plates from H_2O . M.p. 44°. Resolidifies at 32–5°.Wood, Travers, *J. Am. Chem. Soc.*, 1928, **50**, 1226.Hinsberg, *Ber.*, 1929, **62**, 2168.Bert, *Compt. rend.*, 1924, **178**, 1826.Di-*n*-butyl sulfoxide $\text{C}_8\text{H}_{18}\text{OS}$ MW, 162Needles. M.p. 32°. Insol. H_2O .Grabowsky, *Ann.*, 1875, **175**, 349.Bert, *Compt. rend.*, 1924, **178**, 1826.sym.-Di-*n*-butylthiourea $\text{C}_9\text{H}_{20}\text{N}_2\text{S}$ MW, 188

Needles from EtOH. M.p. 78° (64-5°).

Dyson, Hunter, *Rec. trav. chim.*, 1926, 45, 423.

Schmidt, Hitzler, Lahde, *Ber.*, 1938, 71, 1935.

sym.-Di-n-butylurea

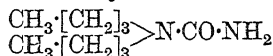


$\text{C}_9\text{H}_{20}\text{ON}_2$ MW, 172

M.p. 71°.

Boehmer, *Rec. trav. chim.*, 1936, 55, 390.

unsym.-Di-n-butylurea



$\text{C}_9\text{H}_{20}\text{ON}_2$ MW, 172

Cryst. M.p. 149-50°. B.p. 118-9°/2-3 mm. Hygroscopic.

Picrate: m.p. 82-3°.

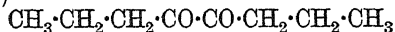
Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1798.

Werner, *J. Chem. Soc.*, 1919, 115, 1014.

Dibutyryn.

See under *n*-Butyric Acid.

Dibutyryl (*Octandione-4 : 5, di-n-propyl diketone*)



$\text{C}_8\text{H}_{14}\text{O}_2$ MW, 142

Yellow oil. B.p. 168°, 60°/12 mm. D_4^{20} 0.934.

Monoxime: b.p. 117-20°/12 mm.

Dioxime: needles. M.p. 186-7° (175°). Sublimes.

Ponzio, *J. prakt. Chem.*, 1901, 63, 367.

Dicarbamide.

See *p*-Urazine.

Dicarbamylaniline.

See *ms*.-Phenylbiuret.

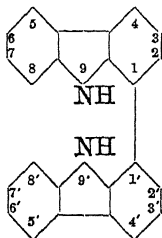
Dicarbamylhydrazine.

See Biurea.

Dicarbamylurea.

See Triuret.

1 : 1'-Dicarbazyl



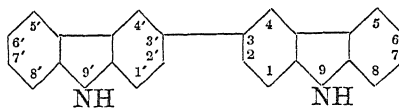
$\text{C}_{24}\text{H}_{16}\text{N}_2$ MW, 332

Needles from C_6H_6 -ligroin. M.p. 205-7°. Sol. MeOH, EtOH, Me_2CO , AcOEt. Sol. conc. H_2SO_4 with pale green col.

Macrae, Tucker, *J. Chem. Soc.*, 1933, 1522.

Dunlop, Macrae, Tucker, *J. Chem. Soc.*, 1934, 1672.

3 : 3'-Dicarbazyl



$\text{C}_{24}\text{H}_{16}\text{N}_2$

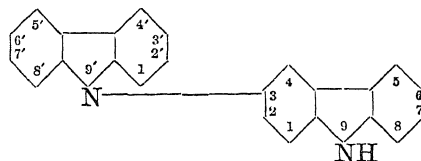
MW, 332

Cryst. from benzaldehyde. M.p. above 350°. Sol. Me_2CO , cyclohexanone, Py. Spar. sol. Me_2CO , amyl alcohol, xylene, Ac_2O . Insol. EtOH, CCl_4 , AcOH, C_6H_6 .

9 : 9'-N-Diacetyl: m.p. 247-9°.

Tucker, *J. Chem. Soc.*, 1926, 3033.

3 : 9'-Dicarbazyl



$\text{C}_{24}\text{H}_{16}\text{N}_2$

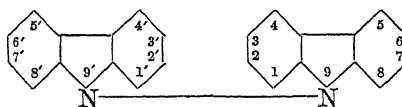
MW, 332

Prisms. M.p. 212-13° corr. Sol. Me_2CO , AcOEt, CHCl_3 , C_6H_6 . Insol. MeOH, EtOH, CCl_4 , ligroin.

9-N-Acetyl: needles from AcOH. M.p. 197°.

Nelmes, Tucker, *J. Chem. Soc.*, 1933, 1525.

9 : 9'-Dicarbazyl (*Bisdiphenylene-hydrazine*)



$\text{C}_{24}\text{H}_{16}\text{N}_2$

MW, 332

Cryst. from C_6H_6 or Me_2CO . M.p. 220°.

McLintock, Tucker, *J. Chem. Soc.*, 1927, 1214.

Dicarbethoxyurea.

See Carbonyl-diurethane.

Dicarboxydiethylamine.

See Iminodipropionic Acid.

Dicarboxydi-isopropylamine.

See 2 : 2'-Iminodibutyric Acid.

Dicarboxydimethylamine.

See Iminodiacetic Acid.

Dicarboxydimethyl disulphide.

See Disulphidoacetic Acid.

Dicarboxydimethyl sulphide.

See Thiodiglycollic Acid.

Di-carboxymethyl Ether.

See Diglycollic Acid.

2 : 6-Di-[carboxymethyl]-pyridine.

See Pyridyl-2 : 6-diacetic Acid.

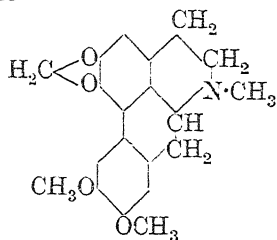
Dicarboxyphenylenediamine.

See Benzene-dicarbamic Acid.

Diccatechol.

See 3 : 4 : 3' : 4'-Tetrahydroxydiphenyl.

Dicentrine

 $C_{20}H_{21}O_4N$

MW, 339

d.-

Alkaloid from roots of *Dicentra formosa*. Prisms from EtOH or AcOH. M.p. 168–9°. Very sol. $CHCl_3$. Sol. hot EtOH, AcOH. Spar. sol. Et_2O . $[\alpha]_D^{20} + 62.7^\circ$ in $CHCl_3$.

B_2HCl : leaflets from $EtOH.Aq.$ M.p. 169°.

Methiodide: leaflets + $1H_2O$ from $EtOH.Aq.$ M.p. anhyd. 224°.

l.-

Prisms from Et_2O . M.p. 169° corr. $[\alpha]_D^{25} - 63.5^\circ$ in $CHCl_3$.

dl.-

Prisms. M.p. 178–9°.

B_2HCl : needles from H_2O . M.p. 263–5° decomp.

Methiodide: plates from EtOH. M.p. 228–9°.

Picrate: orange prisms from EtOH. M.p. 188–9°.

Haworth, Perkin, Rankin, *J. Chem. Soc.*, 1926, 29; 1925, 127, 2018.

Asahina, *Arch. Pharm.*, 1909, 247, 201.

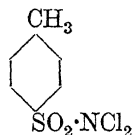
Gadamer, *Arch. Pharm.*, 1911, 249, 701.

Waud, *J. Pharmacol.*, 1936, 58, 332.

Dicetyl.

See Dotriacontane.

Dichloramine-T (N-Dichloro-p-toluenesulphonamide)

 $C_7H_7O_2NCl_2S$

MW, 240

Prisms from $CHCl_3$ -pet. ether. M.p. 83°. As ordinarily obtained is a colourless or slightly yellow powder, m.p. 78–84°. Mod. sol. $CHCl_3$. Prac. insol. H_2O . Antiseptic. Used in solution in chlorinated paraffin wax (*chlorcosane*) and in chlorinated eucalyptol.

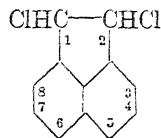
Smith, *Chem. Abstracts*, 1923, 17, 3403 (Review).

Harold, *Chem. Abstracts*, 1928, 22, 1817.

Krauss, Crede, *J. Am. Chem. Soc.*, 1917, 39, 2720.

Chem. Fabrik von Heyden A.-G., D.R.P. 530,984, (*Chem. Zentr.*, 1931, II, 2386).

1 : 2-Dichloroacenaphthene

 $C_{12}H_8Cl_2$

MW, 223

Plates from pet. ether, needles from EtOH. M.p. 115°.

Campbell, *J. Chem. Soc.*, 1915, 107, 919.

5 : 6-Dichloroacenaphthene.

Needles from EtOH. M.p. 169–70°. Sol. $CHCl_3$, CCl_4 , xylene. Spar. sol. EtOH with mauve fluor.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 420T.

Daschewski, Karischin, *Chem. Zentr.*, 1939, I, 2416.

Dichloroacetal.

See under Dichloroacetaldehyde.

Dichloroacetaldehyde

 $CHCl_2 \cdot CHO$ $C_2H_2OCl_2$

MW, 113

B.p. 90–91°. Sol. EtOH. Polymerises on standing or with small quantity HCl. Conc. $H_2SO_4 \rightarrow$ polymer, paradichloroacetaldehyde, m.p. 129–30°. Conc. $HNO_3 \rightarrow$ dichloroacetic acid. Hydroxylamine \rightarrow glyoxime.

Hydrate: $CHCl_2 \cdot CH(OH)_2$. $C_2H_4O_2Cl_2$. MW, 131. M.p. 56–7° (43°). B.p. 97° (118°). Sol. H_2O , Et_2O .

Oxime: b.p. 67–9°/17 mm., 40–44°/2–3 mm.

Di-Me acetal: 2 : 2-dichloro-1 : 1-dimethoxyethane. $CHCl_2 \cdot CH(OC_2H_5)_2$. $C_4H_8O_2Cl_2$. MW, 159. B.p. 166–8°.

Et acetal: 2 : 2-dichloro-1-hydroxy-1-ethoxyethane. $CHCl_2 \cdot CH(OH)(OC_2H_5)$. $C_4H_8O_2Cl_2$. MW, 159. B.p. 110–11°.

Me-Et acetal: 2 : 2-dichloro-1-methoxy-1-ethoxyethane. $CHCl_2 \cdot CH(OC_2H_5)(OC_2H_5)$. $C_5H_{10}O_2Cl_2$. MW, 173. B.p. 173–5°.

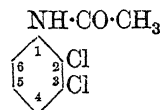
Di-Et acetal: 2 : 2-dichloro-1 : 1-diethoxyethane. $CHCl_2 \cdot CH(OC_2H_5)_2$. $C_6H_{12}O_2Cl_2$. MW, 187. B.p. 183–4°, 67–71°/12 mm. D^{25}_4 1.383.

Missenden, *Chemical Age*, (London), 1922, 7, 78.

Plauson, Vielle, B.P. 156,120, (*Chem. Abstracts*, 1921, 15, 1728).

Kätz, *J. prakt. Chem.*, 1914, 90, 311.

2 : 3-Dichloroacetanilide (N-Acetyl-2 : 3-dichloroaniline)

 $C_8H_7ONCl_2$

MW, 204

Needles from C_6H_6 . M.p. 157° . Mod. sol. EtOH. Spar. sol. Et_2O , C_6H_6 , ligroin.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 218.

2 : 4-Dichloroacetanilide.

Needles. M.p. $143-6^\circ$ ($143-4^\circ$). Sol. EtOH, Et_2O , AcOH. Spar. sol. C_6H_6 , ligroin. D_{20}^{20} 1.499.

Reed, Orton, *J. Chem. Soc.*, 1907, 91, 1553.

2 : 5-Dichloroacetanilide.

Needles from AcOH.Aq. M.p. 133° . Sol. EtOH. Spar. sol. C_6H_6 . Insol. CS_2 , ligroin.

N-Chloro : prisms. M.p. 73° .

Crauw, *Rec. trav. chim.*, 1931, 50, 768.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 215.

2 : 6-Dichloroacetanilide.

Needles from AcOH.Aq. M.p. 175° . Sol. EtOH.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 220.

3 : 4-Dichloroacetanilide.

Needles. M.p. 121° .

N-Chloro : prisms. M.p. 92° .

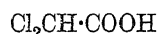
Beilstein, Kurbatow, *Ann.*, 1879, 196, 217.

3 : 5-Dichloroacetanilide.

Needles. M.p. $186-7^\circ$.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 219.

Dichloroacetic Acid



$C_2H_2O_2Cl_2$ MW, 129

M.p. $5-6^\circ$ (F.p. 11°). B.p. 194° , $144^\circ/164$ mm., $125^\circ/70$ mm., $102^\circ/20$ mm. D_4^{20} 1.5634. n_D^{20} 1.4659. $k = 5.14 \times 10^{-2}$ at 25° . $NH_2OH \rightarrow$ isonitrosoacetic acid. The Na, K and Ca salts are sol. H_2O .

Me ester: $C_3H_4O_2Cl_2$. MW, 143. B.p. $143-4^\circ$. Et ester: $C_4H_6O_2Cl_2$. MW, 157. B.p. 158° . D_4^{20} 1.2821. n_D^{20} 1.43860.

Propyl ester: $C_5H_8O_2Cl_2$. MW, 171. B.p. 176° ($167-70^\circ$). D_4^{25} 1.2006. n_D^{25} 1.4360.

n-Butyl ester: $C_6H_{10}O_2Cl_2$. MW, 185. B.p. 184° , $102^\circ/37$ mm.

Isobutyl ester: b.p. $182-4^\circ$.

n-Amyl ester: b.p. $207^\circ/756$ mm., $124^\circ/48$ mm. D_{20}^{20} 1.1455.

sec.-Amyl ester: b.p. $198^\circ/756$ mm., $93^\circ/20$ mm. D_{20}^{20} 1.1210.

tert.-Amyl ester: b.p. $180^\circ/756$ mm. decomp., $93^\circ/30$ mm. D_{20}^{20} 1.1230.

active Amyl ester: $C_7H_{12}O_2Cl_2$. MW, 199. B.p. $200^\circ/721$ mm. D_4^{20} 1.149. n_D^{21} 1.4456. $[\alpha]_D^{20} +3.61^\circ$.

Allyl ester: $C_5H_6O_2Cl_2$. MW, 169. B.p. 175.5° .

Phenyl ester: $C_8H_6O_2Cl_2$. MW, 205. Leaflets. M.p. 33° .

Benzyl ester: $C_9H_8O_2Cl_2$. MW, 219. B.p. $178.5^\circ/50$ mm. D_4^{21} 1.3887. n_D^{19} 1.5288.

Anhydride: $C_4H_2O_3Cl_4$. MW, 240. B.p. $215-16^\circ$ decomp., $140^\circ/35$ mm. D^{24} 1.574.

Fluoride: C_2HOFCl_2 . MW, 131. B.p. $71-2^\circ$. D^{17} 1.4802. n_D^{17} 1.3961.

Chloride: $C_2HOC_2H_3$. MW, 147.5. B.p. $108-11^\circ$.

Amide: $C_2H_3ONCl_2$. MW, 128. M.p. 98° . B.p. $234^\circ/745$ mm. Sol. EtOH, Et_2O , hot H_2O .

Sublimes. Volatile in steam. Nitrile: $C_2HNC_2H_3$. MW, 110. B.p. 113° . $D^{11.5}$ 1.374.

Chattaway, Irving, *J. Chem. Soc.*, 1929, 1042.

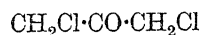
Doughty, Derge, *J. Am. Chem. Soc.*, 1931, 53, 1594 (*Bibl.*).

Liston, Dehn, *J. Am. Chem. Soc.*, 1938, 60, 1264.

Dichloro-acetnaphthalide.

See under Dichloronaphthylamine.

sym.-Dichloroacetone (1 : 3-Dichloroacetone)

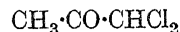


$C_3H_4OCl_2$ MW, 127

Cryst. M.p. 45° . B.p. 173° . Sol. H_2O , EtOH, Et_2O . D_4^{16} 1.3826. n_D^{16} 1.47144.

Conant, Quayle, *Organic Syntheses*, Collective Vol. I, 206.

unsym.-Dichloroacetone (Methyl dichloromethyl ketone, 1 : 1-dichloroacetone)



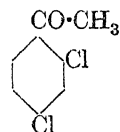
$C_3H_4OCl_2$ MW, 127

B.p. 120° . D_{15}^{18} 1.305. Boiling alk. carbonates \rightarrow acrylic acid.

Semicarbazone: m.p. 163° .

Borsche, Fittig, *Ann.*, 1865, 133, 113.

2 : 4-Dichloroacetophenone (Methyl 2 : 4-dichlorophenyl ketone)



$C_8H_6OCl_2$ MW, 189

M.p. $33-4^\circ$. B.p. $140-50^\circ/15$ mm. $104-5^\circ/5$ mm. n_D^{20} 1.5640.

Oxime: m.p. 148° .

Roberts, Turner, *J. Chem. Soc.*, 1927, 1846.

Leonard, Boyd, *J. Org. Chem.*, 1946, 11, 405.

2 : 5-Dichloroacetophenone.

M.p. 14° . B.p. 251° . Does not form bisulphite comp.

Oxime: m.p. 130° .

Crauw, *Rec. trav. chim.*, 1931, 50, 768.

2 : 6-Dichloroacetophenone.

Cryst. from EtOH. M.p. 44°.

Lock, Böck, *Ber.*, 1937, 70, 921.**3 : 4-Dichloroacetophenone.**

Needles from pet. ether. M.p. 76°. B.p. 135°/12 mm.

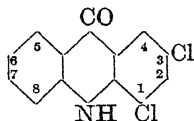
Roberts, Turner, *J. Chem. Soc.*, 1927, 1855.Florence, *Chem. Zentr.*, 1933, II, 2123.**3 : 5-Dichloroacetophenone.**

M.p. 26°. B.p. 134-6°/17 mm.

Oxime: m.p. 138°.Lock, Böck, *Ber.*, 1937, 70, 922.**ω-Dichloroacetophenone.***See* Phenacylidene chloride.**Dichloro-acet-toluidine.***See under* Dichlorotoluidine.**Dichloroacetylene** C_2Cl_2

MW, 95

M.p. -66 to -64.2°. B.p. 32-3°/748 mm., 29°/743 mm. Explodes on heating strongly.

Ott, Ottmeyer, Packendorff, *Ber.*, 1930, 63, 1941 (*Bibl.*).I.G., B.P. 333,946, (*Chem. Abstracts*, 1931, 25, 711).Straus, Kollek, Heyn, *Ber.*, 1930, 63, 1874.Ott, Dittus, *Ber.*, 1943, 76, 80.**1 : 3-Dichloroacridone** $\text{C}_{13}\text{H}_7\text{ONCl}_2$

MW, 264

Yellow needles from AcOH. Does not melt below 360°. Sol. AcOH with light yellow col. and bluish-violet fluor. Spar. sol. boiling EtOH. Prac. insol. Et₂O, C₆H₆. Sol. conc. H₂SO₄ with blue fluor.Ullmann, *Ann.*, 1907, 355, 340.**1 : 4-Dichloroacridone.**

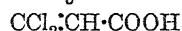
Yellow needles. M.p. 268°.

Nisbet, *J. Chem. Soc.*, 1933, 1372.**2 : 3-Dichloroacridone.**

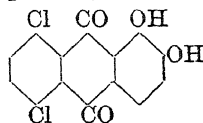
Yellow cryst. Does not melt below 360°. Sol. EtOH with blue fluor. → green on addition of alkali.

Tănăsescu, Ramontianu, *Bull. soc. chim.*, 1939, 6, 491.**2 : 6-Dichloroacridone.**M.p. 416°. Blue fluor. in conc. H₂SO₄, intense violet in EtOH → yellowish-green with NaOH.Tănăsescu, Suciu, *Bull. soc. chim.*, 1937, 4, 245.**1 : 2-Dichloroacrylic Acid** $\text{C}_3\text{H}_2\text{O}_2\text{Cl}_2$

MW, 141

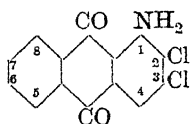
Prisms from CHCl₃. M.p. 87-8°. Sol. H₂O, EtOH, Et₂O, CHCl₃, hot C₆H₆, hot ligroin.*Chloride*: C₃H₂OCl₃. MW, 159.5. B.p. 145-6°. *n*_D²⁰ 1.5288.*Amide*: C₃H₃ONCl₂. MW, 140. M.p. 134°.Prins, D.R.P. 261,689, (*Chem. Zentr.*, 1913, II, 394).Zincke, *Ber.*, 1891, 24, 918.**2 : 2-Dichloroacrylic Acid** $\text{C}_3\text{H}_2\text{O}_2\text{Cl}_2$

MW, 141

Prisms from CHCl₃. M.p. 76-7° (70-72.5°). Sol. Et₂O, CHCl₃. Spar. sol. H₂O.*Ester*: C₅H₆O₂Cl₂. MW, 169. B.p. 173-5°.*Chloride*: b.p. above 145°.*Amide*: needles. M.p. 113°.Straus, Kollek, Heyn, *Ber.*, 1930, 63, 1877.**Dichloroaldehydoacrylic Acid.***See* Mucochloric Acid.**5 : 8-Dichloroalizarin (5 : 8-Dichloro-1 : 2-dihydroxyanthraquinone)** $\text{C}_{14}\text{H}_6\text{O}_4\text{Cl}_2$

MW, 309

M.p. 257°. Sol. dil. KOH → bluish-violet sol.

Acetyl deriv.: yellow. M.p. 178°.Waldmann, *J. prakt. Chem.*, 1938, 150, 99.**2 : 3-Dichloro-1-aminoanthraquinone** $\text{C}_{14}\text{H}_7\text{O}_2\text{NCl}_2$

MW, 292

M.p. 219-21°.

I.G., D.R.P. 534,305, (*Chem. Abstracts*, 1932, 26, 736).**2 : 4-Dichloro-1-aminoanthraquinone.**

Yellowish-red needles from AcOH. M.p. 217-9° (205-6°).

Gubelmann, Weiland, Stallmann, *Ind. Eng. Chem.*, 1929, 21, 1231.Newport Co., D.R.P. 565,041, (*Chem. Abstracts*, 1933, 27, 1014).**4 : 8-Dichloro-1-aminoanthraquinone.***N-Acetyl*: m.p. 218-9°.*N-Benzoyl*: m.p. 213-4°.

N-Carboethoxyl : m.p. 205–6°.

S.C.I., F.P. 760,209, (*Chem. Abstracts*, 1934, 28, 3594).

5 : 8-Dichloro-1-aminoanthraquinone.

Red needles. M.p. 199°.

N-Acetyl : yellow needles from xylene. M.p. 178°.

Walsh, Weizmann, *J. Chem. Soc.*, 1910, 97, 687.

1 : 3-Dichloro-2-aminoanthraquinone.

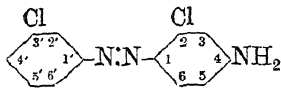
Yellowish-brown needles from AcOH. M.p. 231° corr. Sol. hot Py, PhNO₂, aniline. Very spar. sol. EtOH, Et₂O. Sol. conc. H₂SO₄ with yellowish-red col.

N-Diacyl : leaflets from AcOH. M.p. 199° corr.

N-Benzoyl : yellowish needles from xylene. M.p. 227° corr.

Junghans, *Ann.*, 1913, 399, 323.

2 : 3'-Dichloro-4-aminoazobenzene



C₁₂H₉N₃Cl₂

MW, 266

Golden yellow needles. M.p. 127°. Sol. most ord. org. solvents.

N-Acetyl : m.p. about 165°.

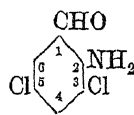
Niemientowski, *Chem. Zentr.*, 1902, II, 938.

3 : 2'-Dichloro-4-aminoazobenzene.

Yellow needles. M.p. 113°. Sol. EtOH, Et₂O, etc.

Niemientowski, *Chem. Zentr.*, 1902, II, 938.

3 : 5-Dichloro-*o*-aminobenzaldehyde



C₇H₅ONCl₂

MW, 190

Yellow needles from EtOH.Aq. or C₆H₆-ligroin. M.p. 123°.

Oxime : needles from EtOH.Aq. M.p. 175°.

Phenylhydrazone : yellowish-green needles from EtOH.Aq. M.p. 118°.

Asinger, *Monatsh.*, 1933, 63, 389.

3 : 6-Dichloro-*o*-aminobenzaldehyde.

Yellow needles from EtOH.Aq. M.p. 84–5°. Spar. sol. H₂O. Sol. EtOH, Et₂O.

Oxime : m.p. 175–6°.

Gnehm, Bänziger, *Ann.*, 1897, 296, 79.

2 : 5-Dichloro-*m*-aminobenzaldehyde.

Yellow needles from ligroin. M.p. 158–9°. Forms bisulphite comp.

Gnehm, Bänziger, *Ber.*, 1896, 29, 876; *Ann.*, 1897, 296, 76.

2 : 6-Dichloro-*m*-aminobenzaldehyde.

Yellowish needles from MeOH or C₆H₆. M.p. 122°.

Oxime : two forms. (α-). Needles from C₆H₆. M.p. 158–9°. (β-). Needles from C₆H₆. M.p. 174°.

Meisenheimer, Theilacker, Beisswenger, *Ann.*, 1932, 495, 258.

4 : 6-Dichloro-*m*-aminobenzaldehyde.

2 : 4-Dichlorophenylhydrazone : m.p. 190°.

Chattaway, Clemo, *J. Chem. Soc.*, 1923, 123, 3060.

2 : 6-Dichloro-*p*-aminobenzaldehyde.

Needles. M.p. 203–5° (rapid heat.). Sol. EtOH, Et₂O, C₆H₆.

Geigy, D.R.P. 105,103, (*Chem. Zentr.*, 1900, I, 238).

3 : 5-Dichloro-*p*-aminobenzaldehyde.

Needles from pet. ether. M.p. 144°. Sol. EtOH, Et₂O, Me₂CO, CHCl₃, C₆H₆. Mod. sol. hot pet. ether. Volatile in steam.

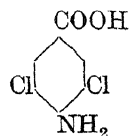
Phenylhydrazone : m.p. 156–7°.

p-Nitrophenylhydrazone : m.p. 288–9° decomp. van de Bunt, *Rec. trav. chim.*, 1929, 48, 129.

Dichloro-*o*-aminobenzoic Acid.

See Dichloroanthranilic Acid.

3 : 5-Dichloro-*p*-aminobenzoic Acid



C₇H₅O₂NCl₂

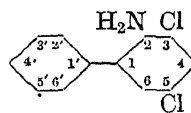
MW, 206

M.p. 291°.

Me ester : m.p. 98°. Sublimes *in vacuo*.

Elion, *Rec. trav. chim.*, 1925, 44, 1106.

3 : 5-Dichloro-2-aminodiphenyl



C₁₂H₉NCl₂

MW, 238

Needles from EtOH.Aq. M.p. 51°.

B, HCl : m.p. 140–5° decomp.

N-Benzoyl : needles from EtOH. M.p. 207°.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 92.

3' : 5'-Dichloro-2-aminodiphenyl.

Needles from EtOH.Aq. M.p. 74°.

N-Acetyl : acicular plates from EtOH. M.p. 163°.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 2791.

3' : 5'-Dichloro-3-aminodiphenyl.

N-Acetyl : plates from EtOH.Aq. M.p. 168°.

Hinkel, Dippy, *J. Chem. Soc.*, 1930, 1389.

4 : 2'-Dichloro-3-aminodiphenyl.Needles from Et₂O. M.p. 44°.Bellavita, *Gazz. chim. ital.*, 1935, 65, 632.**2 : 4'-Dichloro-4-aminodiphenyl.**Needles from Et₂O. M.p. 83°.

N-Acetyl: needles. M.p. 182°.

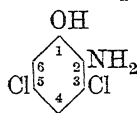
Finzi, Bellavita, *Gazz. chim. ital.*, 1934, 64, 335.**3' : 5'-Dichloro-4-aminodiphenyl.**

Acicular plates from EtOH.Aq. M.p. 124°.

N-Acetyl: needles from EtOH. M.p. 188°.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 2790.**Dichloroaminodiphenyl Ether.**

See under 4-Chloro-2-aminophenol.

3 : 5-Dichloro-o-aminophenolC₆H₅ONCl₂

MW, 178

Needles from H₂O. M.p. 132-3°. Sol. ord. org. solvents. Insol. pet. ether.Hodgson, Wignall, *J. Chem. Soc.*, 1927, 2218.Auwers, *Fortschritte der Chemie, Physik und physikalischen Chemie*, 1924, 18, ii, 33.**4 : 6-Dichloro-o-aminophenol.**

M.p. 109° decomp.

Hunter, Barnes, *J. Chem. Soc.*, 1928, 2056.**4 : 6-Dichloro-m-aminophenol.**Prisms from H₂O. M.p. 135-6°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, Me₂CO, hot H₂O.Me ether: 4 : 6-dichloro - m - anisidine. C₇H₇ONCl₂. MW, 192. Cryst. from ligroin. M.p. 51°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Mod. sol. hot H₂O. N-Acetyl: m.p. 157.5-159°.

N-Acetyl: m.p. 233-6°.

O-p-Toluenesulphonyl: m.p. 113-14°.

Groves, Turner, Sharp, *J. Chem. Soc.*, 1929, 522.Jacobs, Heidelberger, Rolf, *J. Am. Chem. Soc.*, 1919, 41, 461.**2 : 5-Dichloro-p-aminophenol.**Et ether: 2 : 5-dichloro-p-phenetidine. C₈H₉ONCl₂. MW, 206. Prisms from EtOH. M.p. 64°. Sol. ord. org. solvents. Spar. sol. H₂O. N-Acetyl: 2 : 5-dichlorophenacetin. M.p. 162°. Picrate: m.p. 149-50°.Reverdin, Düring, *Ber.*, 1899, 32, 154.**2 : 6-Dichloro-p-aminophenol.**Needles or leaflets from H₂O or C₆H₆. M.p. 165-6° (167°). Sol. EtOH. Spar. sol. C₆H₆, H₂O. Sublimes. Ox. → 2 : 6-dichloro-p-benzoquinone.B, HNO₃: m.p. 110° decomp.Kollrepp, *Ann.*, 1886, 234, 10.**3 : 5-Dichloro-p-aminophenol.**Needles from H₂O. M.p. 154°. Spar. sol. CCl₄, CS₂, CHCl₃.Me ether: 3 : 5-dichloro - p - anisidine. C₇H₇ONCl₂. MW, 192. Needles from MeOH.Aq. M.p. 71°.Hodgson, Wignall, *J. Chem. Soc.*, 1927, 2219.**3 : 5-Dichloro-2-aminopyridine**C₅H₄N₂Cl₂

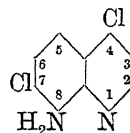
MW, 163

Prisms or needles from EtOH.Aq. M.p. 84-5°. Sol. EtOH, Me₂CO.Sell, *J. Chem. Soc.*, 1908, 93, 2002.**4 : 6-Dichloro-2-aminopyridine.**M.p. 108°. Sol. EtOH, C₆H₆, hot H₂O.

N-Acetyl: plates from EtOH. M.p. 218-19°.

Graf, *J. prakt. Chem.*, 1932, 133, 42.**2 : 6-Dichloro-3-aminopyridine.**Needles from H₂O. M.p. 119°. B.p. 110°/0.3 mm. Sol. EtOH, Et₂O.Schickh, Binz, Schulz, *Ber.*, 1936, 69, 2597.**2 : 6-Dichloro-4-aminopyridine.**Needles from EtOH.Aq. M.p. 176°. Sol. EtOH, Et₂O, C₆H₆, Me₂CO, hot H₂O.Meyer, Beck, *Monatsh.*, 1915, 36, 739.**3 : 5-Dichloro-4-aminopyridine.**

Needles from EtOH. M.p. 161°.

Sell, *J. Chem. Soc.*, 1911, 99, 1683.**4 : 7-Dichloro-8-aminoquinoline**C₇H₆N₂Cl₂

MW, 189

M.p. 110-11.5°.

Surrey, Cope, *J. Am. Chem. Soc.*, 1946, 68, 1244.**5 : 7-Dichloro-8-aminoquinoline.**Prisms from Et₂O. M.p. 125°. Sol. EtOH, Et₂O, CHCl₃. Prac. insol. cold H₂O. Sol. dil. min. acids with red col.

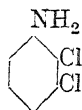
B, HCl: red needles. M.p. 183° decomp.

B₂, H₂PtCl₆: yellowish-red needles. Decomp. at 230°.

Methiodide: yellow needles. M.p. 154°.

Claus, Ammelburg, *J. prakt. Chem.*, 1895, 51, 419.

2 : 3-Dichloroaniline

 $C_6H_5NCl_2$

MW, 162

Needles from ligroin. M.p. 24°. B.p. 252°.
Sol. EtOH. Spar. sol. ligroin.

N-Acetyl: see 2 : 3-Dichloroacetanilide.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 218.

2 : 4-Dichloroaniline.

Needles from MeOH.Aq. M.p. 63°. B.p. 245°.
Sol. EtOH, Et₂O. Spar. sol. H₂O. D²⁰ 1.567.

N-Formyl: 2 : 4-dichloroformanilide. M.p. 154°.

N-Acetyl: see 2 : 4-Dichloroacetanilide.

N : N'-Oxalyl: 2 : 2' : 4 : 4'-tetrachloro-oxanilide. M.p. 276°.

N-Benzoyl: m.p. 117°.

N-Benzylidene: m.p. 84°.

Picrate: m.p. 106°.

Kuhlmann, F.P. 649,851, (*Chem. Abstracts*, 1929, 23, 2986).

Holleman, Reiding, *Rec. trav. chim.*, 1904, 23, 359.

2 : 5-Dichloroaniline.

Needles from ligroin. M.p. 50°. B.p. 251°.
Sol. EtOH, Et₂O, CS₂. Spar. sol. H₂O, ligroin.

CrO₃ → 2 : 5-dichloro-*p*-benzoquinone.

B.HCl: m.p. 191-2°.

B.HNO₃: decomp. at 165°.

B₂H₂SO₄: m.p. 196-7°.

N-Acetyl: see 2 : 5-Dichloroacetanilide.

N-Benzoyl: m.p. 120°.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 215, 220.

Crauw, *Rec. trav. chim.*, 1931, 50, 768.

2 : 6-Dichloroaniline.

Needles from EtOH.Aq. M.p. 39°.

N-Acetyl: see 2 : 6-Dichloroacetanilide.

Dyson, George, Hunter, *J. Chem. Soc.*, 1926, 3043.

Seikel, *Organic Syntheses*, 1944, XXIV, 47.

3 : 4-Dichloroaniline.

Needles from ligroin. M.p. 71.5°. B.p. 272°, 145°/15 mm.

N-Acetyl: see 3 : 4-Dichloroacetanilide.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 216.

Gubelmann, Weiland, Stallmann, U.S.P. 1,663,251, (*Chem. Abstracts*, 1928, 22, 1597).

3 : 5-Dichloroaniline.

Needles. M.p. 51°. B.p. 260°.

N-Acetyl: see 3 : 5-Dichloroacetanilide.

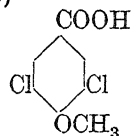
N-Benzoyl: m.p. 147°.

Dyson, George, Hunter, *J. Chem. Soc.*, 1926, 3043.

Auwers, *Fortschritte der Chemie, Physik und physikalischen Chemie*, 1924, 18, ii, 32.

Chapman, Perrott, *J. Chem. Soc.*, 1932, 1773.

3 : 5-Dichloroanisic Acid (3 : 5-Dichloro-4-methoxybenzoic acid)

 $C_8H_6O_3Cl_2$

MW, 221

Needles from EtOH. M.p. 202°. Insol. H₂O.

Anilide: 3 : 5-dichloro-4-methoxybenzanilide. M.p. 154°.

Blackey, Jones, Scarborough, *J. Chem. Soc.*, 1927, 2868.

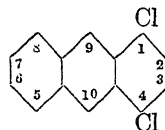
Dichloroanisidine.

See under Dichloroaminophenol.

Dichloroanisole.

See under Dichlorophenol.

1 : 4-Dichloroanthracene

 $C_{14}H_8Cl_2$

MW, 247

Yellow cryst. from methyl ethyl ketone. M.p. 180°.

Barnett, Matthews, Wiltshire, *Rec. trav. chim.*, 1926, 45, 559.

1 : 5-Dichloroanthracene.

Yellow needles from butanol. M.p. 187°.

Schilling, *Ber.*, 1913, 46, 1068.

Bergmann, Weizmann, *J. Am. Chem. Soc.*, 1938, 60, 1804.

1 : 6-Dichloroanthracene.

Golden plates from AcOH. M.p. 149-50°.

Goldberg, *J. Chem. Soc.*, 1931, 1781.

1 : 7-Dichloroanthracene.

Yellow needles from AcOH. M.p. 160-1°.

Goldberg, *J. Chem. Soc.*, 1931, 1781.

1 : 8-Dichloroanthracene.

Yellow needles from toluene. M.p. 185°.

Schilling, *Ber.*, 1913, 46, 1068.

Bergmann, Weizmann, *J. Am. Chem. Soc.*, 1938, 60, 1804.

1 : 9-Dichloroanthracene.

Yellow needles. M.p. 127-8°. CrO₃ in AcOH → 1-chloroanthraquinone.

Liebermann, Beudet, *Ber.*, 1914, 47, 1013.

2 : 3-Dichloroanthracene.

Pale yellow leaflets. M.p. 261° (255°). Sol. AcOH, AcOEt, hot EtOH. Spar. sol. CHCl₃. Sublimes with part. decomp. CrO₃ → 2 : 3-dichloroanthraquinone.

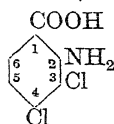
Kircher, *Ann.*, 1887, 238, 347.

Barnett, Matthews, Wiltshire, *Rec. trav. chim.*, 1926, 45, 561.

9 : 10-Dichloroanthracene (ms-Dichloroanthracene).

Yellow needles from CCl₄. M.p. 209–10°. Sol. C₆H₆. Spar. sol. Et₂O, EtOH. Ox. → anthraquinone.

Ninaev, Fedorov, *Chem. Abstracts*, 1931, 25, 1252, 2995.

3 : 4-Dichloroanthranilic Acid (3 : 4-Dichloro-o-aminobenzoic acid)

C₇H₅O₂NCl₂ MW, 206

Needles from hot AcOH. M.p. 237–8°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆, AcOH. Heat → 2 : 3-dichloroaniline.

Villiger, *Ber.*, 1909, 42, 3544.

3 : 5-Dichloroanthranilic Acid.

Needles from hot EtOH. M.p. 231°. Sol. ord. org. solvents.

Me ester: C₈H₇O₂NCl₂. MW, 220. M.p. 63–4°.

Amide: C₇H₆ON₂Cl₂. MW, 205. M.p. 284° decomp.

N-Acetyl: m.p. 203°.

M.L.B., D.R.P. 152,484, (*Chem. Zentr.*, 1904, II, 168).

Elion, *Rec. trav. chim.*, 1925, 44, 1106 (*Bibl.*).

Asinger, *Monatsh.*, 1933, 63, 391.

3 : 6-Dichloroanthranilic Acid.

Needles. M.p. 154–5°. Sol. hot H₂O and most ord. org. solvents. Sublimes. Heat at 230–40° → 2 : 5-dichloroaniline. NaNO₂ in EtOH → 2 : 5-dichlorobenzoic acid.

Villiger, *Ber.*, 1909, 42, 3539 (*Bibl.*).

4 : 5-Dichloroanthranilic Acid.

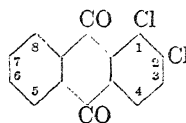
Needles from AcOH. M.p. 213–14°. Sol. Et₂O, AcOH. Heat above m.p. → 3 : 4-dichloroaniline.

Villiger, *Ber.*, 1909, 42, 3547.

5 : 6-Dichloroanthranilic Acid.

Needles from hot MeOH. M.p. 176–7° decomp. Sol. EtOH, Et₂O, AcOH, MeOH, hot H₂O. Heat → 3 : 4-dichloroaniline.

Villiger, *Ber.*, 1909, 42, 3544.

1 : 2-Dichloroanthraquinone

C₁₄H₆O₂Cl₂

MW, 277

Yellow needles from AcOH. M.p. 196–5° (208°). Sol. AcOH, PhNO₂, Py. Insol. EtOH, Et₂O, Me₂CO.

Goldberg, *J. Chem. Soc.*, 1931, 1788.

Fierz-David, *J. Am. Chem. Soc.*, 1927, 49, 2334.

1 : 3-Dichloroanthraquinone.

Yellow needles from AcOH. M.p. 209–10°.

Goldberg, *J. Chem. Soc.*, 1931, 2829.

1 : 4-Dichloroanthraquinone.

Orange-yellow cryst. from AcOH. M.p. 187–5°. Sol. PhNO₂, Py, hot C₆H₆, hot AcOH. Spar. sol. EtOH, Et₂O, ligroin. 10% oleum + boric acid at 200° → quinizarin.

Phillips, *J. Am. Chem. Soc.*, 1926, 48, 3198 (*Bibl.*).

Barnett, Matthews, Wiltshire, *Rec. trav. chim.*, 1926, 45, 563.

1 : 5-Dichloroanthraquinone.

Yellow needles from AcOH. M.p. 245° (251°). Sol. PhNO₂, anisole, benzyl alcohol. Spar. sol. EtOH, AcOH, C₆H₆, toluene.

Oxime: m.p. 252°.

Dioxime: decomp. at 245°.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 203, 209.

Goldberg, *J. Chem. Soc.*, 1931, 1782, 1792.

Hardmann, U.S.P. 2,421,837, (*Chem. Abstracts*, 1947, 41, 5901).

1 : 6-Dichloroanthraquinone.

Pale yellow needles from AcOH. M.p. 203–4°.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 207.

Goldberg, *J. Chem. Soc.*, 1931, 1780 (*Bibl.*).

1 : 7-Dichloroanthraquinone.

Needles from AcOH. M.p. 213–14°.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 213.

Goldberg, *J. Chem. Soc.*, 1931, 1780.

1 : 8-Dichloroanthraquinone.

Pale yellow needles. M.p. 202–3° (199°). Sol. PhNO₂, hot toluene. Spar. sol. EtOH. Yellow sol. in conc. H₂SO₄.

Fierz-David, *Helv. Chim. Acta*, 1927, 10, 211.

Goldberg, *J. Chem. Soc.*, 1931, 1791.

Deinet, U.S.P. 1,761,620, (*Chem. Abstracts*, 1930, 24, 3520).

2 : 3-Dichloroanthraquinone.

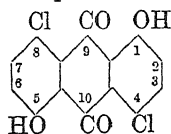
Yellow needles from AcOH. M.p. 271° (258–9°). Sol. hot C₆H₆. Spar. sol. EtOH, AcOH.
 Fierz-David, *J. Am. Chem. Soc.*, 1927, 49, 2334.
 Goldberg, *J. Chem. Soc.*, 1931, 1787.
 Barnett, Matthews, Wiltshire, *Rec. trav. chim.*, 1926, 45, 561.

2 : 6-Dichloroanthraquinone.

Pale yellow leaflets from chlorobenzene. M.p. 282°. Yellow sol. in conc. H₂SO₄.
 Fierz-David, *Helv. Chim. Acta*, 1927, 10, 225.

2 : 7-Dichloroanthraquinone.

Yellow needles from anisole. M.p. 210°.
 Badische, D.R.P. 228,876, (*Chem. Zentr.*, 1911, I, 102).
 Fierz-David, *Helv. Chim. Acta*, 1927, 10, 227.

4 : 8-Dichloroanthrarufin (4 : 8-Dichloro-1 : 5-dihydroxyanthraquinone)

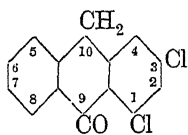
C₁₄H₆O₄Cl₂ MW, 309

Cryst. with red metallic reflex from PhNO₂. Spar. sol. EtOH, AcOH, C₆H₆, Py, ligroin. Orange sol. in NaOH.Aq.

Ullmann, D.R.P. 282,494, (*Chem. Zentr.*, 1915, I, 585).

Bayer, D.R.P. 127,699, (*Chem. Zentr.*, 1902, I, 338).

Wedekind, D.R.P. 167,743, (*Chem. Zentr.*, 1906, I, 1071).

1 : 3-Dichloroanthrone

C₁₄H₈OCl₂ MW, 263

Cryst. from AcOH or C₆H₆. M.p. 194°.

Barnett, Goodway, Watson, *Ber.*, 1933, 66, 1876.

1 : 4-Dichloroanthrone.

Yellow needles from C₆H₆. M.p. 148°. Sol. hot EtOH.

Barnett, Wiltshire, *Ber.*, 1929, 62, 1971.
 Eckert, Tomaschek, *Monatsh.*, 1918, 39, 850.

1 : 5-Dichloroanthrone.

Yellow needles from C₆H₆. M.p. 192°.

Barnett, Matthews, *J. Chem. Soc.*, 1923, 123, 2555.

1 : 8-Dichloroanthrone.

Yellow needles from EtOH. M.p. 167°.

Barnett, Hewett, *J. Chem. Soc.*, 1932, 506.
 Eckert, Tomaschek, *Monatsh.*, 1918, 39, 854.

Barnett, Matthews, *J. Chem. Soc.*, 1923, 123, 2555.

2 : 3-Dichloroanthrone.

Yellow cryst. from AcOH. M.p. 202°.

Barnett, Matthews, Wiltshire, *Rec. trav. chim.*, 1926, 45, 562.

2 : 4-Dichloroanthrone.

Yellow cryst. M.p. 161°.

Barnett, Goodway, Watson, *Ber.*, 1933, 66, 1876.

4 : 5-Dichloroanthrone.

Needles from Me₂CO. M.p. 198°.

Barnett, Cook, Matthews, *Rec. trav. chim.*, 1926, 45, 79.

4 : 10-Dichloroanthrone.

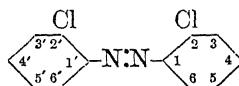
Pale yellow cryst. from pet. ether. M.p. 125–8°.

Matthews, *J. Chem. Soc.*, 1926, 243.

ms-Dichloroanthrone (*Anthraquinone dichloride*, 10 : 10-dichloroanthraquinone-9).

Prisms. M.p. 132–4°. Sol. C₆H₆, CHCl₃. H₂O → anthraquinone + HCl.

Diesbach, Dobbeltmann, *Helv. Chim. Acta*, 1931, 14, 373.

2 : 2'-Dichloroazobenzene

C₁₂H₈N₂Cl₂ MW, 251

Orange needles from pet. ether. M.p. 137°. Spar. sol. cold EtOH.

Zechmeister, Rom, *Ann.*, 1929, 468, 130.

Vorländer, Meyer, *Ann.*, 1902, 320, 129.

2 : 4-Dichloroazobenzene.

Orange cryst. from EtOH. M.p. 105°.

Stieglitz, Graham, *J. Am. Chem. Soc.*, 1916, 38, 1748.

2 : 5-Dichloroazobenzene.

M.p. 64°.

Crauw, *Rec. trav. chim.*, 1931, 50, 777.

3 : 3'-Dichloroazobenzene.

Orange needles from EtOH. M.p. 101°. Spar. sol. cold EtOH.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

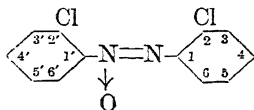
Vorländer, Meyer, *Ann.*, 1902, 320, 129.

4 : 4'-Dichloroazobenzene.

Pale yellow needles from Me_2CO . M.p. 188°. Spar. sol. cold EtOH.

Burns, McCombie, Scarborough, *J. Chem. Soc.*, 1928, 2933.

Bogoslovskii, *J. Gen. Chem. U.S.S.R.*, 1946, 16, 193.

2 : 2'-Dichloroazoxybenzene

$\text{C}_{12}\text{H}_8\text{ON}_2\text{Cl}_2$ MW, 267

Yellowish needles from EtOH. M.p. 56°. Sol. Et_2O , EtOH.

Zechmeister, Rom, *Ann.*, 1929, 468, 129.

3 : 3'-Dichloroazoxybenzene.

Pale yellow needles. M.p. 97° (95.5°). Sol. Et_2O . Spar. sol. cold EtOH, cold AcOH.

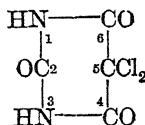
Zechmeister, Rom, *Ann.*, 1929, 468, 129.

4 : 4'-Dichloroazoxybenzene.

Yellowish needles from EtOH. M.p. 158°. Sol. Et_2O . Spar. sol. cold EtOH.

Burns, McCombie, Scarborough, *J. Chem. Soc.*, 1928, 2933.

Zechmeister, Rom, *Ann.*, 1929, 468, 129.

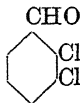
5 : 5-Dichlorobarbituric Acid (5 : 5-Dichloromalonylurea)

$\text{C}_4\text{H}_2\text{O}_3\text{N}_2\text{Cl}_2$ MW, 197

Cryst. from H_2O . Decomp. at 209–11°. Sol. H_2O , EtOH.

Bock, *Ber.*, 1923, 56, 1224.

Biltz, Hamburger, *Ber.*, 1916, 49, 639.

2 : 3-Dichlorobenzaldehyde

$\text{C}_7\text{H}_4\text{OCl}_2$ MW, 175

Cryst. from EtOH.Aq. M.p. 65–7°.

Marvel *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 861.

2 : 4-Dichlorobenzaldehyde.

Prisms. M.p. 72°. Sol. EtOH, Et_2O , AcOH, C_6H_6 . $\text{KMnO}_4 \rightarrow$ 2 : 4-dichlorobenzoic acid.

Oxime : needles. M.p. 136–7°.

Blanksma, *Chem. Zentr.*, 1910, I, 260.

Gindraux, *Helv. Chim. Acta*, 1929, 12, 933.

Dict. of Org. Comp.—II.

2 : 5-Dichlorobenzaldehyde.

Cryst. from EtOH. M.p. 58°. B.p. 231–3°. Sol. EtOH, Et_2O , CHCl_3 , AcOH, CS_2 , C_6H_6 . $\text{KMnO}_4 \rightarrow$ 2 : 5-dichlorobenzoic acid. Forms bisulphite comp.

Oxime : m.p. 128°.

Di-Me acetal : $\text{C}_9\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 221. M.p. 15°. B.p. 257–8°. D^{15}_4 1.274.

Crauw, *Rec. trav. chim.*, 1931, 50, 773.

2 : 6-Dichlorobenzaldehyde.

Needles from ligroin. M.p. 71°.

Oxime : m.p. 149–50°.

Hydrazone : yellow. M.p. 153°.

p-Bromophenylhydrazone : m.p. 142°.

o-Nitrophenylhydrazone : m.p. 154°.

Geigy, D.R.P. 199,943, (*Chem. Zentr.*, 1908, II, 363).

Gindraux, *Helv. Chim. Acta*, 1929, 12, 933.

Reich, *Bull. soc. chim.*, 1917, 21, 223.

3 : 4-Dichlorobenzaldehyde.

M.p. 44°. B.p. 247–8°. Sol. EtOH, Et_2O . Volatile in steam.

Oxime : m.p. 118–19°.

p-Nitrophenylhydrazone : m.p. 276–7°.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

Kraay, *Rec. trav. chim.*, 1930, 49, 1086.

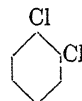
3 : 5-Dichlorobenzaldehyde.

Needles or leaflets from EtOH.Aq. or pet. ether. M.p. 65°. B.p. 235–40°/748 mm. Spar. sol. hot H_2O . Volatile in steam.

Oxime : cryst. from ligroin. M.p. 112°.

Phenylhydrazone : needles. M.p. 106.5°.

Asinger, Lock, *Monatsh.*, 1933, 62, 344.

***o*-Dichlorobenzene**

$\text{C}_6\text{H}_4\text{Cl}_2$ MW, 147

M.p. –17.5°. (F.p. –16.7°). B.p. 180–3°, 86°/18 mm., 65.8°/14 mm. Sol. EtOH, Et_2O . Insol. H_2O . D^{20}_4 1.3048. n^{20}_D 1.5518.

Carswell, *Ind. Eng. Chem.*, 1928, 20, 728 (*Bibl.*).

***m*-Dichlorobenzene.**

F.p. –24.4°. B.p. 172°, 66°/20 mm. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O . D^{20}_4 1.2881. n^{20}_D 1.548.

Jois, Manjunath, *Chem. Zentr.*, 1931, I, 2866.

Chattaway, Evans, *J. Chem. Soc.*, 1896, 69, 850.

Kinzlberger, D.R.P. 280,739, (*Chem. Zentr.*, 1915, I, 104).

Schmidt, Wagner, *Ann.*, 1912, 387, 165.

***p*-Dichlorobenzene.**

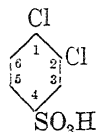
Leaflets. M.p. 53°. B.p. 174°. Very sol. EtOH. Sol. Et_2O , CHCl_3 , CS_2 , C_6H_6 . Insol.

H₂O. D₂₀²⁵ 1.4581. Mol. f.p. depression 77.
Destroys moth larvæ.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

Schmidt, Wagner, *Ann.*, 1912, 387, 165.

1 : 2-Dichlorobenzene-4-sulphonic Acid



C₆H₄O₃Cl₂S MW, 227

KOH fusion → catechol-4-sulphonic acid.
Ca salt, sol. H₂O: Ba salt and Pb salt, spar. sol. H₂O.

Chloride: C₆H₃O₂Cl₃S. MW, 245.5. F.p. 22.4°.

Amide: C₆H₅O₂NCl₂S. MW, 226. M.p. 140°.

Kraay, *Rec. trav. chim.*, 1930, 49, 1083.

Holleman, van der Linden, *Rec. trav. chim.*, 1911, 30, 332.

1 : 3-Dichlorobenzene-4-sulphonic Acid.
M.p. 86°. Ca salt, sol. H₂O: Ba salt, spar. sol. H₂O: Pb salt, mod. sol. H₂O.

Aniline salt: cryst. +1H₂O. M.p. 254-5°.

o-Toluidine salt: m.p. 170-2°.

p-Toluidine salt: cryst. +1H₂O. M.p. 204-6°.

Chloride: f.p. 55°.

Amide: m.p. 182°.

Beilstein, Kurbatow, *Ann.*, 1876, 182, 97.

Holleman, van der Linden, *Rec. trav. chim.*, 1911, 30, 334.

van de Lande, *Rec. trav. chim.*, 1932, 51, 98.

Dermer, Dermer, *J. Org. Chem.*, 1942, 7, 581.

1 : 4-Dichlorobenzenesulphonic Acid.
Needles from H₂O. M.p. above 100°. Sol. H₂O. Spar. sol. Et₂O.

Aniline salt: m.p. 262-3°.

o-Toluidine salt: m.p. 250-1°.

p-Toluidine salt: m.p. 247-8°.

Chloride: f.p. 37°.

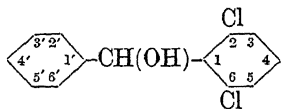
Amide: m.p. 185-6° (182°).

Crauw, *Rec. trav. chim.*, 1931, 50, 766.

Holleman, van der Linden, *Rec. trav. chim.*, 1911, 30, 334.

Dermer, Dermer, *J. Org. Chem.*, 1942, 7, 581.

2 : 6-Dichlorobenzhydrol



C₁₃H₁₀OCl₂ MW, 253

M.p. 57°.

Acetyl: m.p. 105°.

Reich, Salzmann, Kawa, *Bull. soc. chim.*, 1917, 21, 220.

4 : 4'-Dichlorobenzhydrol.

Needles from EtOH. M.p. 94° (89-90°).

Acetyl: m.p. 43-5°.

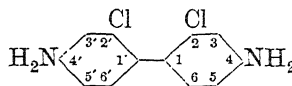
3 : 5-Dinitrobenzoyl: pale yellow. M.p. 174-6°.

Cohen, *Rec. trav. chim.*, 1919, 38, 116.

Montagne, Koopal, *Rec. trav. chim.*, 1910, 29, 149.

Grummitt, Buck, Joseph, *J. Am. Chem. Soc.*, 1945, 67, 693.

2 : 2' - Dichlorobenzidine (2 : 2' - Dichloro-4 : 4'-diaminodiphenyl)



C₁₂H₁₀N₂Cl₂ MW, 253

Prisms from EtOH. M.p. 167°. Sol. Et₂O, EtOH. Insol. H₂O.

Laubenheimer, *Ber.*, 1875, 8, 1625.

Schultz, *Ber.*, 1884, 17, 465.

2 : 5-Dichlorobenzidine.

Cryst. from C₆H₆-ligroin. M.p. 95°.

Crauw, *Rec. trav. chim.*, 1931, 50, 777.

3 : 3'-Dichlorobenzidine.

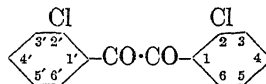
Needles from EtOH. M.p. 133°. Sol. EtOH, AcOH, C₆H₆. Insol. H₂O. The sulphate, nitrate, and oxalate are spar. sol. H₂O.

4 : 4'-N-Dibenzoyl: m.p. 265°.

Levinstein, D.R.P. 94,410, (*Chem. Zentr.*, 1898, I, 295).

Cohn, *Ber.*, 1900, 33, 3552.

2 : 2'-Dichlorobenzil (Di-o-chlorophenyl diketone)



C₁₄H₈O₂Cl₂ MW, 279

Yellowish-green prisms. M.p. 128°. Spar. sol. Et₂O, AcOH, hot EtOH.

anti-Dioxime: needles from C₆H₆. M.p. 270°.

Diacetyl deriv.: m.p. 157°.

amphi-Dioxime: needles from EtOH. M.p. 226-7°.

Diacetyl deriv.: m.p. 129°.

Hodgson, Rosenberg, *J. Chem. Soc.*, 1930, 16.

Werner, Bloch, *Ber.*, 1899, 32, 1984.

4 : 4'-Dichlorobenzil.

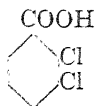
Yellow needles. M.p. 195-6° (193°). Spar. sol. hot EtOH, Et₂O.

Mono-phenylhydrazone: m.p. 200° (178°).

Kenner, Witham, *J. Chem. Soc.*, 1910, 97, 1967.

Gomberg, van Natta, *J. Am. Chem. Soc.*, 1929, 51, 2241.

2 : 3-Dichlorobenzoic Acid

 $C_7H_4O_2Cl_2$

MW, 191

Needles. M.p. 164° (160°). Sol. EtOH, Et₂O. Soda lime dist. \rightarrow *o*-dichlorobenzene.

Chloride: $C_7H_3OCl_3$. MW, 209.5. B.p. $140^\circ/14$ mm.

Crauw, *Rec. trav. chim.*, 1931, 50, 777.

2 : 4-Dichlorobenzoic Acid.

Needles from H₂O or C₆H₆. M.p. 164° (160° , 158°). Sol. EtOH, Et₂O, CHCl₃, C₆H₆, hot H₂O. Sublimes.

Me ester: b.p. $132^\circ/15$ mm. D₂₀²⁰ 1.572.

Chloride: b.p. $150^\circ/34$ mm.

Nitrile: $C_7H_3NCl_2$. MW, 172. M.p. 61° .

Lellmann, Klotz, *Ann.*, 1885, 231, 316.

Roberts, Turner, *J. Chem. Soc.*, 1927, 1846.

Magidson, Grigorovskii, *Russ. P.* 44,548, (*Chem. Abstracts*, 1938, 32, 2960).

2 : 5-Dichlorobenzoic Acid.

Needles from H₂O. M.p. 154° . B.p. 301° . Sol. EtOH, Et₂O. Mod. sol. hot H₂O. Part. volatile in steam.

Et ester: $C_9H_8O_2Cl_2$. MW, 219. B.p. 271° . D₀⁰ 1.3278.

Chloride: b.p. $137^\circ/15$ mm.

Amide: $C_7H_5ONCl_2$. MW, 190. Needles. M.p. 155° .

m-Nitroanilide: m.p. $151-2^\circ$.

Nitrile: needles. M.p. 130° . Sol. EtOH, Et₂O.

Crauw, *Rec. trav. chim.*, 1931, 50, 773, 777.

Ullmann, Wagner, *Ann.*, 1909, 371, 388.

2 : 6-Dichlorobenzoic Acid.

Needles from EtOH. M.p. 139° (133°). Sol. EtOH, Et₂O, hot H₂O. Sublimes.

Chloride: b.p. $142-3^\circ/21$ mm. Volatile in steam.

Amide: m.p. 202° .

Nitrile: m.p. 143° .

Reich, Salzmann, Kawa, *Bull. soc. chim.*, 1917, 21, 222.

3 : 4-Dichlorobenzoic Acid.

Needles from EtOH or C₆H₆. M.p. $208-9^\circ$ ($201-2^\circ$). Sol. EtOH, Et₂O. Mod. sol. hot H₂O.

Et ester: b.p. $262-3^\circ$.

Chloride: b.p. 242° , $160^\circ/42$ mm.

Amide: needles. M.p. 133° .

Nitrile: m.p. 72° .

Hodgson, Beard, *J. Chem. Soc.*, 1927, 25.

Kraay, *Rec. trav. chim.*, 1930, 49, 1084.

3 : 5-Dichlorobenzoic Acid.

Needles from EtOH. M.p. 188° . Sol. EtOH, Et₂O. Sublimes.

Me ester: m.p. 58° .

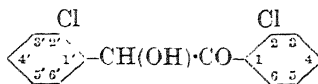
Chloride: b.p. $135-7^\circ/25$ mm.

Nitrile: needles. M.p. 65° . Sol. EtOH, Et₂O. Sublimes. Volatile in steam.

Claus, Stavenhagen, *Ann.*, 1892, 269, 225.

Asinger, Lock, *Monatsh.*, 1933, 62, 344.

2 : 2'-Dichlorobenzoin

 $C_{14}H_{10}O_2Cl_2$

MW, 281

Needles from EtO.HAq. M.p. $63-4^\circ$.

Weissberger, Strasser, Mainz, Schwarze, *Ann.*, 1930, 478, 128.

Hodgson, Rosenberg, *J. Chem. Soc.*, 1930, 16.

Weissberger, *J. Chem. Soc.*, 1935, 225.

3 : 3'-Dichlorobenzoin.

Cryst. from ligroin. M.p. 76° after sintering at 69° . Conc. HNO₃ \rightarrow 3 : 3'-dichlorobenzil.

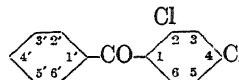
Weissberger, *J. Chem. Soc.*, 1935, 225.

4 : 4'-Dichlorobenzoin.

Needles from EtOH.Aq. M.p. 88° ($85-6^\circ$). Conc. HNO₃ \rightarrow 4 : 4'-dichlorobenzil.

Hantzsch, Glower, *Ber.*, 1907, 40, 1519.
Gomberg, van Natta, *J. Am. Chem. Soc.*, 1929, 51, 2242.

2 : 4-Dichlorobenzophenone

 $C_{13}H_8OCl_2$

MW, 251

Cryst. M.p. 52° .

Böeseken, *Rec. trav. chim.*, 1908, 27, 15.

2 : 5-Dichlorobenzophenone.

Cryst. from EtOH. M.p. 88° . Does not form bisulphite comp. KMnO₄ \rightarrow 2 : 5-dichlorobenzoic acid.

Oxime: m.p. 207° (slow heat.), 135° (rapid heat.).

Crauw, *Rec. trav. chim.*, 1931, 50, 767.

Ganzmüller, *J. prakt. Chem.*, 1933, 138, 311.

3 : 4-Dichlorobenzophenone.

Cryst. M.p. $104-5^\circ$.

Oxime: m.p. $153-4^\circ$.

Böeseken, *Rec. trav. chim.*, 1908, 27, 15.

Kraay, *Rec. trav. chim.*, 1930, 49, 1085.

Newton, Groggins, *Ind. Eng. Chem.*, 1935, 27, 1398.

3 : 5-Dichlorobenzophenone.

Cryst. from MeOH. M.p. 65°.

α-Oxime : m.p. 137°.*β*-Oxime : m.p. 118°.Waters, *J. Chem. Soc.*, 1929, 2108.**2 : 2'-Dichlorobenzophenone.**

Cryst. from EtOH. M.p. 45-7°.

2 : 4-Dinitrophenylhydrazone : m.p. 206-8°.

Haller et al., *J. Am. Chem. Soc.*, 1945, 67, 1591.Gatzi, *Helv. Chim. Acta*, 1946, 29, 1159.**2 : 3'-Dichlorobenzophenone.**

Viscous oil. B.p. 140-2°/1 mm.

2 : 4-Dinitrophenylhydrazone : m.p. 255-7°.

Haller et al., *J. Am. Chem. Soc.*, 1945, 67, 1591.**2 : 4'-Dichlorobenzophenone.**Prisms from EtOH. M.p. 66-7°. B.p. 214°/2 mm. D₄¹⁴ 1.393.

2 : 4-Dinitrophenylhydrazone : m.p. 230-1°.

Norris, Twieg, *Am. Chem. J.*, 1903, 30, 397.Montagne, *Rec. trav. chim.*, 1906, 25, 384.**3 : 3'-Dichlorobenzophenone.**

M.p. 124°. B.p. 160-6°/2 mm.

2 : 4-Dinitrophenylhydrazone : m.p. 235-8°.

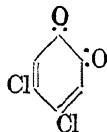
Haller et al., *J. Am. Chem. Soc.*, 1945, 67, 1591.**3 : 4'-Dichlorobenzophenone.**

M.p. 113°.

2 : 4-Dinitrophenylhydrazone : m.p. 258-60°.

Haller et al., *J. Am. Chem. Soc.*, 1945, 67, 1591.**4 : 4'-Dichlorobenzophenone.**Colourless leaflets from EtOH. M.p. 147-8° (145°). B.p. 353°. Sol. Et₂O, Me₂CO, CHCl₃, AcOH, CS₂. Zn + AcOH, or NaHg → 4 : 4'-dichlorobenzhydrol.*Oxime* : m.p. 135°.*Hydrazone* : yellow. M.p. 91-3°.

2 : 4-Dinitrophenylhydrazone : m.p. 238-40°.

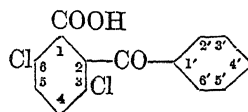
Böeseken, Cohen, *Chem. Zentr.*, 1915, I, 1376.**Dichlorobenzophenone-carboxylic Acid.**See Dichloro-*o*-benzoylbenzoic Acid.**4 : 5-Dichloro-*o*-benzoquinone**C₆H₂O₂Cl₂

MW, 177

Yellow prisms or plates. M.p. 94° decomp. Unstable. Decomposes in H₂O and EtOH.Willstätter, Müller, *Ber.*, 1911, 44, 2190.**2 : 3-Dichloro-*p*-benzoquinone (2 : 3-Dichloroquinone)**C₆H₂O₂Cl₂

MW, 177

Yellow cryst. M.p. 96°.

Gebauer-Fulnegg, Malnič, *Monatsh.*, 1926, 47, 403 (*Bibl.*).**2 : 5-Dichloro-*p*-benzoquinone.**Yellow prisms from EtOH. M.p. 161-2°. Sol. Et₂O, CHCl₃, hot EtOH. Insol. H₂O. Volatile in steam. Decomp. by dil. KOH. SO₂ → 2 : 5-dichlorohydroquinone.*Monoxime* : 2 : 5-dichloro-4-nitrosophenol. Yellow cryst. from C₆H₆. Decomp. at 155-6°.*Acetyl deriv.* : m.p. 149°.*Dioxime* : yellow cryst. from C₆H₆. Sol. hot C₆H₆. Spar. sol. EtOH, Et₂O. Insol. H₂O.Kohn, Gurewitsch, *Monatsh.*, 1930, 56, 135.Hollander, *Chem. Abstracts*, 1919, 13, 3154.**2 : 6-Dichloro-*p*-benzoquinone.**Yellow prisms from ligroin or C₆H₆. M.p. 121°. Sol. CHCl₃, hot EtOH. Spar. sol. H₂O. Heat of comb. C_p 580.4 Cal., C_v 580.9 Cal. Sublimes. Volatile in steam. SO₂ → 2 : 6-dichlorohydroquinone.*4-Oxime* : 2 : 6-dichloro-4-nitrosophenol. Yellow leaflets. Decomp. at 140°. Sol. EtOH, Et₂O. Spar. sol. C₆H₆, CS₂, hot H₂O.*4-Semicarbazone* : 3 : 5-dichloro-1-hydroxy-4-benzeneazoformamide. Yellow or red needles. M.p. 218° decomp.Hodgson, Nixon, *J. Chem. Soc.*, 1930, 1868.van Erp, *Ber.*, 1925, 58, 665.Hollander, *Chem. Abstracts*, 1919, 13, 3154.**3 : 6-Dichloro-*o*-benzoylbenzoic Acid (3 : 6-Dichlorobenzophenone-2-carboxylic acid)**C₁₄H₈O₃Cl₂

MW, 295

Needles from EtOH. Aq. M.p. 168-5° (159°). Sol. EtOH, Et₂O, C₆H₆. Easily resinifies.*Et ester* : C₁₈H₁₂O₃Cl₂. MW, 323. Needles. M.p. 85°.Dougherty, Gleason, *J. Am. Chem. Soc.*, 1930, 52, 1027.

4 : 5-Dichloro-*o*-benzoylbenzoic Acid (4 : 5-Dichlorobenzophenone-2-carboxylic acid).

M.p. 208°. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ 2 : 3-dichloro-anthraquinone.

Barnett, Goodway, Watson, *Ber.*, 1933, 61, 1889.

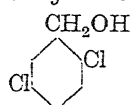
2' : 5'-Dichloro-*o*-benzoylbenzoic Acid (2' : 5'-Dichlorobenzophenone-2-carboxylic acid).

M.p. 169°.

Dougherty, Gleason, *J. Am. Chem. Soc.*, 1930, 52, 1027.

Phillips, *J. Am. Chem. Soc.*, 1926, 48, 3198.

2 : 5-Dichlorobenzyl Alcohol



$\text{C}_7\text{H}_6\text{OCl}_2$

MW, 177

Needles from hot H_2O . M.p. 80°. Sol. EtOH.

Crauw, *Rec. trav. chim.*, 1931, 50, 774.

3 : 4-Dichlorobenzyl Alcohol.

Needles from hot H_2O . M.p. 38° (77°). Mod. sol. hot H_2O . Sol. EtOH.

Acetyl : b.p. 259°.

Beilstein, Kurbatow, *Ann.*, 1868, 147, 350.

Kraay, *Rec. trav. chim.*, 1930, 49, 1086.

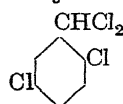
3 : 5-Dichlorobenzyl Alcohol.

Cryst. from C_6H_6 . M.p. 82°.

Acetyl : m.p. 113-14°.

Asinger, Lock, *Monatsh.*, 1933, 62, 347.

2 : 5-Dichlorobenzylidene chloride



$\text{C}_7\text{H}_4\text{Cl}_4$

MW, 230

Cryst. from CHCl_3 . M.p. 42°. Sol. EtOH, Et_2O , CHCl_3 , AcOH, C_6H_6 .

Crauw, *Rec. trav. chim.*, 1931, 50, 773.

2 : 6-Dichlorobenzylidene chloride.

B.p. 124-6°/16 mm.

Gindraux, *Helv. Chim. Acta*, 1929, 12, 933.

Lock, Asinger, *Monatsh.*, 1932, 59, 152.

Geigy, D.R.P. 213,503, (*Chem. Zentr.*, 1909, II, 1515).

3 : 4-Dichlorobenzylidene chloride.

B.p. 257°. Sol. EtOH, Et_2O , C_6H_6 , AcOH. D²² 1.518. H_2O at 220° \rightarrow 3 : 4-dichlorobenzaldehyde.

Beilstein, Kuhlberg, *Ann.*, 1869, 150, 291.

3 : 5-Dichlorobenzylidene chloride.

Cryst. from MeOH or AcOH. Aq. M.p. 36-5°.

Asinger, Lock, *Monatsh.*, 1933, 62, 347.

Dichlorobromoacetic Acid

$\text{CCl}_2\text{Br}\cdot\text{COOH}$

$\text{C}_2\text{HO}_2\text{Cl}_2\text{Br}$

MW, 205

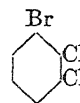
Prisms. M.p. 64°. B.p. 215° decomp. Sol. H_2O , EtOH. Deliquescent. Hot aq. alkalis \rightarrow dichlorobromomethane.

Et ester : $\text{C}_4\text{H}_5\text{O}_2\text{Cl}_2\text{Br}$. MW, 236. B.p. 188-9°.

Amide : $\text{C}_2\text{H}_2\text{ONCl}_2\text{Br}$. MW, 207. M.p. 139°. B.p. 253-5° decomp.

Neumeister, *Ber.*, 1882, 15, 602.

2 : 3-Dichlorobromobenzene



$\text{C}_6\text{H}_3\text{Cl}_2\text{Br}$

MW, 226

Leaflets. M.p. 60°. B.p. 243°. Cryst. from EtOH. Sol. Et_2O , C_6H_6 .

Hurtley, *J. Chem. Soc.*, 1901, 79, 1302.

2 : 4-Dichlorobromobenzene.

Prisms. M.p. 25°. B.p. 235°, 111°/21 mm. Sol. Et_2O , CHCl_3 , C_6H_6 . Mod. sol. EtOH.

Hurtley, *J. Chem. Soc.*, 1901, 79, 1297.

2 : 5-Dichlorobromobenzene.

Needles or prisms. M.p. 35°. B.p. 235°, 119°/26 mm. Sol. Et_2O , CHCl_3 , C_6H_6 , ligroin. Mod. sol. EtOH.

Noelting, Kopp, *Ber.*, 1905, 38, 3509.

Hurtley, *J. Chem. Soc.*, 1901, 79, 1297.

2 : 6-Dichlorobromobenzene.

Plates. M.p. 65°. B.p. 242°. Sol. Et_2O , CHCl_3 , C_6H_6 .

Hurtley, *J. Chem. Soc.*, 1901, 79, 1303.

3 : 4-Dichlorobromobenzene.

Prisms. M.p. 24-5°. B.p. 237°, 124°/33 mm. Sol. Et_2O , CHCl_3 , C_6H_6 . Spar. sol. EtOH.

Hurtley, *J. Chem. Soc.*, 1901, 79, 1297.

3 : 5-Dichlorobromobenzene.

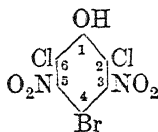
Prisms. M.p. 82-4° (77-5°). B.p. 232°. Sol. Et_2O , CHCl_3 , C_6H_6 . Mod. sol. EtOH.

Hurtley, *J. Chem. Soc.*, 1901, 79, 1300.

Dichlorobromodinitroanisol.

See under Dichlorobromodinitrophenol.

2 : 6-Dichloro-4-bromo-3 : 5-dinitro-phenol

C₆H₃O₅N₂Cl₂Br MW, 332

Prisms. M.p. 170–2°.

Me ether : 2 : 6-dichloro-4-bromo-3 : 5-dinitroanisole. C₇H₃O₅N₂Cl₂Br. MW, 346. M.p. 122–3°.

Kohn, Sussmann, *Monatsh.*, 1925, 46, 585.

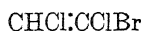
2 : 4-Dichloro-6-bromo-3 : 5-dinitro-phenol.

Prisms from EtOH.Aq. M.p. 170–1°.

Me ether : 2 : 4-dichloro-6-bromo-3 : 5-dinitroanisole. M.p. 119–20°.

Kohn, Sussmann, *Monatsh.*, 1925, 46, 591.

1 : 2-Dichlorobromoethylene

C₂HCl₂Br MW, 176*Cis*-.

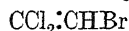
B.p. 113.8°. D₄¹⁵ 1.9133. n_D¹⁵ 1.52182. Stable form.

Trans-. D₄¹⁵ 1.8922. n_D¹⁵ 1.51592.

van de Walle, *Bull. soc. chim. Belg.*, 1920, 29, 322; 1925, 34, 17.

Mkryan, *Chem. Abstracts*, 1946, 40, 3392.

2 : 2-Dichlorobromoethylene

C₂HCl₂Br MW, 176B.p. 107–8° (114–16°/740 mm.). D₄¹⁵ 1.9053.

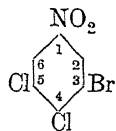
van de Walle, *Bull. soc. chim. Belg.*, 1925, 34, 15.

Dichlorobromomethane (*Dichloromethyl bromide*)CHCl₂Br MW, 164

M.p. – 57.1°. B.p. 90°. D₁₅¹⁵ 2.0555. n_D¹⁵ 1.5012.

Arnhold, *Ann.*, 1887, 240, 207.

4 : 5-Dichloro-3-bromonitrobenzene

C₆H₃O₂NCl₂Br MW, 271

Yellow prisms. M.p. 82.5°.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, 823.

2 : 5-Dichloro-4-bromonitrobenzene.

Yellow leaflets. M.p. 57–8°.

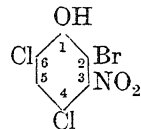
Fox, Turner, *J. Chem. Soc.*, 1930, 1859.

3 : 5-Dichloro-4-bromonitrobenzene.

Colourless cryst. M.p. 88°. Sol. EtOH, Et₂O, C₆H₆. Spar. volatile in steam.

Flürscheim, Simon, *J. Chem. Soc.*, 1908, 93, 1481.

4 : 6-Dichloro-2-bromo-3-nitrophenol

C₆H₂O₃NCl₂Br MW, 287

Prisms. M.p. 92–3°.

p-Toluenesulphonyl : plates. M.p. 134–5°.

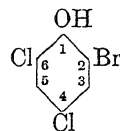
Fox, Turner, *J. Chem. Soc.*, 1930, 1862.

2 : 4-Dichloro-6-bromo-3-nitrophenol.

Yellow needles. M.p. 78–9°.

p-Toluenesulphonyl : prisms. M.p. 122–22.5°.

Fox, Turner, *J. Chem. Soc.*, 1930, 1862.

4 : 6-Dichloro-*o*-bromophenolC₆H₃OCl₂Br MW, 242

Needles. M.p. 68°. B.p. 220°/200 mm. Sol. CHCl₃, Et₂O, C₆H₆. Prac. insol. cold H₂O. Sublimes.

p-Toluenesulphonyl : cryst. M.p. 82–3°.

Fox, Turner, *J. Chem. Soc.*, 1930, 1861.

2 : 6-Dichloro-*m*-bromophenol.

Needles from ligroin. M.p. 76.5°. B.p. 264–70°/751 mm.

Benzoyl : needles. M.p. 102°.

Me ether : b.p. 260–5°/750 mm.

Kohn, Reichmann, *J. Org. Chem.*, 1947, 12, 213.

2 : 5-Dichloro-*p*-bromophenol.

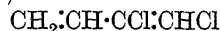
Needles. M.p. 71–2°.

Fox, Turner, *J. Chem. Soc.*, 1930, 1858.

2 : 6-Dichloro-*p*-bromophenol.

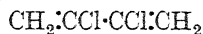
Needles. M.p. 66.5°.

Ling, *J. Chem. Soc.*, 1892, 61, 560.

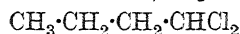
1 : 2-Dichloro-1 : 3-butadiene (*1 : 2-Dichloroerythrene*)C₄H₄Cl₂ MW, 123

B.p. 60–5°/105 mm., 45–8°/10 mm. D₁₅¹⁵ 1.207. n_D¹⁵ 1.5078. Polymerises spontaneously.

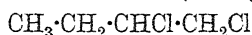
Klebanskii, Wolkenstein, Orlova, *J. prakt. Chem.*, 1936, 145, 1.

2 : 3-Dichloro-1 : 3-butadiene (2 : 3-Dichloroerythrene)

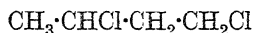
$\text{C}_4\text{H}_4\text{Cl}_2$ MW, 123
B.p. 98° , $41\text{--}3^\circ/85$ mm. D_4^{20} 1.1829. n_D^{20} 1.4890.
Berchet, Carothers, *J. Am. Chem. Soc.*, 1933, 55, 2007.

1 : 1-Dichlorobutane (*Butylidene chloride*)

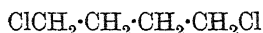
$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
B.p. $114\text{--}15^\circ$.
Meyer, Petrenko-Kritschenko, *Ber.*, 1892, 25, 3308.

1 : 2-Dichlorobutane (1-Butylene dichloride)

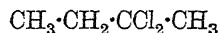
$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
B.p. 125° (approx.).
Perkin, *J. Soc. Chem. Ind.*, 1912, 31, 622.

1 : 3-Dichlorobutane

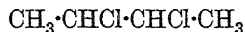
$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
B.p. 134° ($131\text{--}3^\circ$). D_4^{20} 1.1158. n_D^{20} 1.445.
Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1356.
Tishchenko, *Chem. Abstracts*, 1937, 31, 5755.

1 : 4-Dichlorobutane (*Tetramethylene chloride*)

$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
B.p. $161\text{--}3^\circ$, $53\text{--}4^\circ/12$ mm.
v. Braun, Beschke, *Ber.*, 1906, 39, 4124.

2 : 2-Dichlorobutane

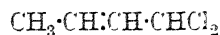
$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
M.p. -74° . B.p. $102\text{--}4^\circ$ ($95\text{--}7^\circ$). n_D 1.4295.
Henry, Bruylants, *Ber.*, 1875, 8, 412.

2 : 3-Dichlorobutane (2-Butylene dichloride)

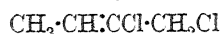
$\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127
B.p. $119\text{--}20^\circ$ ($112\text{--}14^\circ$). D_0 1.126.
Meyer, Müller, *J. prakt. Chem.*, 1892, 46, 186.
Batalin, Ugryumov, *Chem. Abstracts*, 1936, 30, 6701.
Lucas, Gould, *J. Am. Chem. Soc.*, 1941, 63, 2541.

3 : 3-Dichlorobutanone-2.

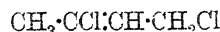
See Methyl 1 : 1-dichloroethyl Ketone.

1 : 1-Dichloro-2-butylene (*Crotylidene chloride*)

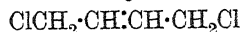
$\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125
B.p. $125\text{--}7^\circ$. D^{20} 1.131.
Kekulé, *Ann.*, 1872, 162, 98.

1 : 2-Dichloro-2-butylene

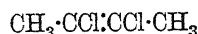
$\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125
Two forms.
(1) B.p. $116\text{--}8^\circ/765$ mm. D_4^{20} 1.1544. n_D^{20} 1.4642.
(2) B.p. $125\text{--}7^\circ$. D_4^{20} 1.1601. n_D^{20} 1.459.
Tishchenko, Churbakov, *Chem. Abstracts*, 1937, 31, 2165.

1 : 3-Dichloro-2-butylene

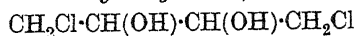
$\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125
B.p. $127\text{--}9^\circ$, $61\text{--}3^\circ/70$ mm., $53\text{--}4^\circ/50$ mm.
 D_4^{20} 1.1591. n_D^{20} 1.47239.
Carothers, Berchet, Collins, *J. Am. Chem. Soc.*, 1932, 54, 4070.
Carothers, Collins, U.S.P. 2,102,611, (*Chem. Abstracts*, 1938, 32, 1282).

1 : 4-Dichloro-2-butylene

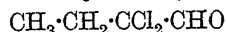
$\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125
B.p. $74\text{--}5\text{--}75\text{--}5^\circ/40$ mm. D_4^{20} 1.1825. n_D^{20} 1.4890.
Petrov, Sopov, *J. Gen. Chem. U.S.S.R.*, 1945, 15, 981.

2 : 3-Dichloro-2-butylene

$\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125
Two forms.
(1) B.p. $101\text{--}3^\circ/758$ mm. D_4^{18} 1.1421. n_D^{18} 1.4539.
(2) B.p. $124\text{--}6^\circ/758$ mm. D_4^{18} 1.162. n_D^{18} 1.459.
Tishchenko, Churbakov, *Chem. Abstracts*, 1937, 31, 2165.

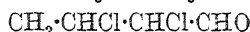
1 : 4-Dichloro-ψ-butylene Glycol (1 : 4-Dichloro-2 : 3-dihydroxybutane)

$\text{C}_4\text{H}_8\text{O}_2\text{Cl}_2$ MW, 159
M.p. $126\text{--}5^\circ$. B.p. $150^\circ/30$ mm. Sol. EtOH.
Przibytek, *Ber.*, 1884, 17, 1091.

1 : 1-Dichlorobutylaldehyde

$\text{C}_4\text{H}_6\text{OCl}_2$ MW, 141
B.p. $108\text{--}112^\circ/15$ mm. D^{16} 1.32518.
Faworski, *J. prakt. Chem.*, 1895, 51, 543.

1 : 2-Dichlorobutyraldehyde



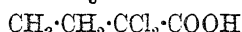
$\text{C}_4\text{H}_5\text{OCl}_2$ MW, 141
B.p. 58–60°/20 mm., 48–9°/13 mm. D_4^{20} 1.2915, D_4^{25} 1.2666. n_D^{25} 1.4618.
Di-Me acetal: b.p. 86–90°/13 mm. $D_4^{19.5}$ 1.179. $n_D^{19.5}$ 1.4498.

Semicarbazone: m.p. 96–7°.

Moureu, Murat, Tampier, *Bull. soc. chim.*, 1921, 29, 29.

Helferich, Besler, *Ber.*, 1924, 57, 1277.

1 : 4-Dichlorobutyric Acid



$\text{C}_4\text{H}_6\text{O}_2\text{Cl}_2$ MW, 157
B.p. 107–10°/14 mm. $D_4^{22.8}$ 1.389.
Ester: $\text{C}_6\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 185. B.p. 71°/16 mm.

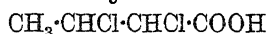
Chloride: $\text{C}_4\text{H}_5\text{OCl}_3$. MW, 175.5. B.p. 48–50°/16 mm.

Amide: $\text{C}_4\text{H}_7\text{ONCl}_2$. MW, 156. Plates from Et_2O -pet. ether. M.p. 51°.

Anilide: b.p. 165–8°/16 mm.

v. Braun, Jostes, Munch, *Ann.*, 1927, 453, 135.

1 : 2-Dichlorobutyric Acid



$\text{C}_4\text{H}_6\text{O}_2\text{Cl}_2$ MW, 157
Exists in two stereoisomeric forms corresponding to crotonic and isocrotonic acids (*q.v.*).

1. *Crotonic acid dichloride*. Prisms. M.p. 63°. B.p. 124–5°/20 mm. Sol. C_6H_6 , CHCl_3 , CS_2 . Mod. sol. EtOH , Et_2O . $k = 8.2 \times 10^{-3}$. Forms an oily product with water.

Me ester: $\text{C}_5\text{H}_8\text{O}_2\text{Cl}_2$. MW, 171. B.p. 174–80° part. decomp., 83–6°/28 mm. $D_4^{18.5}$ 1.2614.

Et ester: b.p. 96°/35 mm.

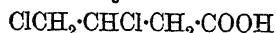
Chloride: b.p. 164°/747 mm., 67.5–71°/30 mm.

2. *Isocrotonic acid dichloride*. Prisms. M.p. 78°. B.p. 132°/20 mm. Sol. EtOH , Et_2O . Spar. sol. H_2O . $k = 6.1 \times 10^{-3}$.

Michael, Bunge, *Ber.*, 1908, 41, 2910.

Melikoff, Petrenko-Kritschenko, *Ann.*, 1891, 266, 372.

2 : 3-Dichlorobutyric Acid



$\text{C}_4\text{H}_6\text{O}_2\text{Cl}_2$ MW, 157
M.p. 48–50°. B.p. 123°/8 mm., part. decomp. Sol. Et_2O , AcOH , CHCl_3 . Spar. sol. pet. ether.

Me ester: b.p. 90°/15 mm. D 1.278. n_D^{25} 1.459.

Et ester: b.p. 206–9°, 92°/12 mm. D 1.273.

n-Propyl ester: b.p. 114–15°/14 mm. D 1.175. n_D^{19} 1.454.

n-Butyl ester: b.p. 127–8°/15 mm. D 1.143. n_D^{19} 1.454.

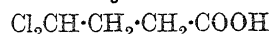
Amide: m.p. 74–5°.

Nitrile: $\text{C}_4\text{H}_5\text{NCl}_2$. MW, 138. B.p. 113–14°/25 mm. D^{20} 1.314.

Lespieau, *Compt. rend.*, 1904, 138, 1051.

Broche, Rambaud, *Compt. rend.*, 1944, 218, 880.

3 : 3-Dichlorobutyric Acid

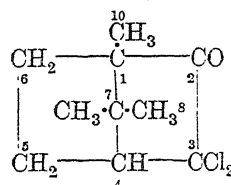


$\text{C}_4\text{H}_6\text{O}_2\text{Cl}_2$ MW, 157
M.p. 103–4°.

Me ester: $\text{C}_5\text{H}_8\text{O}_2\text{Cl}_2$. MW, 171. B.p. 95–100°/36 mm.

Meldrum, Alimechandani, *Quart. J. Indian Chem. Soc.*, 1925, 2, 1.

3 : 3-Dichloro-d-camphor



$\text{C}_{10}\text{H}_{14}\text{OCl}_2$ MW, 221
Prisms. M.p. 96°. Sol. hot EtOH , Et_2O , CHCl_3 , CS_2 . Spar. sol. hot H_2O , AcOH . Sublimes. $[\alpha]_D^{25} + 57.3^\circ$ in EtOH or CHCl_3 .

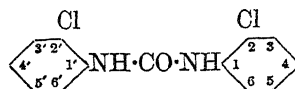
Cazeneuve, *Compt. rend.*, 1882, 94, 730.

3 : 8-Dichloro-d-camphor.

Prisms. M.p. 118–118.5°. Sol. CHCl_3 , C_6H_6 . Spar. sol. pet. ether. Sublimes. Volatile in steam. $[\alpha]_D^{25} + 86.74^\circ$ in CHCl_3 .

Kipping, Pope, *J. Chem. Soc.*, 1895, 67, 389.

2 : 2'-Dichlorocarbanilide



$\text{C}_{13}\text{H}_{10}\text{ON}_2\text{Cl}_2$ MW, 281
Needles. M.p. 240.5–1.5° (238°). Sol. hot AcOH . Mod. sol. hot EtOH . Insol. H_2O , Et_2O , C_6H_6 .

Manuelli, Ricca-Rosellini, *Gazz. chim. ital.*, 1899, 29, 129.

Vittenet, *Bull. soc. chim.*, 1899, 21, 303.

3 : 3'-Dichlorocarbanilide.

Needles. M.p. 245°. Sol. hot EtOH , hot AcOH .

Manuelli, Ricca-Rosellini, *Gazz. chim. ital.*, 1899, 29, 129.

Vittenet, *Bull. soc. chim.*, 1899, 21, 303.

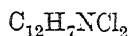
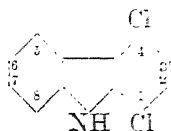
4 : 4'-Dichlorocarbanilide.

Needles. Decomp. above 270° with part. melting and part. sublimation. (M.p. 306–7°). Sol. hot AcOH .

Manuelli, Ricca-Rosellini, *Gazz. chim. ital.*, 1899, 29, 129.

Vittenet, *Bull. soc. chim.*, 1899, 21, 303.

1 : 4-Dichlorocarbazole



MW, 236

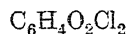
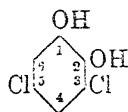
Plates from xylene. M.p. 84–5°.

Barclay, Campbell, *J. Chem. Soc.*, 1945, 530.

3 : 6-Dichlorocarbazole.

Cryst. from $CHCl_3$. M.p. 202–3°. Readily sol. EtOH, AcOH, C_6H_6 .N-Acetyl: needles from $CHCl_3$. M.p. 185–6°.Mazzara, Lamberti-Zanardi, *Gazz. chim. ital.*, 1896, 26, ii, 240.

3 : 5-Dichlorocatechol



MW, 179

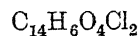
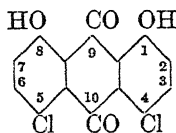
Prisms. M.p. 83–4°. Sol. hot H_2O . Reduces $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ green col.Dakin, *Am. Chem. J.*, 1909, 42, 489.

4 : 5-Dichlorocatechol.

Prisms. M.p. 116–17°.

1-Me ether: 4:5-dichloroguaiacol. $C_7H_6O_2Cl_2$. MW, 193. Needles. M.p. 71–2°. B.p. 260–70°.Di-Me ether: 4:5-dichloroveratrol. $C_8H_8O_2Cl_2$. MW, 207. Needles. M.p. 86–7°.Willstätter, Müller, *Ber.*, 1911, 44, 2184.

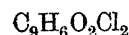
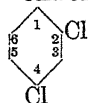
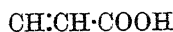
4 : 5-Dichlorochrysazin (4:5-Dichloro-1:8-dihydroxyanthraquinone)



MW, 309

Cryst. with metallic lustre from $PhNO_2$. Spar. sol. EtOH. Mod. sol. C_6H_6 . Red sol. in NaOH.Aq.Bayer, D.R.P. 127,699, (*Chem. Zentr.*, 1902, I, 338).Wedekind, D.R.P. 172,300, (*Chem. Zentr.*, 1906, II, 478).

2 : 4-Dichlorocinnamic Acid



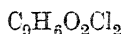
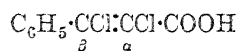
MW, 217

Cryst. from EtOH. M.p. 235–6° (229°).

Newman, Fones, Renoll, *J. Am. Chem. Soc.*, 1947, 69, 718.Walling, Wolfstirn, *ibid.*, 852.

3 : 4-Dichlorocinnamic Acid.

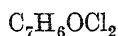
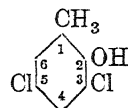
Cryst. from EtOH. M.p. 217–18°.

Walling, Wolfstirn, *J. Am. Chem. Soc.*, 1947, 69, 852. α : β -Dichlorocinnamic Acid

MW, 217

Cis-. M.p. 123°.Sol. EtOH, Et_2O , $CHCl_3$, AcOH.Me ester: $C_{10}H_8O_2Cl_2$. MW, 231. B.p. 113°/0.6 mm.Chloride: $C_9H_7OCl_3$. MW, 235.5. B.p. 127–37°.*Trans*-. M.p. 101°.

Me ester: b.p. 121°/0.6 mm.

Stoermer, Kirchner, *Ber.*, 1920, 53, 128°.3 : 5-Dichloro-*o*-cresol

MW, 177

Needles. M.p. 55°. Sol. EtOH, Et_2O , hot H_2O .Me ether: $C_8H_8OCl_2$. MW, 191. Prisms. M.p. 29–30°. Sol. EtOH, Et_2O , pet. ether.

Acetyl: m.p. 28.5°.

Zincke, *Ann.*, 1918, 417, 206.Tanaka, Morikawa, Sakamoto, *Chem. Abstracts*, 1932, 26, 706.4 : 5-Dichloro-*o*-cresol.Needles. M.p. 101°. Sol. EtOH, C_6H_6 , AcOH.

Benzoyl: needles. M.p. 81°.

Zincke, *Ann.*, 1918, 417, 207.2 : 4-Dichloro-*m*-cresol.

M.p. 58°. B.p. 234°.

Benzoyl: plates from EtOH. M.p. 78–8.5°.

p-Toluenesulphonyl: plates from EtOH. M.p. 100–1°.

Huston, Chen, *J. Am. Chem. Soc.*, 1933, 55, 4217.2 : 6-Dichloro-*m*-cresol.

Prisms from pet. ether. M.p. 27°. B.p. 240.5–42.5°.

Benzoyl: plates from EtOH. M.p. 90.5°.

Benzenesulphonyl: plates from EtOH. M.p. 70°.

p-Toluenesulphonyl: prisms from EtOH. M.p. 92–2.5°.

Huston, Chen, *J. Am. Chem. Soc.*, 1933, 55, 4217.

4 : 6-Dichloro-*m*-cresol.

Needles from pet. ether. M.p. 72°. B.p. 235-6°.

Benzoyl : needles from EtOH. M.p. 57.5°.

Benzenesulphonyl : prisms from EtOH. M.p. 86°.

p-Toluenesulphonyl : needles from EtOH. M.p. 104-5°.

Huston, Chen, *J. Am. Chem. Soc.*, 1933, 55, 4217.

3 : 5-Dichloro-*p*-cresol.

Needles. M.p. 39° (42°). B.p. 130-6°/27 mm. Sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O. Forms add. comp. with 1NH₃. Also forms NH₄ salt, m.p. 125°.

Me ether : C₈H₈OCl₂. MW, 191. B.p. 234°.

HNO₃ → 3 : 5-dichloroanisic acid.

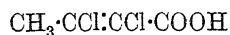
Et ether : C₉H₁₀OCl₂. MW, 205. B.p. 147-50°/26 mm.

Acetyl : leaflets. M.p. 48°.

Benzoyl : plates. M.p. 91°.

Zincke, *Ann.*, 1903, 328, 278.

Chulkov, Parini, Barshev, *Chem. Abstracts*, 1937, 31, 7047.

1 : 2-Dichlorocrotonic Acid

C₄H₄O₂Cl₂ MW, 155

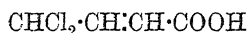
Cis. 1 : 2-Dichloroisocrotonic Acid.

Cryst. from pet. ether. M.p. 75.5°.

Trans.

Needles from ligroin. M.p. 92°.

Szenic, Taggesell, *Ber.*, 1895, 28, 2668.

3 : 3-Dichlorocrotonic Acid

C₄H₄O₂Cl₂ MW, 155

Prisms from pet. ether. M.p. 100-1° (42-3°). B.p. 130°/18 mm., 123°/12 mm. Sol. EtOH, Et₂O, AcOH, CHCl₃, CS₂. Spar. sol. cold H₂O. D₄²⁰ 1.3331. n_D^{20} 1.4597.

Me ester : C₅H₆O₂Cl₂. MW, 169. B.p. 77°/14 mm. D₄²⁰ 1.302. n_D^{20} 1.4694.

Et ester : C₆H₈O₂Cl₂. MW, 183. B.p. 82°/12 mm. D₄¹⁷ 1.2323. n_D^{17} 1.4635.

Chloride : C₄H₃OCl₃. MW, 173.5. B.p. 66-7°/12 mm. D₄²⁰ 1.4429. n_D^{20} 1.4991.

Amide : C₄H₅ONCl₂. MW, 154. Needles from C₆H₆-pet. ether. M.p. 82-3°.

Nitrile : 3 : 3-dichloro-1-cyanopropylene. C₄H₃NCl₂. MW, 136. B.p. 94°/21 mm., 82-3°/12 mm. D₄²⁰ 1.3049. n_D^{20} 1.4974.

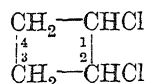
Anilide : needles from C₆H₆-pet. ether. M.p. 83°.

Auwers, Wissebach, *Ber.*, 1923, 56, 731.

Deodhar, *J. Indian Chem. Soc.*, 1934, 11, 83.

3 : 3-Dichloro-1-cyanopropylene.

See under 3 : 3-Dichlorocrotonic Acid.

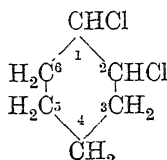
1 : 2-Dichlorocyclobutane

C₄H₆Cl₂

MW, 125

B.p. 133.5-134.5°. Misc. with most ord. org. solvents. D₄²⁰ 1.213.

Willstätter, Bruce, *Ber.*, 1907, 40, 3990.

1 : 2-Dichlorocyclohexane

C₆H₁₀Cl₂

MW, 153

B.p. 187-9°.

Cis., (β -).

B.p. 92-4°/30 mm.

Trans., (α -).

B.p. 87-9°/30 mm.

Markownikow, *Ann.*, 1898, 302, 29.

Komatsu, Kawamoto, *Chem. Abstracts*, 1932, 26, 5080.

1 : 4-Dichlorocyclohexane.

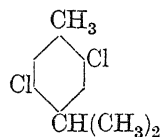
Cis.

B.p. 79-80°. D₄¹³ 1.1831. n_D^{15} 1.4950.

Trans.

B.p. 79-80°.

Palfray, Rothstein, *Compt. rend.*, 1929, 189, 701.

2 : 5-Dichloro-*p*-cymene (2 : 5-Dichloro-1-methyl-4-isopropylbenzene)

C₁₀H₁₂Cl₂

MW, 203

B.p. 240-2°. D₄²⁰ 1.165.

Qvist, Holmberg, *Chem. Zentr.*, 1932, II, 2816.

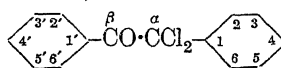
1 : 10-Dichlorodecane (Decamethylene chloride)

C₁₀H₂₀Cl₂

MW, 211

B.p. 147-8°/11 mm. D₄²² 0.9941.

Kawai, Hosono, Shikunami, Shunychi, *Chem. Zentr.*, 1931, II, 1694.

 α : α -Dichlorodeoxybenzoin (Phenyl ω -dichlorobenzyl ketone)

C₁₄H₁₀OCl₂

MW, 265

Cryst. from Et₂O. M.p. 61–2°. B.p. 217°/20 mm. Sol. Et₂O. Spar. sol. EtOH. Insol. H₂O. Decomp. at b.p. under ord. pressures giving benzoyl chloride. Zn + HCl in EtOH → deoxybenzoin. Zn + AcOH → stilbene. HNO₃ → benzil. Alc. KOH → benzaldehyde + benzoic acid.

Zinin, *Ann.*, 1861, 119, 177.

Redsko, *Ber.*, 1889, 22R, 760.

sym.-Dichlorodiacetamide



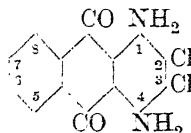
C₄H₅O₂NCl₂ MW, 170

Needles from Me₂CO. M.p. 195° (189°). Sol. EtOH, Me₂CO, AcOH, hot H₂O. Prac. insol. Et₂O. Zn dist. → pyrrole.

König, *J. prakt. Chem.*, 1904, 69, 11.

Bergell, Feigl, *Chem. Zentr.*, 1908, I, 815.

2 : 3-Dichloro-1 : 4-diaminoanthraquinone



C₁₄H₈O₂N₂Cl₂ MW, 307

Prisms with metallic lustre. Violet sol. in Py.

I.G., D.R.P. 488,684, (*Chem. Abstracts*, 1930, 24, 2146).

4 : 8-Dichloro-1 : 5-diaminoanthraquinone.

Red needles with green metallic lustre from PhNO₂. M.p. 305°.

Badische, D.R.P. 199,758, (*Chem. Zentr.*, 1908, II, 46).

Scholl, Wanka, *Ber.*, 1929, 62, 1427.

2 : 2'-Dichlorodiazaminobenzene



C₁₂H₈N₂Cl₂ MW, 266

Golden yellow cryst. M.p. 90°. Sol. EtOH, Et₂O.

Niementowski, *Chem. Zentr.*, 1902, II, 938.

3 : 3'-Dichlorodiazaminobenzene.

Yellow needles from C₆H₆-ligroin. M.p. 107°. Sol. EtOH, Et₂O.

Goldschmidt, Bardach, *Ber.*, 1892, 25, 1357.

4 : 4'-Dichlorodiazaminobenzene.

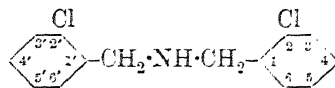
Orange needles from C₆H₆-ligroin. M.p. 130° (124–5°). Sol. EtOH, Et₂O.

Meldola, Streatfeild, *J. Chem. Soc.*, 1888, 53, 670.

Dichlorodibenzyl.

See Stilbene dichloride.

2 : 2'-Dichlorodibenzylamine



C₁₄H₁₃NCl₂ MW, 266

B.p. 211–13°/14 mm.

B.HCl : m.p. 289°.

N-Benzoyl : m.p. 86°.

Picrate : m.p. 136°.

v. Braun, Kühn, Weismantel, *Ann.*, 1926, 449, 275.

2 : 3'-Dichlorodibenzylamine.

B.HCl : m.p. 172°.

N-Benzoyl : m.p. 74°.

Picrate : m.p. 137°.

v. Braun, Kühn, Weismantel, *Ann.*, 1926, 449, 275.

2 : 4'-Dichlorodibenzylamine.

B.p. 200–2°/16 mm.

B.HCl : m.p. 220°.

N-Benzoyl : m.p. 92°.

Picrate : m.p. 129°.

v. Braun, Kühn, Weismantel, *Ann.*, 1926, 449, 275.

3 : 3'-Dichlorodibenzylamine.

Needles from EtOH. M.p. 112°. Sol. EtOH, Et₂O. Insol. H₂O.

B.HCl : m.p. 233°.

B.HNO₃ : m.p. 203°.

B.HNO₂ : m.p. 133°.

B₂H₂PtCl₆ : m.p. 212° decomp.

N-Nitroso : pale yellow needles. M.p. 53°.

N-Benzoyl : m.p. 100°.

Picrate : m.p. 126°.

Curtius, *J. prakt. Chem.*, 1912, 85, 178.

3 : 4'-Dichlorodibenzylamine.

B.HCl : m.p. 236°.

N-Benzoyl : m.p. 196°.

Picrate : m.p. 156°.

v. Braun, Kühn, Weismantel, *Ann.*, 1926, 449, 272.

4 : 4'-Dichlorodibenzylamine.

M.p. 31°. B.p. 230°/15 mm. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

B.HCl : leaflets from EtOH. M.p. 288–9°.

B.HBr : needles. M.p. 283–90°.

N-Me : C₁₅H₁₅NCl₂. MW, 280. B.p. 200°/5 mm.

N-Benzoyl : leaflets from EtOH.Aq. M.p. 119°.

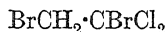
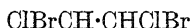
Picrate : m.p. 187°.

v. Braun, Kühn, Weismantel, *Ann.*, 1926, 449, 266.

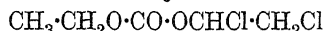
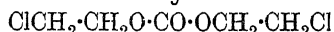
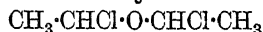
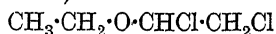
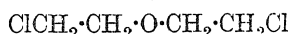
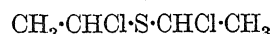
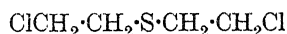
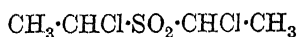
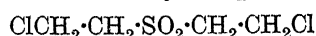
Jackson, Field, *Am. Chem. J.*, 1880, 2, 91.

Dichlorodibenzyl Ether.

See under Chlorobenzyl Alcohol.

1 : 1'-Dichloro-1 : 2-dibromoethane $\text{C}_2\text{H}_2\text{Cl}_2\text{Br}_2$ MW, 257M.p. -66.8° . B.p. $176-8^\circ$ decomp. D^{15}_D 2.2695. n^{15}_D 1.55930.Stadel, Denzel, *Ann.*, 1879, 195, 200.van de Walle, *Bull. soc. chim. Belg.*, 1925, 34, 10.**1 : 2-Dichloro-1 : 2-dibromoethane** $\text{C}_2\text{H}_2\text{Cl}_2\text{Br}_2$ MW, 257M.p. -26° . B.p. 195° , $140^\circ/70$ mm., $79-9.5^\circ/15$ mm. Volatile in steam. $\text{Zn} + \text{EtOH} \rightarrow \text{sym. dichloroethylene}$.Chavanne, *Compt. rend.*, 1912, 154, 777.Sabanejew, *Ann.*, 1882, 216, 261.**Dichlorodibromomethane** CCl_2Br_2 MW, 243M.p. $38^\circ (22^\circ)$. B.p. $150.2^\circ (135^\circ)$. D^{25}_D 2.42. Turns yellow on exposure to light.Besson, *Ber.*, 1892, 25, 188.Arnhold, *Ann.*, 1887, 240, 208.Volkringer, Lecomte, Tchakirian, *Compt. rend.*, 1937, 204, 1927.**2 : 2'-Dichlorodiethylamine.**

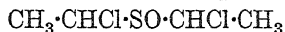
See under 2-Chloroethylamine.

1 : 2-Dichlorodiethyl carbonate $\text{C}_5\text{H}_8\text{O}_3\text{Cl}_2$ MW, 187B.p. $195-6^\circ$.Müller, *Ann.*, 1890, 258, 58.**2 : 2'-Dichlorodiethyl carbonate** $\text{C}_5\text{H}_8\text{O}_3\text{Cl}_2$ MW, 187Needles. M.p. 8.5° . B.p. $240-1^\circ$, $115^\circ/8$ mm. Insol. H_2O . D^{20}_D 1.3506. n^{20}_D 1.4610. Volatile in steam.Nekrassow, Komissarow, *J. prakt. Chem.*, 1929, 123, 160.**1 : 1'-Dichlorodiethyl Ether** $\text{C}_4\text{H}_8\text{OCl}_2$ MW, 143B.p. $112.5-114^\circ$. D^{25}_D 1.106. n^{25}_D 1.4186. $\text{H}_2\text{O} \rightarrow$ acetaldehyde.Geuther, Laatsch, *Ann.*, 1883, 218, 16.Gebauer-Fuelnegg, Moffett, *J. Am. Chem. Soc.*, 1934, 56, 2009.de Kok, Leendertse, Waterman, *Chem. Weekblad*, 1940, 37, 579.**1 : 2-Dichlorodiethyl Ether (Ethyl 1 : 2-dichloroethyl ether)** $\text{C}_4\text{H}_8\text{OCl}_2$ MW, 143B.p. $140-5^\circ$. D^{23}_D 1.174. Decomp. by H_2O , NH_3 , Zn , H_2SO_4 , etc.Lieben, *Ann.*, 1868, 146, 181.**2 : 2'-Dichlorodiethyl Ether** $\text{C}_4\text{H}_8\text{OCl}_2$ MW, 143M.p. -24.5° . B.p. $177-8^\circ$, $70^\circ/15$ mm. D^{20}_D 1.213. n^{20}_D 1.457.Kamm, Waldo, *J. Am. Chem. Soc.*, 1921, 43, 2223.Gibson, Johnson, *J. Chem. Soc.*, 1930, 2526.**1 : 1'-Dichlorodiethyl sulphide** $\text{C}_4\text{H}_8\text{Cl}_2\text{S}$ MW, 159B.p. $58.5-59.5^\circ/15$ mm. D^{15}_D 1.1972. Decomp. by dist. at ord. press. Non-vesicant.Bales, Nickelson, *J. Chem. Soc.*, 1922, 121, 2138.**2 : 2'-Dichlorodiethyl sulphide (Mustard Gas, Yperite, Yellow Cross)** $\text{C}_4\text{H}_8\text{Cl}_2\text{S}$ MW, 159Colourless, oily liq. Solidifies on cooling to colourless prisms, m.p. $13-14^\circ$. B.p. $215-17^\circ$, $98^\circ/10$ mm. Sol. most ord. org. solvents. Prac. insol. H_2O . D^{13}_D (solid) 1.338, D^{20}_D 1.2741. n^{20}_D 1.53125. Volatile in steam. Hyd. by alkalis, slowly by H_2O . Powerful vesicant and poison, causing conjunctivitis and blindness, blistering and inflammation of the skin, even in minute quantities.Pope, Gibson, Thuillier, B.P. 142,875, (*Chem. Abstracts*, 1920, 14, 2802).Gibson, Pope, *J. Chem. Soc.*, 1920, 117, 271.Mann, Pope, *J. Chem. Soc.*, 1922, 121, 594.Helfrich, Reid, *J. Am. Chem. Soc.*, 1920, 42, 1208.Fuson, Ziegler, *J. Org. Chem.*, 1946, 11, 510.**1 : 1'-Dichlorodiethyl sulphone** $\text{C}_4\text{H}_8\text{O}_2\text{Cl}_2\text{S}$ MW, 191Cryst. from CHCl_3 . M.p. $78-80^\circ$. Sol. ord. org. solvents.Lewin, *J. prakt. Chem.*, 1930, 127, 83.**2 : 2'-Dichlorodiethyl sulphone** $\text{C}_4\text{H}_8\text{O}_2\text{Cl}_2\text{S}$ MW, 191

Leaflets from H_2O or EtOH . M.p. 56° . B.p. $183^\circ/20$ mm. Sol. hot. EtOH . Spar. sol. H_2O with hydrolysis. Volatile in steam. Vesicant.

Helfrich, Reid, *J. Am. Chem. Soc.*, 1920, 42, 1213.

1 : 1'-Dichlorodiethyl sulphoxide

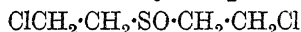


$\text{C}_4\text{H}_8\text{OCl}_2\text{S}$ MW, 175

B.p. $68-70^\circ/1-2$ mm. Sol. EtOH , Et_2O . D_4^{20} 1.3106. n_D^{20} 1.5089.

Lewin, *J. prakt. Chem.*, 1930, 127, 82.

2 : 2'-Dichlorodiethyl sulphoxide



$\text{C}_4\text{H}_8\text{OCl}_2\text{S}$ MW, 175

Plates from EtOH.Aq. M.p. $109-11^\circ$. Sol. H_2O , EtOH , Et_2O , C_6H_6 , CS_2 , Me_2CO . Decomp. by hot H_2O . Non-vesicant.

Helfrich, Reid, *J. Am. Chem. Soc.*, 1920, 42, 1210.

Lewin, Tschulkoff, *J. prakt. Chem.*, 1930, 128, 176.

Gibson, Pope, *J. Chem. Soc.*, 1920, 117, 277.

Dichlorodihydroxybenzoquinone.

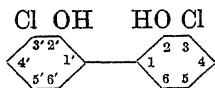
See Chloranilic Acid.

1 : 4-Dichloro-2 : 3-dihydroxybutane.

See 1 : 4-Dichloro-*n*-butylene Glycol.

3 : 3'-Dichloro-2 : 2'-dihydroxydiphenyl

(3 : 3'-Dichloro-*o*-diphenol)



$\text{C}_{12}\text{H}_8\text{O}_2\text{Cl}_2$ MW, 255

Cryst. from C_6H_6 -pet. ether. M.p. about 129° .

Robertson, Briscoe, *J. Chem. Soc.*, 1912, 101, 1973.

5 : 5'-Dichloro-2 : 2'-dihydroxydiphenyl.

Cryst. from C_6H_6 . M.p. 170° .

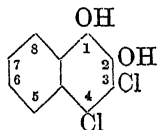
Robertson, Briscoe, *J. Chem. Soc.*, 1912, 101, 1973.

3 : 3'-Dichloro-4 : 4'-dihydroxydiphenyl

(3 : 3'-Dichloro-*p*-diphenol).

Needles from H_2O . M.p. 124° . Sol. EtOH , Et_2O , alkalis. Spar. sol. hot H_2O .

Cain, *J. Chem. Soc.*, 1904, 85, 10.

3 : 4-Dichloro-1 : 2-dihydroxynaphthalene (3 : 4-Dichloro- β -naphthohydroquinone)

$\text{C}_{10}\text{H}_6\text{O}_2\text{Cl}_2$ MW, 229

Needles. M.p. 125° . Sol. EtOH , Et_2O , AcOH .

Zincke, *Ber.*, 1886, 19, 2500.

2 : 4-Dichloro-1 : 3-dihydroxynaphthalene (2 : 4-Dichloronaphthoresorcinol).

Leaflets or needles. M.p. 139° . Sol. EtOH , C_6H_6 , AcOH . Sublimes.

1 : 3-Diacetyl : m.p. 136° .

Zincke, Egly, *Ann.*, 1898, 300, 193.

2 : 3-Dichloro-1 : 4-dihydroxynaphthalene (2 : 3-Dichloro- α -naphthohydroquinone).

Cryst. from EtOH.Aq. M.p. 135° ($135-40^\circ$). Sol. EtOH , Et_2O . Spar. sol. hot H_2O . Ox. \rightarrow 2 : 3-dichloro-1 : 4-naphthoquinone.

1 : 4-Diacetyl : needles. M.p. 236° .

Claus, *Ber.*, 1886, 19, 1144.

4 : 8-Dichloro-1 : 5-dihydroxynaphthalene.

Needles from AcOH . M.p. 194° . Sol. EtOH , Et_2O , CHCl_3 , hot C_6H_6 . Darkens slowly in moist air.

1-Acetyl : needles from AcOH . M.p. $158-60^\circ$. 1 : 5-Diacetyl : cryst. from Me_2CO . M.p. 154° (143°).

1-Benzoyl : cryst. from AcOH . M.p. $157-8^\circ$. 1 : 5-Dibenzoyl : cryst. from Me_2CO . M.p. 179° .

Wheeler, Mattox, *J. Am. Chem. Soc.*, 1933, 55, 687.

1 : 4-Dichloro-2 : 3-dihydroxynaphthalene.

Prisms. M.p. 181° . Sol. EtOH , Et_2O , Me_2CO . Mod. sol. AcOH , CHCl_3 .

2 : 3-Diacetyl : m.p. 141° .

Zincke, Fries, *Ann.*, 1904, 334, 353.

1 : 5-Dichloro-2 : 6-dihydroxynaphthalene.

Needles from AcOH . M.p. 223.5° . Sol. EtOH , Et_2O , Me_2CO , hot C_6H_6 . Insol. H_2O .

2 : 6-Diacetyl : m.p. 179° .

Willstätter, Parnas, *Ber.*, 1907, 40, 3974.

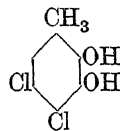
1 : 8-Dichloro-2 : 7-dihydroxynaphthalene.

Needles from AcOH . M.p. 192° . Sol. EtOH , hot AcOH .

2 : 7-Diacetyl : needles. M.p. 195° .

Clausius, *Ber.*, 1890, 23, 525.

4 : 5-Dichloro-2 : 3-dihydroxytoluene (4 : 5-Dichloroisohomocatechol)



$\text{C}_7\text{H}_6\text{O}_2\text{Cl}_2$ MW, 193

Needles. M.p. 107° . Turns red in air. Sol. ord. org. solvents. Spar. sol. H_2O . $\text{NaOH} \rightarrow$ bluish-violet col. in air.

2 : 3-Diacetyl : m.p. 112° .

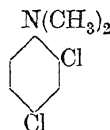
Zincke, *Ann.*, 1918, 417, 214.

Dichloro-2 : 5-dihydroxytoluene.

See Dichlorotoluhydroquinone.

Dichlorodi-iodomethane

MW, 337

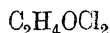
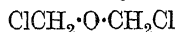
Plates. M.p. 85° decomp. Decomp. on dissolving in EtOH or Et₂O.Höland, *Ann.*, 1887, 240, 233.**2 : 4-Dichloro-*N*-dimethylaniline**

MW, 190

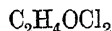
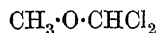
B.p. 234°, 92–5°/2 mm.

 $\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 198° decomp.I.G., B.P. 288,665, (*Chem. Abstracts*, 1929, 23, 606).Schmidt, Schumacher, *Ber.*, 1921, 54, 1417.**3 : 5-Dichloro-*N*-dimethylaniline.**

Plates. M.p. 55°. B.p. 264°/740 mm.

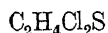
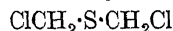
Geigy, D.R.P. 105,103, (*Chem. Zentr.*, 1900, I, 238).***sym.*-Dichlorodimethyl Ether**

MW, 115

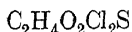
B.p. 104–5°. D_4^{15} 1.328. n_D^{20} 1.435. $\text{H}_2\text{O} \longrightarrow \text{H}\cdot\text{CHO} + \text{HCl}$. $\text{NH}_3 \longrightarrow$ hexamethylene-tetramine. Forms add. comp. with Py.Vorohtzov, Yurvigina, *Chem. Abstracts*, 1931, 25, 4522.Fuchs, Katscher, D.R.P. 505,687, (*ibid.*, 5231).Litterscheid, Thimme, *Ann.*, 1904, 334, 13.***unsym.*-Dichlorodimethyl Ether**

MW, 115

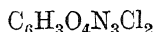
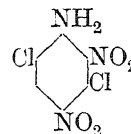
B.p. 82–4°.

Salzberg, Werntz, U.S.P. 2,065,400, (*Chem. Zentr.*, 1937, I, 3715).***sym.*-Dichlorodimethyl sulphide**

MW, 131

B.p. 156.5°, 51°/11 mm. D_4^{20} 1.4065. Decomp. by hot H_2O .Bloch, Höhn, *Ber.*, 1922, 55, 54.***sym.*-Dichlorodimethyl sulphone**

MW, 163

Needles from CCl_4 . M.p. 70.5–72°. Sol. EtOH, Et₂O. Decomp. by hot H_2O .Lewin, *J. prakt. Chem.*, 1930, 127, 82.**3 : 6-Dichloro-2 : 4-dinitroaniline**

MW, 252

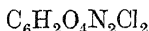
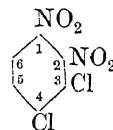
Orange needles. M.p. 168°.

Sandoz, F.P. 798,141, (*Chem. Zentr.*, 1936, II, 2616).**5 : 6-Dichloro-2 : 4-dinitroaniline.**

Yellow needles. M.p. 197–8°.

Hüffer, *Rec. trav. chim.*, 1921, 40, 451.**3 : 4-Dichloro-2 : 6(?) -dinitroaniline.**

Red needles from 50% AcOH. M.p. 127–8°.

N-Acetyl: m.p. 245–6°.Beilstein, Kurbatow, *Ann.*, 1879, 196, 225, 227.**3 : 4-Dichloro-*o*-dinitrobenzene**

MW, 237

Needles from hot ligroin. M.p. 97°.

Holleman, *Rec. trav. chim.*, 1920, 39, 446.**3 : 5-Dichloro-*o*-dinitrobenzene.**Cryst. from EtOH- C_6H_6 . M.p. 98°. Sol. EtOH, Et₂O, C_6H_6 . Insol. H_2O . D^{10} 1.745. KOH.Aq. \longrightarrow 4 : 6-dichloro-2-nitrophenol. Alc. $\text{NH}_3 \longrightarrow$ 4 : 6-dichloro-2-nitroaniline.Holleman, *Rec. trav. chim.*, 1920, 39, 437.**3 : 6-Dichloro-*o*-dinitrobenzene.**Needles. M.p. 103°. B.p. 318° part. decomp. Sol. EtOH, Et₂O, CS_2 , C_6H_6 . Insol. H_2O . D^{16} 1.6945. Alc. $\text{NH}_3 \longrightarrow$ 3 : 6-dichloro-2-nitroaniline.Holleman, den Hollander, van Haeften, *Rec. trav. chim.*, 1921, 40, 323 (*Bibl.*).**4 : 5-Dichloro-*o*-dinitrobenzene.**Leaflets from EtOH. M.p. 110°. Sol. Et₂O, C_6H_6 . Mod. sol. EtOH. Insol. H_2O . Alc. $\text{NH}_3 \longrightarrow$ 4 : 5-dichloro-2-nitroaniline. NaOMe \longrightarrow 4 : 5-dichloro-2-nitroanisole.Holleman, *Rec. trav. chim.*, 1920, 39, 446.**2 : 4-Dichloro-*m*-dinitrobenzene.**Prisms or needles from EtOH. M.p. 71°. Sol. Et₂O, C_6H_6 . Alc. $\text{NH}_3 \longrightarrow$ 2 : 4-dinitro-*m*-phenylenediamine.Jois, Manjunath, *Chem. Abstracts*, 1931, 25, 2981.Holleman, *Rec. trav. chim.*, 1920, 39, 439.

2 : 5-Dichloro-*m*-dinitrobenzene.

Leaflets from EtOH. M.p. 104–5°. B.p. 312° slight decomp. Sol. Et₂O, CS₂, C₆H₆, AcOH. Mod. sol. hot EtOH. Insol. H₂O. D₄¹⁶ 1.7103.

Holleman, *Rec. trav. chim.*, 1920, 39, 440; 1921, 40, 323.

2 : 6-Dichloro-*m*-dinitrobenzene.

Pale yellow needles. M.p. 102–3°.

Holleman, *Rec. trav. chim.*, 1920, 39, 441.

4 : 5-Dichloro-*m*-dinitrobenzene.

Yellow plates from EtOH. M.p. 56°. Sol. C₆H₆, AcOH, Me₂CO. Spar. sol. ligroin.

Holleman, *Rec. trav. chim.*, 1920, 39, 449.

4 : 6-Dichloro-*m*-dinitrobenzene.

Plates. M.p. 103°. Sol. Et₂O, C₆H₆. Mod. sol. hot EtOH. Insol. H₂O. Alc. NH₃ at 100° → 5-chloro-2 : 4-dinitroaniline, at 150° → 4 : 6-dinitro-*m*-phenylenediamine. Caustic alkalis → 5-chloro-2 : 4-dinitrophenol.

Jois, Manjunath, *Chem. Abstracts*, 1931, 25, 2981.

Borsche, Feske, *Ber.*, 1928, 61, 702.

2 : 3-Dichloro-*p*-dinitrobenzene.

Cryst. from EtOH. M.p. 60°.

den Hollander, *Chem. Abstracts*, 1919, 13, 3154.

Holleman, *Rec. trav. chim.*, 1920, 39, 451.

2 : 5-Dichloro-*p*-dinitrobenzene.

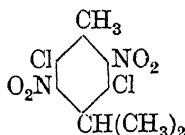
Pale yellow needles from EtOH. M.p. 119°. Red. → 2 : 5-dichloro-*p*-phenylenediamine.

Holleman, den Hollander, van Haeften, *Rec. trav. chim.*, 1921, 40, 323.

2 : 6-Dichloro-*p*-dinitrobenzene.

Needles from EtOH. M.p. 114°. Alc. NH₃ → 2 : 6-dichloro-4-nitroaniline.

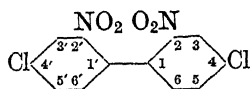
Holleman, *Rec. trav. chim.*, 1920, 39, 438.

3 : 6-Dichloro-2 : 5-dinitro-*p*-cymene (3 : 6-Dichloro-2 : 5-dinitro-1-methyl-4-isopropylbenzene)

C₁₀H₁₀O₄N₂Cl₂ MW, 293

Leaflets from EtOH. M.p. 122.5–124.5°.

Qvist, Holmberg, *Chem. Zentr.*, 1932, II, 2816.

4 : 4'-Dichloro-2 : 2'-dinitrodiphenyl

C₁₂H₆O₄N₂Cl₂ MW, 313

Yellow cryst. from EtOH. M.p. 139–40°. Spar. sol. ligroin, cold EtOH.

Ponte, *Chem. Zentr.*, 1934, I, 1976.

5 : 5'-Dichloro-2 : 2'-dinitrodiphenyl.

Brownish-yellow needles from EtOH or AcOH. M.p. 170°. Spar. sol. EtOH, Et₂O, ligroin.

Borsche, Scholten, *Ber.*, 1917, 50, 610.

4 : 4'-Dichloro-2 : 3'-dinitrodiphenyl.

Needles from AcOH. M.p. 141–2°.

Shaw, Turner, *J. Chem. Soc.*, 1932, 295.

2 : 4'-Dichloro-3 : 3'-dinitrodiphenyl.

Yellow prisms. M.p. 172°.

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 1193.

4 : 4'-Dichloro-3 : 3'-dinitrodiphenyl.

Needles from PhNO₂. M.p. 237°.

Hodgson, Walker, *J. Chem. Soc.*, 1933, 1621.

6 : 6'-Dichloro-3 : 3'-dinitrodiphenyl.

Cryst. from Me₂CO. M.p. 205°.

Mascarelli, Gatti, Longo, *Gazz. chim. ital.*, 1933, 63, 654.

Case, Schock, *J. Am. Chem. Soc.*, 1943, 65, 2086.

4 : 2'-Dichloro-3 : 4'-dinitrodiphenyl.

Orange-yellow needles. M.p. 142°.

Bellavita, *Chem. Zentr.*, 1937, I, 4634.

2 : 2'-Dichloro-4 : 4'-dinitrodiphenyl.

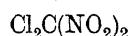
Cryst. from MeOH. M.p. 107–8°.

Case, Schock, *J. Am. Chem. Soc.*, 1943, 65, 2086.

3 : 3'-Dichloro-4 : 4'-dinitrodiphenyl.

Needles from AcOH. M.p. 226–30°.

Hodgson, Ward, *J. Chem. Soc.*, 1947, 127.

Dichlorodinitromethane

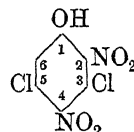
C₂N₂Cl₂ MW, 175

B.p. 121–22.5°, 43°/17 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, CS₂. Insol. H₂O. D₄²⁵ 1.6606 (1.6124). n_D²⁰ 1.4575. Volatile in steam.

Birkenbach, Sennewald, *Ann.*, 1931, 489, 21.

Boyd, *J. Soc. Chem. Ind.*, 1925, 44, 222t.

Downing, Orr, *J. Chem. Soc.*, 1934, 1671.

3 : 5-Dichloro-2 : 4-dinitrophenol

C₆H₂O₅N₂Cl₂ MW, 253

Yellow plates from H₂O. M.p. 120°. Sol. EtOH. Spar. sol. Et₂O, C₆H₆.

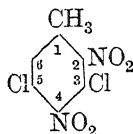
Borsche, Trautner, *Ann.*, 1926, 447, 9.

3 : 6-Dichloro-2 : 4-dinitrophenol.

Yellow prisms. M.p. 146°.

Fries, Buchler, *Ann.*, 1927, 454, 247.

3 : 5-Dichloro-2 : 4-dinitrotoluene

 $C_7H_4O_4N_2Cl_2$

MW, 251

Needles from EtOH. M.p. 127°.

Borsche, Trautner, *Ann.*, 1926, 447, 13.

3 : 6-Dichloro-2 : 4-dinitrotoluene.

Cryst. from AcOH. M.p. 101°.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1131.

5 : 6-Dichloro-2 : 4-dinitrotoluene.

M.p. 71-2°.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1128.

3 : 4-Dichloro-2 : 6-dinitrotoluene.

Needles from AcOH. M.p. 92-3°.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1133; 1902, 81, 1349.

3 : 5-Dichloro-2 : 6-dinitrotoluene.

Needles from EtOH. M.p. 99-100°.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1133; 1902, 81, 1349.

2 : 6-Dichloro-3 : 4-dinitrotoluene.

Needles from hot EtOH. M.p. 130-1°.

Levy, Stephen, *J. Chem. Soc.*, 1931, 79.

2 : 4-Dichloro-3 : 5-dinitrotoluene.

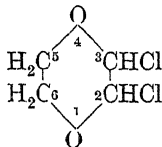
Needles from MeOH. M.p. 104°. Alc. NH_3 → 3 : 5-dinitro-2 : 4-tolylendiamine.Blanksma, *Rec. trav. chim.*, 1910, 29, 415.

2 : 6-Dichloro-3 : 5-dinitrotoluene.

Needles from EtOH. M.p. 122°.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1132.

2 : 3-Dichloro-1 : 4-dioxan

 $C_4H_6O_2Cl_2$

MW, 157

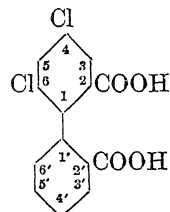
M.p. 30°. B.p. 88-9°/16-17 mm. (97-8°/20 mm.).

Butler, Cretcher, *J. Am. Chem. Soc.*, 1932, 54, 2988.Baker, Shannon, *J. Chem. Soc.*, 1933, 1598.Kucera, Carpenter, *J. Am. Chem. Soc.*, 1935, 57, 2346.Gunther, Metcalf, *J. Am. Chem. Soc.*, 1946, 68, 2046.

2 : 5-Dichloro-1 : 4-dioxan.

Needles from pet. ether. M.p. 117-18°. Hyd. by H_2O .Smedley, U.S.P. 2,414,982, (*Chem. Abstracts*, 1947, 41, 2755).Umhoefer, U.S.P. 2,414,989, (*Chem. Abstracts*, 1947, 41, 2756).

4 : 6-Dichlorodiphenic Acid (4 : 6-Dichlorodiphenyl-2 : 2'-dicarboxylic acid)

 $C_{14}H_8O_4Cl_2$

MW, 311

Needles from AcOEt-ligroin. M.p. 216-17°.

Atkinson *et al.*, *J. Am. Chem. Soc.*, 1945, 67, 1513.

3 : 3'-Dichlorodiphenic Acid.

Cryst. from EtOH.Aq. M.p. 304-5°.

Anhydride: $C_{14}H_6O_3Cl_2$. MW, 293. Cryst. from C_6H_6 -ligroin. M.p. 257-8°.Huntress, Cliff, *J. Am. Chem. Soc.*, 1933, 55, 2562.

5 : 5'-Dichlorodiphenic Acid.

Pale yellow plates from EtOH.Aq. M.p. 297°. Sol. Me_2CO , hot EtOH. Spar. sol. Et_2O , hot C_6H_6 . Insol. H_2O .*Anhydride*: cryst. from C_6H_6 -ligroin. M.p. 206°.Hunn, *J. Am. Chem. Soc.*, 1923, 45, 1028.

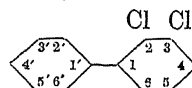
6 : 6'-Dichlorodiphenic Acid.

dl.

Needles from EtOH. M.p. 288°.

Mono-Me ester: $C_{15}H_{10}O_4Cl_2$. MW, 325. Prisms from C_6H_6 . M.p. 156°.*Mono-Et ester*: $C_{16}H_{12}O_4Cl_2$. MW, 339. Plates from EtOH. M.p. 103-4°.*d*.Plates. M.p. 259°. $[\alpha]_D^{15} -20.18^\circ$ in dil. NaOH.Aq.*l*.Plates. M.p. 259°. $[\alpha]_D^{15} +21.43^\circ$ in dil. NaOH.Aq.Christie, James, Kenner, *J. Chem. Soc.*, 1923, 123, 1950.

2 : 3-Dichlorodiphenyl

 $C_{12}H_8Cl_2$

MW, 223

B.p. 172°/3 mm.

Crauw, *Rec. trav. chim.*, 1931, 50, 776.

2 : 5-Dichlorodiphenyl.

B.p. 182°/30 mm., 171°/15 mm. CrO_3 in $\text{AcOH} \rightarrow$ 2 : 5-dichlorobenzoic acid.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 94.

Crauw, *Rec. trav. chim.*, 1931, 50, 777.

3 : 4-Dichlorodiphenyl.

Pale yellow cryst. M.p. 49–50° (46°). B.p. 195–200°/15 mm. CrO_3 in $\text{AcOH} \rightarrow$ 3 : 4-dichlorobenzoic acid.

Scarborough, Waters, *J. Chem. Soc.*, 1926, 560.

3 : 5-Dichlorodiphenyl.

Needles from EtOH. M.p. 36°. B.p. 180°/15 mm. CrO_3 in $\text{AcOH} \rightarrow$ 3 : 5-dichlorobenzoic acid.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 93.

Hinkel, Hey, *J. Chem. Soc.*, 1928, 2789.

2 : 2'-Dichlorodiphenyl.

Cryst. from MeOH. M.p. 60.5°. Sol. most ord. org. solvents.

Dobbie, Fox, Gauge, *J. Chem. Soc.*, 1911, 99, 1619.

Schwechten, *Ber.*, 1932, 65, 1607.

2 : 4'-Dichlorodiphenyl.

B.p. 191°/3 mm.

Crauw, *Rec. trav. chim.*, 1931, 50, 776.

Finzi, Bellavita, *Gazz. chim. ital.*, 1934, 64, 335.

3 : 3'-Dichlorodiphenyl.

Needles from EtOH.Aq. M.p. 29° (23°). B.p. 322–4° (298°). Sol. EtOH, Et_2O , C_6H_6 .

Ullmann, *Ann.*, 1904, 332, 54.

Cain, *J. Chem. Soc.*, 1904, 85, 7.

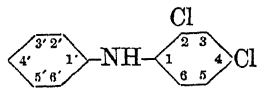
4 : 4'-Dichlorodiphenyl.

Prisms or needles from toluene-pet. ether. M.p. 148–9°. B.p. 315–19°. CrO_3 in $\text{AcOH} \rightarrow$ *p*-chlorobenzoic acid.

Shaw, Turner, *J. Chem. Soc.*, 1932, 294.

Fichter, Adler, *Helv. Chim. Acta*, 1926, 9, 285.

Schwechten, *Ber.*, 1932, 65, 1607.

2 : 4-Dichlorodiphenylamine

$\text{C}_{12}\text{H}_9\text{NCl}_2$

MW, 238

Needles from MeOH.Aq. M.p. 64°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin. Insol. H_2O . Colourless sol. in conc. H_2SO_4 changing to violet then brown on addn. of HNO_3 .

Ullmann, *Ann.*, 1907, 355, 340.

2 : 5-Dichlorodiphenylamine.

F.p. below –16°. B.p. 195°/17 mm.

Elson, Gibson, *J. Chem. Soc.*, 1931, 299.

Dict. of Org. Comp.—II.

3 : 4-Dichlorodiphenylamine.

Plates from EtOH. M.p. 69°. B.p. 218–20°/20 mm.

Elson, Gibson, *J. Chem. Soc.*, 1931, 299.

3 : 5-Dichlorodiphenylamine.

M.p. 41–2°. B.p. 222–224°/25 mm.

Chapman, Perrott, *J. Chem. Soc.*, 1932, 1773.

2 : 2'-Dichlorodiphenylamine.

M.p. 30–1°. B.p. 200–202°/27 mm.

Chapman, Perrott, *J. Chem. Soc.*, 1932, 1777.

2 : 4'-Dichlorodiphenylamine.

Prisms from EtOH. M.p. 42°.

N-Nitroso : needles from pet. ether. M.p. 66–7°.

Jamison, Turner, *J. Chem. Soc.*, 1937, 1955.

3 : 3'-Dichlorodiphenylamine.

F.p. below –16°. B.p. 225–30°/18 mm. Darkens in air.

Elson, Gibson, *J. Chem. Soc.*, 1931, 301.

3 : 4'-Dichlorodiphenylamine.

Prisms from EtOH. M.p. 63–4°. B.p. 235°/25 mm.

Elson, Gibson, *J. Chem. Soc.*, 1931, 301.

4 : 4'-Dichlorodiphenylamine.

Cryst. from ligroin. M.p. 71–2°.

Burton, Gibson, *J. Chem. Soc.*, 1926, 2246.

Dichlorodiphenylethane.

See Stilbene dichloride.

α : α -Dichlorodiphenylmethane (*Diphenylmethylene chloride, benzophenone chloride*)



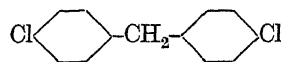
$\text{C}_{13}\text{H}_{10}\text{Cl}_2$

MW, 237

B.p. 305° decomp., 186°/26 mm., 162°/16 mm. D_{15}^{25} 1.235. Sol. conc. H_2SO_4 to yellow sol. : colour disappears on standing owing to formation of benzophenone.

Norris, Thomas, Brown, *Ber.*, 1910, 43, 2958.

Staudinger, Anthes, Pfenninger, *Ber.*, 1916, 49, 1941.

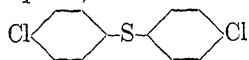
4 : 4'-Dichlorodiphenylmethane

$\text{C}_{13}\text{H}_{10}\text{Cl}_2$

MW, 237

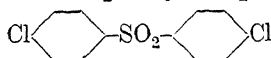
Prisms. M.p. 55°. B.p. 337°. Sol. EtOH. D_{17}^{25} 1.365.

Montagne, *Rec. trav. chim.*, 1906, 25, 390, 412.

4 : 4'-Dichlorodiphenyl sulphide (*Di-p-chlorophenyl sulphide*)

$C_{12}H_8Cl_2S$ MW, 255
M.p. 98°.

Fries, Vogt, *Ann.*, 1911, 381, 342

4 : 4'-Dichlorodiphenyl sulphone

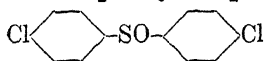
$C_{12}H_8O_2Cl_2S$ MW, 287
Cryst. M.p. 148°. Spar. sol. cold EtOH.
Insol. H_2O . Sublimes.

Bayer, D.R.P. 234,518, (*Chem. Zentr.*, 1911, I, 1620).

Ullmann, Korselt, *Ber.*, 1907, 40, 642.

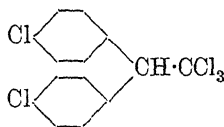
Fougue, Lacroix, *Bull. soc. chim.*, 1923, 33, 183.

Heymann, Fieser, *J. Am. Chem. Soc.*, 1945, 67, 1979.

4 : 4'-Dichlorodiphenyl sulphoxide

$C_{12}H_8OCl_2S$ MW, 271
Cryst. from C_6H_6 . M.p. 143°. Sol. $CHCl_3$.
Mod. sol. EtOH, C_6H_6 , AcOH.

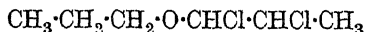
Fries, Vogt, *Ann.*, 1911, 381, 343.

pp'-Dichlorodiphenyltrichloroethane (*D.D.T.*)

$C_{14}H_9Cl_5$ MW, 354.5
Colourless needles from EtOH. M.p. 107-8°. Spar. sol. H_2O . Sol. most org. solvents. Alc. KOH \rightarrow dichlorodiphenyldichloroethylene. Powerful insecticide.

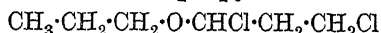
Bailes, *J. Chem. Education*, 1945, 22, 122.

West, Campbell, *DDT, The Synthetic Insecticide*, Chapman & Hall, 1946.

1 : 2-Dichlorodi-n-propyl Ether

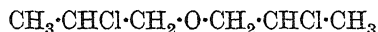
$C_6H_{12}OCl_2$ MW, 171
B.p. 165-70° part decomp., 96-9°/15 mm.
 D_4^{15} 1.129. n_D^{15} 1.447.

Oddo, Cusmano, *Gazz. chim. ital.*, 1911, 41, ii, 240.

1 : 3-Dichlorodi-n-propyl Ether

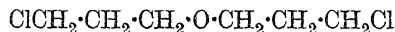
$C_6H_{12}OCl_2$ MW, 171
B.p. 65°/12 mm. D_4^{20} 1.100. n_D^{20} 1.44576.

Dulière, *Bull. soc. chim.*, 1923, 33, 1647.

2 : 2'-Dichlorodi-n-propyl Ether

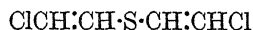
$C_6H_{12}OCl_2$ MW, 171
B.p. 188°. D_4^{20} 1.109. n_D^{20} 1.44675.

Dewael, *Chem. Abstracts*, 1926, 20, 1386.

3 : 3'-Dichlorodi-n-propyl Ether

$C_6H_{12}OCl_2$ MW, 171
B.p. 215°/745 mm. D_4^{20} 1.140.

Kamm, Newcomb, *J. Am. Chem. Soc.*, 1921, 43, 2229.

2 : 2'-Dichlorodivinyl sulphide

$C_4H_4Cl_2S$ MW, 155
B.p. 71-2°/12 mm. D_4^{20} 1.365.

Kliger, *Chem. Zentr.*, 1934, II, 1608.

2 : 2'-Dichlorodivinyl sulphone

$C_4H_4O_2Cl_2S$ MW, 187
B.p. 60-3°/0.35 mm.

Müller, Metzger, *J. prakt. Chem.*, 1926, 114, 123.

2 : 2'-Dichlorodivinyl sulphoxide

$C_4H_4OCl_2S$ MW, 171
B.p. 86-7°/10 mm.

Kretow, Kliger, *Chem. Zentr.*, 1933, I, 2801.

1 : 12-Dichlorododecane (*Dodecamethylene chloride*)

$C_{12}H_{24}Cl_2$ MW, 239
M.p. 29°. B.p. 170-2°/10 mm.

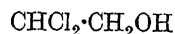
v. Braun, Sobecki, *Ber.*, 1911, 44, 1474.

Dichloroerythrene.

See Dichloro-1 : 3-butadiene.

Dichloroethane.

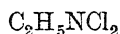
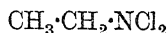
See Ethylidene chloride and Ethylene dichloride.

2 : 2-Dichloroethyl Alcohol (*2 : 2-Dichloro-1-hydroxyethane*)

$C_2H_4OCl_2$ MW, 115
B.p. 146°. Sol. EtOH, Et_2O . Spar. sol. H_2O . D_4^{15} 1.145. $HNO_3 \rightarrow$ dichloroacetic acid. Reduces Tollen's reagent.

Nitrate : $C_2H_3O_3NCl_2$. MW, 160. B.p. 155-6°. Acetyl : b.p. 166-8°. D_4^{15} 1.104.

Delacre, *Compt. rend.*, 1887, 104, 1184.

N-Dichloroethylamine (*Ethyldichloroamine*)

MW, 114

Yellow oil. F.p. below -30° . B.p. 89° (91°). D_{15}^{25} 1.2300. Slowly decomp. on standing in sunlight. Decomp. by H_2O and alkalis. Powerful chlorinating and oxidising agent.

Tcherniac, *Ber.*, 1899, 32, 3582.

Meisenheimer, *Ber.*, 1913, 46, 1158.

Dichloro-ethylarsine.

See Ethyldichloroarsine.

 α : β -Dichloroethylbenzene.

See Styrene dichloride.

sym.-Dichloroethylene.

See Acetylene dichloride.

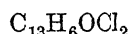
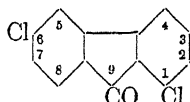
unsym.-Dichloroethylene (1 : 1-Dichloroethylene, vinylidene chloride)

MW, 97

B.p. 37° . D_{15}^{25} 1.250. Polymerises to amorphous mass. Adds Cl_2 .

Jocitsch, Faworski, *Chem. Zentr.*, 1899, I, 777.

I.G., D.R.P. 529,604, (*Chem. Abstracts*, 1931, 25, 5178).

1 : 6-Dichlorofluorenone

MW, 249

Yellow cryst. from EtOH.Aq. or hot C_6H_6 -ligroin. M.p. $218-19^\circ$. Sublimes.

Oxime : m.p. 230° .

Huntress, Cliff, *J. Am. Chem. Soc.*, 1933, 55, 2565.

1 : 8-Dichlorofluorenone.

Yellow cryst. from hot C_6H_6 . M.p. 254° .

Oxime : m.p. 217° decomp.

Huntress, Cliff, *J. Am. Chem. Soc.*, 1933, 55, 2565.

2 : 7-Dichlorofluorenone.

Yellow needles by sublimation. M.p. 189° .

Oxime : yellow needles from EtOH.Aq. M.p. 243° decomp.

Phenylhydrazone : orange-yellow needles from EtOH.Aq. M.p. $186-7^\circ$ decomp.

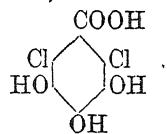
Schmidt, Wagner, *Ann.*, 1912, 387, 161.

3 : 6-Dichlorofluorenone.

Yellow needles from hot C_6H_6 . M.p. 301° .

Oxime : m.p. 243.5° .

Huntress, Cliff, *J. Am. Chem. Soc.*, 1933, 55, 2565.

Dichlorogallic Acid (2 : 6-Dichloro-3 : 4 : 5-trihydroxybenzoic acid)

MW, 239

Cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. 190° decomp. Sol. H_2O , EtOH, Et $_2\text{O}$. Insol. CHCl_3 , C_6H_6 .

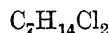
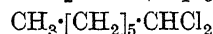
Me ester : $\text{C}_8\text{H}_6\text{O}_5\text{Cl}_2$. MW, 253. Plates + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. anhyd. $169-70^\circ$. $k = 6.0 \times 10^{-7}$ at 25° .

Et ester : $\text{C}_9\text{H}_8\text{O}_5\text{Cl}_2$. MW, 267. Cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. $121-8^\circ$, anhyd. $133-4^\circ$. Sol. Et $_2\text{O}$. $k = 4.2 \times 10^{-7}$ at 25° .

Biétrix, *Bull. soc. chim.*, 1896, 15, 905.

Dichloroguaiacol.

See under Dichlorocatechol.

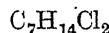
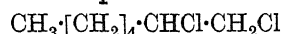
1 : 1-Dichloroheptane (*Heptylidene chloride*)

MW, 169

B.p. 191° , $82^\circ/20$ mm. D_4^{20} 1.011. n_D^{20} 1.4440.

Bachman, Hill, *J. Am. Chem. Soc.*, 1934, 56, 2730.

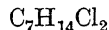
Kuz'min, *Chem. Abstracts*, 1943, 37, 3047.

1 : 2-Dichloroheptane

MW, 169

B.p. $68-72^\circ/7$ mm. D_4^{20} 1.064. n_D^{20} 1.4490.

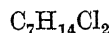
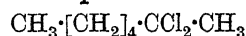
Bachman, Hill, *J. Am. Chem. Soc.*, 1934, 56, 2730.

1 : 7-Dichloroheptane (*Heptamethylene chloride*)

MW, 169

B.p. $120^\circ/28$ mm.

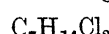
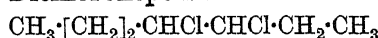
v. Braun, Müller, *Ber.*, 1905, 38, 2347.

2 : 2-Dichloroheptane

MW, 169

B.p. $77^\circ/25$ mm. D_4^{20} 1.012. n_D^{20} 1.4440.

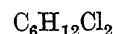
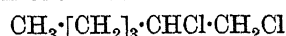
Bachman, Hill, *J. Am. Chem. Soc.*, 1934, 56, 2730.

3 : 4-Dichloroheptane

MW, 169

B.p. $179-81^\circ$. D_4^{20} 1.0260. n_D^{20} 1.45036.

Mathus, Gibon, *Chem. Zentr.*, 1926, I, 2322.

1 : 2-Dichlorohexane

MW, 155

B.p. $172-4^\circ$. D_{15}^{25} 1.085.

Brochet, *Bull. soc. chim.*, 1892, 7, 569.

1 : 5-Dichlorohexane

$\text{CH}_3 \cdot \text{CHCl} \cdot [\text{CH}_2]_3 \cdot \text{CH}_2\text{Cl}$
 $\text{C}_6\text{H}_{12}\text{Cl}_2$ MW, 155
 B.p. 74–8°/10 mm. Insol. H_2O .
 v. Braun, Sobacki, *Ber.*, 1911, **44**, 1042.

1 : 6-Dichlorohexane (*Hexamethylene chloride*)

$\text{ClCH}_2 \cdot [\text{CH}_2]_4 \cdot \text{CH}_2\text{Cl}$
 $\text{C}_6\text{H}_{12}\text{Cl}_2$ MW, 155
 B.p. 203–5°, 94°/22 mm.
 v. Braun, Müller, *Ber.*, 1905, **38**, 2344.

2 : 3-Dichlorohexane

$\text{CH}_3 \cdot [\text{CH}_2]_2 \cdot \text{CHCl} \cdot \text{CHCl} \cdot \text{CH}_3$
 $\text{C}_6\text{H}_{12}\text{Cl}_2$ MW, 155
 B.p. 162–5°. D_4^{25} 1.0527.
 Henry, *Bull. soc. chim.*, 1884, **41**, 363.

2 : 5-Dichlorohexane

$\text{CH}_3 \cdot \text{CHCl} \cdot [\text{CH}_2]_2 \cdot \text{CHCl} \cdot \text{CH}_3$
 $\text{C}_6\text{H}_{12}\text{Cl}_2$ MW, 155
Meso.
 M.p. 18.7°. B.p. 177.8–8.2° corr./751.8 mm.
 D_4^{25} 1.0459.
dl.
 B.p. 176.4–7.4° corr./751.1 mm. D_4^0 1.0675,
 D_4^{25} 1.0431.
 Cortese, *J. Am. Chem. Soc.*, 1930, **52**, 1519.

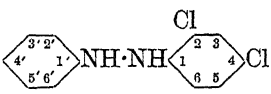
3 : 3-Dichlorohexanone-2.

See Methyl 1 : 1-dichlorobutyl Ketone.

 β : β -Dichlorohydratropic Acid (2 : 2-Dichloro-1-phenylpropionic acid)

$\text{C}_6\text{H}_5 \cdot \text{CH} < \begin{matrix} \text{COOH} \\ \text{CHCl}_2 \end{matrix}$
 $\text{C}_9\text{H}_8\text{O}_2\text{Cl}_2$ MW, 219
Me ester : $\text{C}_{10}\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 233. B.p. 137–41°/23 mm. Loses HCl on standing or on boiling with H_2O .
 Wislicenus, Bilhuber, *Ber.*, 1918, **51**, 1371.

2 : 4-Dichlorohydrazobenzene


 $\text{C}_{12}\text{H}_{10}\text{N}_2\text{Cl}_2$ MW, 253
 M.p. 74.5°.
 Stieglitz, Graham, *J. Am. Chem. Soc.*, 1916, **38**, 1749.

2 : 5-Dichlorohydrazobenzene.

Cryst. from ligroin. M.p. 74°.
 Crauw, *Rec. trav. chim.*, 1931, **50**, 777.

2 : 2'-Dichlorohydrazobenzene.

Plates from EtOH. M.p. 87°. Sol. EtOH, Et_2O .
 Vorländer, Meyer, *Ann.*, 1902, **320**, 130.

3 : 3'-Dichlorohydrazobenzene.

Cryst. M.p. 94°. Sol. EtOH, Et_2O . Turns red in air.

Wülfing, D.R.P. 108,427, (*Chem. Zentr.*, 1900, I, 1175).
 Laubenheimer, *Ber.*, 1875, **8**, 1624.

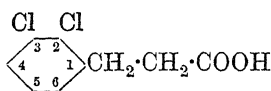
4 : 4'-Dichlorohydrazobenzene.

Cryst. M.p. 122°. Sol. EtOH.
 Calm, Heumann, *Ber.*, 1880, **13**, 1181.
 Wilberg, *Ber.*, 1902, **35**, 955.

Dichlorohydrin.

See sym.-Dichloroisopropyl Alcohol and 2 : 3-Dichloropropyl Alcohol.

2 : 3-Dichlorohydrocinnamic Acid (β -(2 : 3-Dichlorophenyl)-propionic acid)


 $\text{C}_9\text{H}_8\text{O}_2\text{Cl}_2$ MW, 219
 Needles from EtOH.Aq. M.p. 114°.
Chloride : b.p. 178–82°/28 mm.
 Mayer, Phillips, Ruppert, Schmitt, *Ber.*, 1928, **61**, 1972.

2 : 5-Dichlorohydrocinnamic Acid.

Prisms from EtOH.Aq. M.p. 118°.
Chloride : b.p. 154–8°/8 mm.
 Mayer, Phillips, Ruppert, Schmitt, *Ber.*, 1928, **61**, 1972.

 α : β -Dichlorohydrocinnamic Acid (1 : 2-Dichloro-2-phenylpropionic acid, cinnamic acid dichloride)

$\text{C}_6\text{H}_5 \cdot \text{CHCl} \cdot \text{CHCl} \cdot \text{COOH}$
 $\text{C}_9\text{H}_8\text{O}_2\text{Cl}_2$ MW, 219
 I. *High melting form* :
dl.
 Plates from Et_2O -pet. ether. M.p. 167–8° with darkening. Mod. sol. CHCl_3 . Spar. sol. CS_2 , CCl_4 . Resolved into optically active components by micro-organisms. Na_2CO_3 .Aq. \rightarrow β -chlorostyrene.
Me ester : $\text{C}_{10}\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 233. Cryst. M.p. 101°.
Et ester : $\text{C}_{11}\text{H}_{12}\text{O}_2\text{Cl}_2$. MW, 247. Prisms from pet. ether. M.p. 30–31°.
p-Iodophenyl ester : cryst. from EtOH. M.p. 127°.
Chloride : $\text{C}_9\text{H}_7\text{OCl}_3$. MW, 237.5. Needles from pet. ether. M.p. 54–5°. B.p. 136°/14 mm.

d.

$[\alpha]_D + 67.3^\circ$ in EtOH.Aq.

Me ester : m.p. 100–101°. $[\alpha]_D + 61.9^\circ$ in EtOH.

l.

$[\alpha]_D - 65.9^\circ$ in EtOH.Aq.

II. Low melting form :

dl.-

Plates from CHCl_3 -ligroin. M.p. $84-6^\circ$.
Readily sol. CHCl_3 , CCl_4 , CS_2 .

Liebermann, Finkenbeiner, *Ber.*, 1895,
28, 2235; 1893, 26, 833.

2 : 3-Dichlorohydroquinone

 $\text{C}_6\text{H}_4\text{O}_2\text{Cl}_2$

MW, 179

Needles from H_2O . M.p. 144° . Sol. EtOH, Et_2O . Insol. cold ligroin. Sublimes. Ox. \longrightarrow 2 : 3-dichloro-*p*-benzoquinone.

1 : 4-Diacetyl : m.p. 121° .

Dimroth, Eber, Wehr, *Ann.*, 1926, 446,
141, 144.

Eckert, Endler, *J. prakt. Chem.*, 1922,
104, 82.

2 : 5-Dichlorohydroquinone.

Needles or prisms from Me_2CO , C_6H_6 , or hot H_2O . M.p. 170° (166°). Sol. EtOH, Et_2O , hot AcOH, hot H_2O . D₂₄ 1.815. Sublimes. Ox. \longrightarrow 2 : 5-dichloro-*p*-benzoquinone.

Di-Me ether : $\text{C}_8\text{H}_8\text{O}_2\text{Cl}_2$. MW, 207. B.p. $262^\circ/744$ mm.

1 : 4-Diacetyl : needles. M.p. 141° .

Kohn, Gurewitsch, *Monatsh.*, 1930, 56,
135.

Dimroth, Eber, Wehr, *Ann.*, 1926, 446,
141, 144.

Eckert, Endler, *J. prakt. Chem.*, 1922,
104, 82.

2 : 6-Dichlorohydroquinone.

Needles or leaflets from H_2O or C_6H_6 . M.p. 164° . Heat of comb. C_p 615.7 Cal., C_v 615.9 Cal. Ox. \longrightarrow 2 : 6-dichloro-*p*-benzoquinone.

Di-Me ether : m.p. 34° .

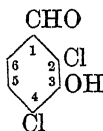
1 : 4-Diacetyl : m.p. $85-6^\circ$ (rapid heat.), $111-13^\circ$ (slow heat.).

Chattaway, Calvet, *J. Chem. Soc.*, 1928,
2918.

Kohn, Marberger, *Monatsh.*, 1924, 45,
654.

3 : 5-Dichloro-*o*-hydroxybenzaldehyde.

See Dichlorosalicylaldehyde.

2 : 4-Dichloro-*m*-hydroxybenzaldehyde $\text{C}_7\text{H}_4\text{O}_2\text{Cl}_2$

MW, 191

Cryst. from AcOH.Aq. M.p. 141° .
Me ether : $\text{C}_8\text{H}_6\text{O}_2\text{Cl}_2$. MW, 205. M.p. 82° .
p-Nitrophenylhydrazone : m.p. $258-60^\circ$.
Oxime : m.p. 188° .
p-Nitrophenylhydrazone : m.p. $277-8^\circ$.

Hodgson, Beard, *J. Chem. Soc.*, 1926, 153.

2 : 6-Dichloro-*m*-hydroxybenzaldehyde.

Cryst. from hot H_2O . M.p. 142° (140°).

Me ether : m.p. $103-4^\circ$. *p*-Nitrophenylhydrazone : m.p. $214-5^\circ$.

Oxime : needles from EtOH.Aq. M.p. $174-5^\circ$.

p-Nitrophenylhydrazone : orange-red needles from EtOH.Aq. M.p. $205-6^\circ$.

Hodgson, Beard, *J. Chem. Soc.*, 1926, 152.

Lock, Hosaeus, *Monatsh.*, 1930, 55, 311.

Bissell, Kranz, U.S.P. 1,776,803, (*Chem. Abstracts*, 1930, 24, 5769).

Lock, *Monatsh.*, 1933, 62, 184.

4 : 6-Dichloro-*m*-hydroxybenzaldehyde.

Needles. M.p. 129° . Sol. EtOH, C_6H_6 , hot H_2O . Insol. ligroin. Volatile in steam.

Me ether : m.p. 117° .

Hodgson, Beard, *J. Chem. Soc.*, 1926, 152.

3 : 5-Dichloro-*p*-hydroxybenzaldehyde.

Needles from EtOH.Aq. or CHCl_3 . M.p. $158-9^\circ$. Sol. EtOH, Et_2O , AcOH. Spar. sol. C_6H_6 , CHCl_3 , ligroin. Ox. \longrightarrow 2 : 6-dichlorohydroquinone.

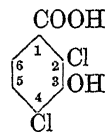
Oxime : needles. M.p. 185° .

Semicarbazone : greenish yellow cryst. M.p. 237° decomp.

Biltz, *Ber.*, 1904, 37, 4033.

Dichloro-*o*-hydroxybenzoic Acid.

See Dichlorosalicylic Acid.

2 : 4-Dichloro-*m*-hydroxybenzoic Acid $\text{C}_7\text{H}_4\text{O}_3\text{Cl}_2$

MW, 207

Me ether : 2 : 4-dichloro-*m*-methoxybenzoic acid. $\text{C}_8\text{H}_6\text{O}_3\text{Cl}_2$. MW, 221. Needles. M.p. 163° .

Hodgson, Beard, *J. Chem. Soc.*, 1926, 155.

2 : 6-Dichloro-*m*-hydroxybenzoic Acid.

Prisms + H_2O from H_2O . M.p. $122-4^\circ$. $k = 2.26 \times 10^{-2}$ at 25° . $\text{FeCl}_3 \longrightarrow$ violet col.

Me ether : 2 : 6-dichloro-*m*-methoxybenzoic acid. M.p. $149-5^\circ$. *Me ester* : $\text{C}_9\text{H}_8\text{O}_3\text{Cl}_2$. MW, 235. M.p. 57° .

Mazzara, Bertozzi, *Gazz. chim. ital.*, 1900,
30, ii, 87.

Hodgson, Beard, *J. Chem. Soc.*, 1926, 155.

3 : 5-Dichloro-*p*-hydroxybenzoic Acid.

Needles from EtOH.Aq. M.p. 269° (265°). Sol. EtOH, Et₂O, hot H₂O. Sublimes at 250–60° with slight decomp. FeCl₃ → brown ppt. Soda lime → 2 : 6-dichlorophenol.

Me ester: C₈H₆O₃Cl₂. MW, 221. Needles. M.p. 122° (124°). *Acetyl*: m.p. 70–1°.

Et ester: C₉H₈O₃Cl₂. MW, 235. Needles + 1H₂O. M.p. 108–16°. Anhyd. m.p. 111–12°.

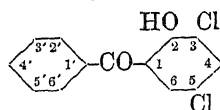
Nitrile: C₇H₃ONCl₂. MW, 188. Needles. M.p. 146°. Spar. sol. ligroin. *Acetyl*: m.p. 93°.

Me ether: see 3 : 5-Dichloroanisic Acid.

Leulier, Pinet, *Bull. soc. chim.*, 1927, 41, 1365.

Tarbell, Wilson, *J. Am. Chem. Soc.*, 1942, 64, 1066.

Hopkins, Chisholm, *Can. J. Research*, 1946, 24B, 208.

3 : 5-Dichloro-2-hydroxybenzophenone

C₁₃H₈O₂Cl₂ MW, 267

Yellow needles from EtOH. M.p. 116°. Sol. C₆H₆, hot EtOH. Very spar. sol. cold H₂O.

Oxime: yellow needles from H₂O. M.p. 196°. Very sol. hot H₂O.

Phenylhydrazone: yellow needles from EtOH. M.p. 186°.

Anschütz, Shores, *Ann.*, 1906, 346, 382.

5 : 2'-Dichloro-2-hydroxybenzophenone.

M.p. 106.5–7.5°.

Houtman, U.S.P. 2,419,553, (*Chem. Abstracts*, 1947, 41, 5150).

3 : 5-Dichloro-4-hydroxybenzophenone.

Needles from MeOH. M.p. 148°.

Me ether: C₁₄H₁₀O₂Cl₂. MW, 281. Needles from EtOH. M.p. 74°. *α-Oxime*: needles from EtOH. M.p. 146°.

Blakey, Jones, Scarborough, *J. Chem. Soc.*, 1927, 2865.

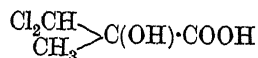
2' : 5'-Dichloro-4-hydroxybenzophenone.

Yellow. M.p. 171–2.5°.

Simpson, Stephenson, *J. Chem. Soc.*, 1942, 353.

2 : 2-Dichloro-1-hydroxyethane.

See 2 : 2-Dichloroethyl Alcohol.

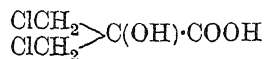
2 : 2-Dichloro-1-hydroxyisobutyric Acid

C₄H₆O₃Cl₂ MW, 173

Prisms from EtOH–Et₂O. M.p. 82–3°. Sol. EtOH, Et₂O.

Et ester: C₆H₁₀O₃Cl₂. MW, 201. B.p. 208–15° decomp.

Bischoff, *Ber.*, 1875, 8, 1334.

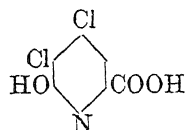
2 : 2'-Dichloro-1-hydroxyisobutyric Acid

C₄H₆O₃Cl₂ MW, 173

Plates. M.p. 91–2°. Sol. EtOH, Et₂O.

Et ester: b.p. 225–30°. Sol. EtOH, Et₂O.

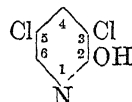
Grimaux, *Bull. soc. chim.*, 1881, 36, 20.

4 : 5-Dichloro-6-hydroxypicolinic Acid

C₆H₃O₃NCl₂ MW, 208

M.p. 284° decomp.

Graf, *J. prakt. Chem.*, 1932, 133, 49.

3 : 5-Dichloro-2-hydroxypyridine (3 : 5-Dichloro-*α*-pyridone)

C₅H₃ONCl₂ MW, 164

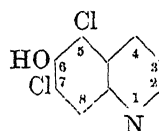
Needles from H₂O. M.p. 178–9°. Sol. alkalis and acids.

Sell, *J. Chem. Soc.*, 1908, 93, 2003.

4 : 6-Dichloro-2-hydroxypyridine (4 : 6-Dichloro-*α*-pyridone).

M.p. 151°. Sol. EtOH, hot H₂O.

Graf, *J. prakt. Chem.*, 1932, 133, 43.

5 : 7-Dichloro-6-hydroxyquinoline

C₉H₅ONCl₂ MW, 214

Needles from EtOH. M.p. 217°. Sublimes undecomp.

Acetyl: needles from EtOH. M.p. 130°.

Zincke, Müller, *Ann.*, 1891, 264, 206, 213.

Zincke, Winzheimer, *Ann.*, 1896, 290, 332.

4 : 7-Dichloro-8-hydroxyquinoline.

Cryst. from EtOH.Aq. M.p. 156–6.5°.

Me ether: m.p. 91–1.5°.

Lauer et al., *J. Am. Chem. Soc.*, 1946, 68, 1268.

5 : 7-Dichloro-8-hydroxyquinoline.

Needles from EtOH. M.p. 180–1°. Sol.

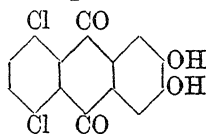
C₉H₅, pet. ether. Spar. sol. EtOH, AcOH, CHCl₃. FeCl₃ in acid sol. → black ppt.

B, HCl: m.p. 215°.

Acetyl: cryst. from pet. ether. M.p. 97-8°. Hyd. by H₂O.

Bratz, Niementowski, *Ber.*, 1919, 52, 190.
Ghosh, Lasker, Banerjee, *J. Indian Chem. Soc.*, 1944, 21, 352.

5 : 8-Dichlorohystazarin (5 : 8-Dichloro-2 : 3-dihydroxyanthraquinone)

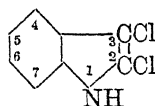


C₁₄H₆O₄Cl₂ MW, 309

Acetyl: citron yellow. M.p. 217°.

Waldmann, *J. prakt. Chem.*, 1938, 150, 99.

2 : 3-Dichloroindole

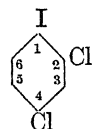


C₈H₅NCl₂ MW, 186

Leaflets from hot H₂O. M.p. 104°. Sol. EtOH, Et₂O, AcOH, C₆H₆, ligroin. Spar. sol. hot H₂O. Sol. KOH.Aq. without decomp. Volatile in steam.

Mazzara, Borgo, *Gazz. chim. ital.*, 1906, 35, ii, 566.

2 : 4-Dichloro-iodobenzene



C₆H₃Cl₂I MW, 273

B.p. 262° (257°). Sol. EtOH, Et₂O, CHCl₃, AcOH, ligroin.

Willgerodt, Böllert, *Ber.*, 1910, 43, 2642.

Ullmann, *Ann.*, 1904, 332, 55.

2 : 5-Dichloro-iodobenzene.

Plates from EtOH. M.p. 21°. B.p. 251°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

Crauw, *Rec. trav. chim.*, 1931, 50, 769.

2 : 6-Dichloro-iodobenzene.

Plates from EtOH. M.p. 68°. Volatile in steam.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, i, 828.

3 : 4-Dichloro-iodobenzene.

Needles from EtOH.Aq. M.p. 30.5°. B.p. 117°/15 mm.

Kraay, *Rec. trav. chim.*, 1930, 49, 1083.

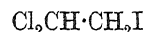
3 : 5-Dichloro-iodobenzene.

M.p. 57°.

Körner, Contardi, *Atti accad. Lincei*, 1913, 22, i, 827.

Roosmalen, *Rec. trav. chim.*, 1934, 53, 359.

2 : 2-Dichloro-1-iodoethane



C₂H₃Cl₂I MW, 225

B.p. 171-2°. Sp. gr. 2.2187. Alc. KOH → CH₂=CCl₂.

Henry, *Bull. soc. chim.*, 1884, 42, 263.

Dichloriodomethane



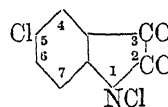
CHCl₂I MW, 211

B.p. 131°, 40°/30 mm. D₄ 2.454, D₂₀ 2.403.

Auger, *Compt. rend.*, 1908, 146, 1038.

Borodine, *Ann.*, 1863, 126, 239.

1 : 5-Dichloroisatin



C₈H₃O₂NCl₂ MW, 216

Red prisms from AcOH. M.p. 155°.

Bayer, D.R.P. 255,772, (*Chem. Zentr.*, 1913, I, 478).

4 : 6-Dichloroisatin.

Lemon yellow cryst. M.p. 250°.

Sandmeyer, *Helv. Chim. Acta*, 1919, 2, 241.

Kränzlein, Wolfram, Hausdörfer, U.S.P. 1,792,170, (*Chem. Abstracts*, 1931, 25, 1845).

4 : 7-Dichloroisatin.

Orange yellow cryst. M.p. 252°. Sol. ord. org. solvents.

3-Oxime : m.p. 245° decomp.

3-Phenylhydrazone : m.p. 265°.

Grandmougin, Seyder, *Ber.*, 1914, 47, 2368.

5 : 6-Dichloroisatin.

Brick red cryst. M.p. 273-5°. Sol. boiling EtOH, AcOH. Spar. sol. hot H₂O.

Höchst, D.R.P. 281,052, (*Chem. Zentr.*, 1915, I, 73).

5 : 7-Dichloroisatin.

Two forms. (a) Yellow cryst. M.p. 223°. Sol. ord. org. solvents. Sublimes. (b) Red

cryst. from AcOH. M.p. 313°. Insol. alkalis.

3-Oxime : canary yellow cryst. Decomp. at 255°.

2-Phenylhydrazone : m.p. 217-18°.

3-Phenylhydrazone : yellow cryst. M.p. 296-7°.

Heller, *Ber.*, 1922, 55, 2692.

Grandmougin, Seyder, *Ber.*, 1914, 47, 2366.

1 : 1-Dichloroisobutane (*Isobutylidene chloride*)



C₄H₈Cl₂ MW, 127

B.p. 103-5° slight decomp.

Oeconomidis, *Bull. soc. chim.*, 1881, 35, 498.

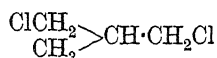
1 : 2-Dichloroisobutane (*Isobutylene dichloride*)
 $\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127

B.p. 106.5°, 59–60°/150 mm., 38.6–39.2°/70 mm. D_{20}^{20} 1.093. n_D^{20} 1.4370. KOH.Aq. \rightarrow isobutylene glycol.

Badische, D.R.P. 259,192, (*Chem. Zentr.*, 1913, I, 1740).

Mouneyrat, *Ann. chim.*, 1900, 20, 532.

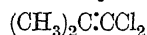
Hersh, Nelson, *J. Am. Chem. Soc.*, 1936, 58, 1631.

1 : 3-Dichloroisobutane
 $\text{C}_4\text{H}_8\text{Cl}_2$ MW, 127

B.p. 136.4°, 45°/10 mm. D_{20}^{20} 1.131.

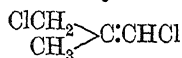
Hass, McBee, U.S.P. 2,004,072, (*Chem. Zentr.*, 1936, I, 3012).

Kleinfeller, *Ber.*, 1929, 62, 1595.

1 : 1-Dichloroisobutylene
 $\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125

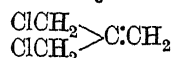
B.p. 108°. D_0^{20} 1.1449.

Jocitsch, Faworsky, *Chem. Zentr.*, 1899, I, 606, 778.

1 : 3-Dichloroisobutylene
 $\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125

B.p. 132°. D_0^{20} 1.1726.

Pogorshelski, *Chem. Zentr.*, 1905, I, 668.

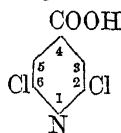
3 : 3'-Dichloroisobutylene
 $\text{C}_4\text{H}_6\text{Cl}_2$ MW, 125

B.p. 30–1°/9 mm.

Kleinfeller, *Ber.*, 1929, 62, 1595.

Dichloroisocrotonic Acid.

See under 1 : 2-Dichlorocrotonic Acid.

2 : 6-Dichloroisonicotinic Acid (2 : 6-Dichloropyridine-4-carboxylic acid)
 $\text{C}_6\text{H}_3\text{O}_2\text{NCl}_2$ MW, 192

Needles or leaflets from EtOH. M.p. 208–9° (210°).

Me ester: $\text{C}_7\text{H}_5\text{O}_2\text{NCl}_2$. MW, 206. M.p. 82°. Sol. EtOH, Et_2O . Insol. H_2O .

Et ester: $\text{C}_8\text{H}_7\text{O}_2\text{NCl}_2$. MW, 220. Needles from EtOH.Aq. M.p. 66°. Sol. Et_2O , Me_2CO .

Chloride: $\text{C}_6\text{H}_2\text{ONCl}_3$. MW, 210.5. M.p. 25–7°. B.p. 243–6°.

Amide: $\text{C}_6\text{H}_4\text{ON}_2\text{Cl}_2$. MW, 191. M.p. 207–8°.

Nitrile: 2 : 6-dichloro-4-cyanopyridine. $\text{C}_6\text{H}_2\text{N}_2\text{Cl}_2$. MW, 173. Needles from EtOH. M.p. 96°.

Levelt, Wibaut, *Rec. trav. chim.*, 1929, 48, 469.

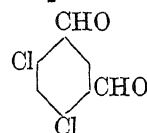
Meyer, Beck, *Monatsh.*, 1915, 36, 734.

3 : 5-Dichloroisonicotinic Acid.

M.p. 223–4°. Sublimes.

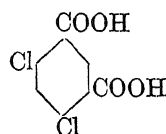
Meyer, Graf, *Ber.*, 1928, 61, 2214.

Graf, Stauch, *J. prakt. Chem.*, 1937, 148, 23.

4 : 6-Dichloroisophthalaldehyde
 $\text{C}_8\text{H}_4\text{O}_2\text{Cl}_2$ MW, 203

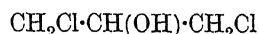
M.p. 163°.

Bayer, D.R.P. 243,749, (*Chem. Zentr.*, 1912, I, 763).

4 : 6-Dichloroisophthalic Acid
 $\text{C}_8\text{H}_4\text{O}_4\text{Cl}_2$ MW, 235

Needles. M.p. 280°. Sol. EtOH, Et_2O , CHCl_3 .

Claus, Burstert, *J. prakt. Chem.*, 1890, 41, 558.

sym.-Dichloroisopropyl Alcohol (*Glycerol 1 : 3-dichlorohydrin, α-dichlorohydrin*)
 $\text{C}_3\text{H}_6\text{OCl}_2$ MW, 129

B.p. 174–5°. Sol. H_2O , Et_2O . D_4^{20} 1.3506. n_D^{17} 1.480245. Good solvent for nitrocellulose, resins, lacquers, etc.

Acetyl: b.p. 81°/15 mm.

Propionyl: b.p. 208°. D_{30}^{20} 1.2222.

Butyryl: b.p. 223.5°. D_{20}^{20} 1.1796. n_D^{20} 1.4540.

Palmityl: cryst. from EtOH. M.p. 34.4°. n_D^{20} 1.4527.

Stearyl: cryst. from EtOH. M.p. 39.5°. n_D 1.4528.

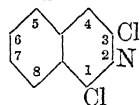
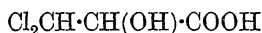
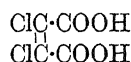
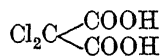
Phenylurethane: m.p. 73°.

Fairbourne, *J. Chem. Soc.*, 1930, 381.

Novelli, *Chem. Abstracts*, 1930, 24, 5021.

Conant, Quayle, *Organic Syntheses*, Collective Vol. I, 286.

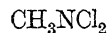
Hill, Fischer, *J. Am. Chem. Soc.*, 1922, 44, 2587.

unsym.-Dichloroisopropyl Alcohol (2-Hydroxypropylidene chloride)
$$\text{C}_3\text{H}_6\text{OCl}_2 \quad \text{CH}_3\cdot\text{CH}(\text{OH})\cdot\text{CHCl}_2 \quad \text{MW, 129}$$
B.p. 146–8°. D_{20}^{25} 1.3334.Wohl, Roth, *Ber.*, 1907, 40, 217.**1 : 3-Dichloroisoquinoline**
 $\text{C}_9\text{H}_5\text{NCl}_2 \quad \text{MW, 198}$
Needles from EtOH. M.p. 123°. B.p. 305–7°. Sol. Et₂O, AcOH, CHCl₃, C₆H₆, hot EtOH.Gabriel, *Ber.*, 1886, 19, 2355.Gabriel, Colman, *Ber.*, 1900, 33, 986.**1 : 4-Dichloroisoquinoline.**Cryst. from Et₂O. M.p. 89°. Sol. Et₂O, AcOH, C₆H₆. Volatile in steam.Gabriel, Colman, *Ber.*, 1900, 33, 986.**2 : 2-Dichlorolactic Acid**
 $\text{C}_3\text{H}_4\text{O}_3\text{Cl}_2 \quad \text{MW, 159}$
Plates. M.p. 77°. Sol. H₂O, EtOH, Et₂O. Reduces NH₃·AgNO₃.*Et ester*: C₅H₈O₃Cl₂. MW, 187. B.p. 219–222°.Grimaux, Adam, *Bull. soc. chim.*, 1880, 34, 29.**Dichloromaleic Acid**
 $\text{C}_4\text{H}_2\text{O}_4\text{Cl}_2 \quad \text{MW, 185}$
Needles from ligroin–Et₂O. M.p. 116°. Sol. H₂O, EtOH, Et₂O, AcOH. Insol. CHCl₃, C₆H₆, CS₂.*Di-Me ester*: C₆H₆O₄Cl₂. MW, 213. B.p. 225°.*Dichloride*: C₄O₃Cl₄. MW, 222. B.p. 192–4°, 78–85°/18 mm. Volatile in steam. Stable to aq. alkalis.*Monoamide*: C₄H₃O₃NCl₂. MW, 184. M.p. 175° decomp.*Anhydride*: C₄O₃Cl₂. MW, 167. M.p. 120°.*Imide*: C₄HO₂NCl₂. MW, 166. M.p. 179°.*Dianilide*: two forms. (a) Yellow. M.p. 170°; (b) colourless. M.p. 193°.*Anil*: silvery leaflets. M.p. 203°. Sublimes.Leder, *J. prakt. Chem.*, 1931, 130, 269.Salmony, Simonis, *Ber.*, 1905, 38, 2588.**Dichloromalonic Acid**
 $\text{C}_3\text{H}_2\text{O}_4\text{Cl}_2 \quad \text{MW, 173}$

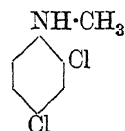
Very hygroscopic needles. M.p. 109–11° decomp.

Aniline salt: m.p. 101.5° decomp.*Di-Et ester*: C₇H₁₀O₄Cl₂. MW, 229. B.p. 231–4°. Sol. EtOH, Et₂O. Insol. H₂O. D_{15}^{25} 1.268.*Diamide*: C₃H₄O₂N₂Cl₂. MW, 171. Cryst. from H₂O. M.p. 204–5°. Sol. hot H₂O.*Dianilide*: needles from MeOH or Et₂O. M.p. 129–30°.Forster, Müller, *J. Chem. Soc.*, 1910, 97, 136.Conrad, Reinbach, *Ber.*, 1902, 35, 1815.Straus, Kühnel, *Ber.*, 1933, 66, 1845.**Dichloromethane.**

See Methylene chloride.

N-Dichloromethylamine (*Methyldichloroamine*)
 $\text{CH}_3\text{NCl}_2 \quad \text{MW, 100}$

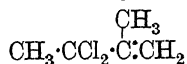
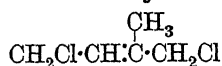
Yellow liq. B.p. 59–60°. Slowly decomp. on heating.

Bamberger, Renauld, *Ber.*, 1895, 28, 1683.Meisenheimer, *Ber.*, 1913, 46, 1154.**2 : 4-Dichloro-N-methylaniline**
 $\text{C}_7\text{H}_7\text{NCl}_2 \quad \text{MW, 176}$

M.p. 40° (25°).

N-Acetyl: prisms from ligroin. M.p. 90°.*Chloroplatinate*: orange-brown needles. M.p. 197–8°.*N-Nitroso*: needles from EtOH.Aq. M.p. 54°.Bülow, Neber, *Ber.*, 1916, 49, 2194.**2 : 5-Dichloro-N-methylaniline.***N-Acetyl*: cryst. from ligroin. M.p. 69–70°.*N-Nitroso*: cryst. from EtOH.Aq. M.p. 66–7°.Bülow, Neber, *Ber.*, 1916, 49, 2201.**Dichloro-methylarsine.**

See Methyldichloroarsine.

3 : 3-Dichloro-2-methyl-1-butylene
 $\text{C}_5\text{H}_8\text{Cl}_2 \quad \text{MW, 139}$
B.p. 151–3°. D_4^{19} 1.1276. n_D^{19} 1.4737.Tishchenko, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 1232.**1 : 4-Dichloro-2-methyl-2-butylene**
 $\text{C}_5\text{H}_8\text{Cl}_2 \quad \text{MW, 139}$

Lachrymatory liq. B.p. 93°/50 mm., 56°/10 mm. D_4^{20} 1.1526. n_D^{20} 1.4932. $\text{KMnO}_4 \longrightarrow$ 1 : 4-dichloro-2-methyl- ψ -butylene glycol, m.p. 106.5°. $\text{Zn} + \text{EtOH} \longrightarrow$ isoprene.

Jones, Williams, *J. Chem. Soc.*, 1934, 835.

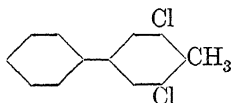
Dichloromethyl *tert.*-butyl Ketone.

See 1 : 1-Dichloropinacolin.

Di-chloromethyl-dioxan.

See Di-epichlorohydrin.

3 : 5-Dichloro-4-methyldiphenyl



$\text{C}_{13}\text{H}_{10}\text{Cl}_2$

MW, 237

Needles from EtOH. M.p. 62°. B.p. 183-4°/11 mm.

Hinkel, Dippy, *J. Chem. Soc.*, 1932, 1470.

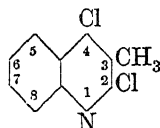
2 : 3-Dichloro-2-methylpentanone-4.

See Methyl 1 : 2-dichloroisobutyl Ketone.

5 : 8-Dichloro-2-methylquinoline.

See 5 : 8-Dichloroquinaldine.

2 : 4-Dichloro-3-methylquinoline.



$\text{C}_{10}\text{H}_7\text{NCl}_2$

MW, 212

M.p. 90-1° (83-4°).

Gabriel, Gerhard, *Ber.*, 1921, 54, 1070.

4 : 5-Dichloro-3-methylquinoline.

White plates from EtOH.Aq. M.p. 71.5-72°.

Steck, Hallock, Holland, *J. Am. Chem. Soc.*, 1946, 68, 380.

4 : 6-Dichloro-3-methylquinoline.

White needles from EtOH. M.p. 118-19° (116°).

Steck *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 129.

Breslow *et al.*, *ibid.*, 1232.

4 : 7-Dichloro-3-methylquinoline.

White needles from EtOH.Aq. M.p. 87.5-8°.

Steck, Hallock, Holland, *J. Am. Chem. Soc.*, 1946, 68, 380.

4 : 8-Dichloro-3-methylquinoline.

White needles from EtOH.Aq. M.p. 103° (98°).

Steck *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 132.

Breslow *et al.*, *ibid.*, 1232.

2 : 4-Dichloro-5-methylquinoline.

Needles from AcOH. M.p. 132°.

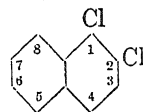
Gabriel, Thieme, *Ber.*, 1919, 52, 1087.

4 : 7-Dichloro-8-methylquinoline.

Cryst. from EtOH. M.p. 87-9°.

Lisk, Stacey, *J. Am. Chem. Soc.*, 1946, 68, 2686.

1 : 2-Dichloronaphthalene



$\text{C}_{10}\text{H}_8\text{Cl}_2$

MW, 197

Plates from EtOH. M.p. 35°. B.p. 295-8°.

Cleve, *Ber.*, 1892, 25, 2489.

Beattie, Whitmore, *J. Am. Chem. Soc.*, 1933, 55, 1546.

1 : 3-Dichloronaphthalene.

Needles from EtOH. M.p. 61.5°. B.p. 291°/775 mm. Sol. EtOH.

Cleve, *Ber.*, 1890, 23, 954.

Armstrong, Wynne, *Chem. News*, 1896, 73, 55.

1 : 4-Dichloronaphthalene.

Needles from EtOH. M.p. 67-8°. B.p. 287°/740 mm. Sol. Me_2CO . Mod. sol. AcOH. Spar. sol. EtOH. $\text{HNO}_3 \longrightarrow$ 3 : 6-dichlorophthalic acid.

Erdmann, *Ann.*, 1888, 247, 351.

M.L.B., D.R.P. 286,489, (*Chem. Abstracts*, 1916, 10, 1912).

Ferrero, Bolliger, *Helv. Chim. Acta*, 1928, 11, 1147.

Beattie, Whitmore, *J. Am. Chem. Soc.*, 1933, 55, 1546.

Silbermann, Raschewskaja, Martynzewa, *Chem. Zentr.*, 1937, I, 4786.

1 : 5-Dichloronaphthalene.

Leaflets from EtOH or AcOH. M.p. 107°. Sublimes. CrO_3 in AcOH \longrightarrow 3-chlorophthalic acid.

Badische, D.R.P. 234,912, (*Chem. Zentr.*, 1911, II, 63).

Ferrero, Bolliger, *Helv. Chim. Acta*, 1928, 11, 1147.

Beattie, Whitmore, *J. Am. Chem. Soc.*, 1933, 55, 1546.

1 : 6-Dichloronaphthalene.

Needles from EtOH. M.p. 49° (127-8°). Sublimes. Volatile in steam.

Erdmann, *Ann.*, 1893, 275, 279.

Armstrong, Wynne, *Chem. News*, 1890, 62, 164.

Silbermann, Raschewskaja, Martynzewa, *Chem. Zentr.*, 1937, I, 4786.

1 : 7-Dichloronaphthalene.

Needles from AcOH. M.p. 63-4° (62°). B.p. 286°. Sol. EtOH, Et_2O , AcOH, C_6H_8 .

Erdmann, *Ann.*, 1893, 275, 257.

Armstrong, Wynne, *Chem. News*, 1890, 62, 162.

1 : 8-Dichloronaphthalene.

Cryst. from EtOH. M.p. 88° (83°). HCl at 250–90° → 1 : 5-dichloronaphthalene.

Atterberg, *Ber.*, 1877, 10, 548.

Armstrong, Wynne, *Chem. News*, 1895, 71, 255.

2 : 3-Dichloronaphthalene.

Leaflets. M.p. 120°. Sol. Et₂O, hot EtOH.

Armstrong, Wynne, *Chem. News*, 1890, 61, 273, 275, 284.

2 : 6-Dichloronaphthalene.

Leaflets from EtOH. M.p. 140–41° (135°). B.p. 285°. Sol. Et₂O, CHCl₃, C₆H₆. Spar. sol. EtOH. HNO₃ → 4-chlorophthalic acid. CrO₃ in AcOH → 2 : 6-dichloro-1 : 4-naphthoquinone.

Claus, Zimmermann, *Ber.*, 1881, 14, 1483.

Franzen, Stäuble, *J. prakt. Chem.*, 1921, 103, 370.

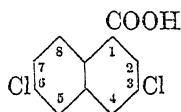
2 : 7-Dichloronaphthalene.

Plates. M.p. 114°. Sol. hot EtOH. HNO₃ → 4-chlorophthalic acid.

Sindall, *Chem. News*, 1890, 60, 58.

Erdmann, *Ann.*, 1893, 275, 280.

Dziewoński, Majewicz, Schimmer, *Chem. Zentr.*, 1936, II, 4214.

3 : 6-Dichloro-1-naphthoic Acid

C₁₁H₆O₂Cl₂ MW, 241

Needles from toluene. M.p. 238–9°.

Me ester : C₁₂H₆O₂Cl₂. MW, 255. Needles from Et₂O. M.p. 112°.

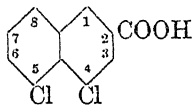
Dziewoński, Majewicz, Schimmer, *Chem. Zentr.*, 1936, II, 4214.

5 : 8-Dichloro-1-naphthoic Acid.

Cryst. from EtOH. M.p. 187°. Sol. EtOH.

Et ester : C₁₃H₁₀O₂Cl₂. MW, 269. Needles. M.p. 61°.

Ekstrand, *J. prakt. Chem.*, 1888, 38, 151.

4 : 5-Dichloro-2-naphthoic Acid

C₁₁H₆O₂Cl₂ MW, 241

Needles from EtOH or AcOH. M.p. 254°. Sol. EtOH, AcOH.

Et ester : C₁₃H₁₀O₂Cl₂. MW, 269. Needles. M.p. 87°.

Ekstrand, *J. prakt. Chem.*, 1891, 43, 426.

5 : 8-Dichloro-2-naphthoic Acid.

Needles from EtOH. M.p. 301° (291°). Spar. sol. cold EtOH. Sublimes.

Me ester : m.p. 145·5°.

Et ester : needles. M.p. 66°.

Chloride : m.p. 102°.

Amide : needles. M.p. 224° (218°).

Nitrile : 5 : 8-dichloro-2-cyanonaphthalene. C₁₁H₅NCl₂. MW, 222. Needles. M.p. 140°.

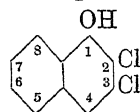
Azide : m.p. 108° decomp.

Hydrazide : m.p. 212°.

Anilide : m.p. 226°.

Ekstrand, *J. prakt. Chem.*, 1891, 43, 419.

Goldstein, Viaud, *Helv. Chim. Acta*, 1944, 27, 883.

2 : 3-Dichloro-1-naphthol

C₁₀H₆OCl₂ MW, 213

Needles. M.p. 101°. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆. Sublimes. CrO₃ in AcOH → 2 : 3-dichloro-1 : 4-naphthoquinone. Boiling dil. HNO₃ → phthalic acid.

Claus, Knyrim, *Ber.*, 1885, 18, 2926.

2 : 4-Dichloro-1-naphthol.

Needles from EtOH or C₆H₆. M.p. 107–8° (105°). Sol. EtOH, Et₂O, C₆H₆. Volatile in steam. Decomp. at 180°. Boiling dil. HNO₃ → phthalic acid. CrO₃ in AcOH → 2-chloro-1 : 4-naphthoquinone.

Me ether : C₁₁H₅OCl₂. MW, 227. Needles from EtOH. M.p. 58°.

Acetyl : m.p. 74–6°.

Reverdin, Kauffmann, *Ber.*, 1895, 28, 3053.

Contardi, Mor, *Chem. Abstracts*, 1925, 19, 827.

5 : 7-Dichloro-1-naphthol.

Yellowish prisms from CS₂. M.p. 132°. Sol. EtOH, Et₂O. Mod. sol. hot H₂O. Heat. with conc. NH₃ → 5 : 7-dichloro-1-naphthylamine.

Acetyl : m.p. 110°.

Erdmann, Schwechten, *Ann.*, 1893, 275, 284.

5 : 8-Dichloro-1-naphthol.

Cryst. from CS₂. M.p. 115°. Sol. EtOH, Et₂O. Spar. sol. hot H₂O.

Acetyl : m.p. 144–5°.

Erdmann, Schwechten, *Ann.*, 1893, 275, 285.

6 : 7-Dichloro-1-naphthol.

M.p. 151°. Sol. EtOH, Et₂O. CrO₃ → 4 : 5-dichlorophthalic acid.

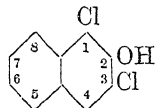
Acetyl : m.p. 102–3°.

Erdmann, Schwechten, *Ann.*, 1893, 275, 286.

7 : 8-Dichloro-1-naphthol.

Needles from EtOH. M.p. 95°.

Acetyl : m.p. 87-8°.

Armstrong, Wynne, *Proc. Chem. Soc.*, 1895, 11, 78.**1 : 3-Dichloro-2-naphthol** $C_{10}H_6OCl_2$ MW, 213Needles from ligroin. M.p. 81°. Sol. EtOH, Et_2O , AcOH, C_6H_6 . $HNO_3 \rightarrow$ 3-chloro-1 : 2-naphthoquinone.

Acetyl : m.p. 79-80°.

Zincke, *Ber.*, 1888, 21, 3386, 3544.Fries, Schimmelschmidt, *Ann.*, 1930, 484, 297.**1 : 4-Dichloro-2-naphthol.**Needles from AcOH. M.p. 124° (121°). Sol. EtOH, Et_2O , AcOH.

Acetyl : m.p. 90-1°.

Fries, Schimmelschmidt, *Ann.*, 1930, 484, 295.**1 : 6-Dichloro-2-naphthol.**

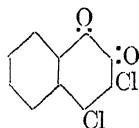
Needles from hot ligroin. M.p. 119-5°.

Ruggli, Knapp, Merz, Zimmermann, *Helv. Chim. Acta*, 1929, 12, 1050.**3 : 4-Dichloro-2-naphthol.**

Needles from ligroin. M.p. 108°.

Marschalk, *Bull. soc. chim.*, 1928, 43, 1361.**4 : 8-Dichloro-2-naphthol.**

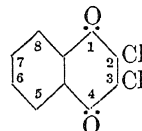
Needles from EtOH. M.p. 158-9°.

Me ether : $C_{11}H_8OCl_2$. MW, 227. Needles. M.p. 94°.Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 49.**5 : 8-Dichloro-2-naphthol.**Needles. M.p. 143°. Sol. hot H_2O .*Me ether* : m.p. 74°.Goldstein, Viaud, *Helv. Chim. Acta*, 1944, 27, 883.**3 : 4-Dichloro-1 : 2-naphthoquinone** $C_{10}H_4O_2Cl_2$ MW, 227Red leaflets from AcOH or C_6H_6 . M.p. 184°. Sol. $CHCl_3$. Spar. sol. EtOH. Sublimes. $SO_2 \rightarrow$ 3 : 4-dichloro-1 : 2-dihydroxynaphthalene.

1-Oxime : m.p. 165-6° decomp.

Zincke, *Ber.*, 1886, 19, 2499.Fletcher, U.S.P. 2,422,229, (*Chem. Abstracts*, 1947, 41, 5900).**5 : 8-Dichloro-1 : 2-naphthoquinone.**

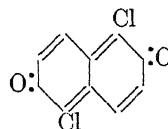
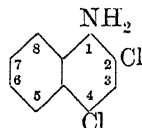
Red needles. M.p. 196-8°. Sublimes.

Fierz-David, Blangley, v. Krannichfeldt, *Helv. Chim. Acta*, 1947, 30, 816.**2 : 3-Dichloro-1 : 4-naphthoquinone** $C_{10}H_4O_2Cl_2$ MW, 227Yellow needles from EtOH. M.p. 193°. Sol. hot EtOH. Spar. sol. Et_2O . Insol. H_2O . HI, SO_2 , or $SnCl_2 \rightarrow$ 2 : 3-dichloro-1 : 4-dihydroxynaphthalene. Fungicide (Phygon).Ullmann, Ettisch, *Ber.*, 1921, 54, 261.Fries, Ochwat, *Ber.*, 1923, 56, 1291.Angeletti, *Chem. Abstracts*, 1937, 31, 678.**2 : 6-Dichloro-1 : 4-naphthoquinone.**

Deep yellow needles. M.p. 148-9°.

Claus, Müller, *Ber.*, 1885, 18, 3073.**5 : 6-Dichloro-1 : 4-naphthoquinone.**

Yellow needles from EtOH. M.p. 181°. Spar. sol. EtOH. Sublimes.

Hellström, *Ber.*, 1888, 21, 3269.**5 : 8-Dichloro-1 : 4-naphthoquinone.**Yellow needles from EtOH. M.p. 173-4°. Sol. Et_2O . Spar. sol. EtOH. Sublimes.Guareschi, *Ber.*, 1886, 19, 1155.**1 : 5-Dichloro-2 : 6-naphthoquinone** $C_{10}H_4O_2Cl_2$ MW, 227Orange prisms from $CHCl_3$. M.p. 206-5° decomp. Sol. AcOH, C_6H_6 , Me_2CO , AcOEt, $CHCl_3$, hot EtOH. Spar. sol. Et_2O . Insol. H_2O , ligroin, pet. ether. $SO_2 \rightarrow$ 1 : 5-dichloro-2 : 6-dihydroxynaphthalene.Willstätter, Parnas, *Ber.*, 1907, 40, 3975.**2 : 4-Dichloro-1-naphthylamine** $C_{10}H_7NCl_2$ MW, 212Needles from EtOH. M.p. 82°. Sol. EtOH. Volatile in steam. Ox. \rightarrow phthalic acid.*B.HCl* : m.p. 186-7°.*N-Acetyl* : 2 : 4-dichloro-1-acetnaphthalide.

M.p. 214°. Sublimes. Spar. sol. EtOH, CHCl_3 , AcOH.

Cleve, *Ber.*, 1887, 20, 448.

4 : 7-Dichloro-1-naphthylamine.

Needles from EtOH. M.p. about 95°. Sol. EtOH. Spar. sol. H_2O .

Cleve, *Bull. soc. chim.*, 1878, 29, 500.

4 : 8-Dichloro-1-naphthylamine.

Needles from EtOH.Aq. M.p. 113°. Sol. EtOH, AcOH, ligroin.

N-Acetyl: 4 : 8-dichloro-1-acetnaphthalide. M.p. 163°.

Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 50.

5 : 7-Dichloro-1-naphthylamine.

Cryst. from C_6H_6 . M.p. 116–17°.

B.HCl: m.p. 204–5°.

Erdmann, Schwechten, *Ann.*, 1893, 275, 288.

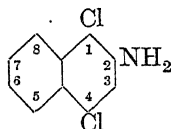
5 : 8-Dichloro-1-naphthylamine.

Needles from EtOH.Aq. M.p. 104°.

N-Acetyl: 5 : 8-dichloro-1-acetnaphthalide. M.p. 202°.

Widmann, *Bull. soc. chim.*, 1877, 28, 510.
Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 51.

1 : 4-Dichloro-2-naphthylamine



$\text{C}_{10}\text{H}_7\text{NCl}_2$ MW, 212

White needles from MeOH. M.p. 92–3°.

N-Acetyl: leaflets. M.p. 212–13°.

Clemo, Legg, *J. Chem. Soc.*, 1947, 539.

1 : 5-Dichloro-2-naphthylamine.

Needles from EtOH. M.p. 124–5°.

N-Acetyl: needles. M.p. 180–1°.

Clemo, Legg, *J. Chem. Soc.*, 1947, 539.

1 : 6-Dichloro-2-naphthylamine.

Cryst. from EtOH. M.p. 100–1°.

N-Acetyl: needles. M.p. 219–20°.

Clemo, Legg, *J. Chem. Soc.*, 1947, 539.

1 : 8-Dichloro-2-naphthylamine.

Needles from MeOH. M.p. 71–2°.

N-Acetyl: needles. M.p. 146–7°.

Clemo, Legg, *J. Chem. Soc.*, 1947, 539.

4 : 8-Dichloro-2-naphthylamine.

Needles from EtOH. M.p. 132–3°.

N-Acetyl: 4 : 8-dichloro-2-acetnaphthalide. M.p. 265°.

Kalle, D.R.P. 343,147, (*Chem. Abstracts*, 1923, 17, 1244).

Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 48.

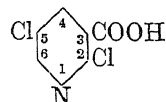
5 : 8-Dichloro-2-naphthylamine.

Needles from pet. ether. M.p. 96°. HNO_3 at 180° \longrightarrow 3 : 6-dichlorophthalic acid.

N-Acetyl: 5 : 8-dichloro-2-acetnaphthalide. M.p. 209°.

Claus, Philipson, *J. prakt. Chem.*, 1891, 43, 59.

2 : 5-Dichloronicotinic Acid



$\text{C}_6\text{H}_3\text{O}_2\text{NCl}_2$ MW, 192

Nitrile: 2 : 5 - dichloro - 3 - cyanopyridine $\text{C}_6\text{H}_2\text{N}_2\text{Cl}_2$. MW, 173. M.p. 118–19°. Sol. ord org. solvents.

Binz, Rath, *Ann.*, 1931, 487, 134.

2 : 6-Dichloronicotinic Acid.

Needles from Et_2O -pet. ether. M.p. 144°.

Guthzeit, Laska, *J. prakt. Chem.*, 1898, 58, 425.

5 : 6-Dichloronicotinic Acid.

Needles + H_2O from H_2O . M.p. 168° Sol. ord. org. solvents.

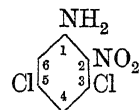
Nitrile: 5 : 6 - dichloro - 3 - cyanopyridine. M.p. 150°.

Binz, Rath, *Ann.*, 1931, 487, 133.

Dichloronitroacetanilide.

See under Dichloronitroaniline.

3 : 5-Dichloro-2-nitroaniline



$\text{C}_6\text{H}_4\text{O}_2\text{N}_2\text{Cl}_2$ MW, 207

Yellow needles. M.p. 79°. Sol. EtOH, C_6H_6 , CS_2 . Spar. sol. ligroin.

N-Acetyl: 3 : 5-dichloro-o-nitroacetanilide $\text{C}_8\text{H}_6\text{O}_3\text{N}_2\text{Cl}_2$. MW, 249. M.p. 138–9°.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 227

3 : 6-Dichloro-2-nitroaniline.

Yellow needles from ligroin. M.p. 67–8° Sol. EtOH, C_6H_6 , CS_2 . Spar. sol. AcOH Sublimes. Volatile in steam.

N-Acetyl: 3 : 6-dichloro-o-nitroacetanilide. M.p. 204–5°.

Beilstein, Kurbatow, *Ann.*, 1879, 196, 222.

Holleman, van Haefte, *Rec. trav. chim.*, 1921, 40, 69.

4 : 5-Dichloro-2-nitroaniline.

Yellow needles from AcOH.Aq. M.p. 176° Sol. EtOH, CHCl_3 , AcOEt. Spar. sol. CS_2 , ligroin

N-*Acetyl* : 4 : 5-dichloro-*o*-nitroacetanilide.
M.p. 123-4°.

Beilstein, Kurbatow, *Ann.*, 1879, **196**, 221, 225.

Nietzki, Konwaldt, *Ber.*, 1904, **37**, 3893.
Société chimique de la Grande Paroisse,
B.P. 169,688, (*Chem. Abstracts*, 1922,
16, 721).

4 : 6-Dichloro-2-nitroaniline.

Orange yellow needles from EtOH. M.p. 102° (99°). Sol. EtOH, Et₂O, ligroin. Spar. sol. H₂O. Zn + HCl → 3 : 5-dichloro-*o*-phenylenediamine. Volatile in steam.

N-*Acetyl* : 4 : 6-dichloro-*o*-nitroacetanilide.
M.p. 188°.

Zinke, Kuchenbecker, *Ann.*, 1904, **330**, 17, 27.

Datta, Mitter, *J. Am. Chem. Soc.*, 1919, **41**, 2036.

Holleman, van Haeften, *Rec. trav. chim.*, 1921, **40**, 72.

5 : 6-Dichloro-2-nitroaniline.

Pale yellow needles from EtOH. M.p. 164°.
Spar. sol. EtOH, AcOH.Aq.

Holleman, *Rec. trav. chim.*, 1920, **39**, 449.
Beilstein, Kurbatow, *Ann.*, 1879, **196**, 221.

2 : 4-Dichloro-3-nitroaniline.

Yellow prisms from EtOH. M.p. 97-5°.

N-*Acetyl* : 2 : 4-dichloro-*m*-nitroacetanilide.
C₈H₆O₃N₂Cl₂. MW, 249. M.p. 128-9°.

Körner, Contardi, *Atti accad. Lincei*, 1909, **18**, i, 94, 103.

2 : 5-Dichloro-3-nitroaniline.

Yellow needles. M.p. 122°.

Hüffer, *Rec. trav. chim.*, 1921, **40**, 453.

Duin, *Chem. Zentr.*, 1919, IV, 769.

2 : 6-Dichloro-3-nitroaniline.

Yellow needles from EtOH.Aq. M.p. 110-8°.

N-*Acetyl* : 2 : 6-dichloro-*m*-nitroacetanilide.
M.p. 128-6°.

Körner, Contardi, *Atti accad. Lincei*, 1909, **18**, i, 94, 95.

4 : 6-Dichloro-3-nitroaniline.

M.p. 108°.

Artini, *Chem. Abstracts*, 1911, **5**, 1270.

2 : 5-Dichloro-4-nitroaniline.

Yellow needles from AcOH.Aq. M.p. 153° (157°). Sol. EtOH, CS₂. Prac. insol. ligroin.
Red. → 2 : 5-dichloro-*p*-phenylenediamine.

N-*Acetyl* : 2 : 5-dichloro-*p*-nitroacetanilide.
C₈H₆O₃N₂Cl₂. MW, 249. M.p. 145-6°.

Holleman, den Hollander, van Haeften,
Rev. trav. chim., 1921, **40**, 325.

Beilstein, Kurbatow, *Ann.*, 1879, **196**, 224.

Whiston, *J. Soc. Chem. Ind.*, 1924, **43**, 370T.

2 : 6-Dichloro-4-nitroaniline.

Yellow needles from EtOH. M.p. 189-90° (195°). Sol. EtOH. Zn + HCl → 2 : 6-dichloro-*p*-phenylenediamine.

N-*Acetyl* : 2 : 6-dichloro-*p*-nitroacetanilide.
M.p. 214-15° (210°).

N-*Diacetyl* : m.p. 142-5°.

Datta, Mitter, *J. Am. Chem. Soc.*, 1919, **41**, 2037.

Körner, Contardi, *Atti accad. Lincei*, 1913, **22**, i, 826.

Goldschmidt, Strohmenger, *Ber.*, 1922, **55**, 2457.

3 : 5-Dichloro-4-nitroaniline.

Yellow needles from EtOH.Aq. M.p. 171°.
Sol. EtOH, C₆H₆, CHCl₃. Prac. insol. ligroin, CS₂.

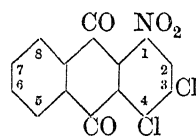
N-*Acetyl* : 3 : 5-dichloro-*p*-nitroacetanilide.
M.p. 222°.

Beilstein, Kurbatow, *Ann.*, 1879, **196**, 227.

Dichloronitroanisole.

See under Dichloronitrophenol.

3 : 4-Dichloro-1-nitroanthraquinone



C₁₄H₅O₄NCl₂

MW, 322

Yellow needles from C₆H₆. M.p. 246°. Sol. C₆H₆, PhNO₂. Spar. sol. EtOH.

Ullmann, D.R.P. 332,853, (*Chem. Zentr.*, 1921, II, 805).

4 : 5-Dichloro-1-nitroanthraquinone.

Yellow prisms from PhNO₂. Sol. most ord. org. solvents.

Bayer, D.R.P. 249,721, (*Chem. Zentr.*, 1912, II, 652).

4 : 8-Dichloro-1-nitroanthraquinone.

Yellow needles from PhNO₂ or AcOH. M.p. 257°. Sol. most ord. org. solvents.

I.G., D.R.P. 473,871, (*Chem. Zentr.*, 1929, II, 97).

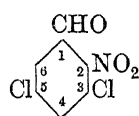
Bayer, D.R.P. 249,721, (*Chem. Zentr.*, 1912, II, 652).

5 : 8-Dichloro-1-nitroanthraquinone.

Yellow needles from AcOH. M.p. 238°. Sol. C₆H₆. Insol. MeOH.

Walsh, Weizmann, *J. Chem. Soc.*, 1910, **97**, 687.

3 : 5-Dichloro-*o*-nitrobenzaldehyde



C₇H₃O₃NCl₂

MW, 220

Needles from C_6H_6 -pet. ether. M.p. 91.5° . Volatile in steam.

Oxime: needles from C_6H_6 -pet. ether. M.p. 97° .

Phenylhydrazone: red needles from C_6H_6 -ligroin. M.p. 175° .

Asinger, *Monatsh.*, 1933, 63, 386.

3 : 6-Dichloro-o-nitrobenzaldehyde.

Leaflets or needles. M.p. 137° . $FeSO_4 + NH_3 \rightarrow$ 3 : 6-dichloro-o-aminobenzaldehyde.

Oxime: needles. M.p. $154-5^\circ$.

Phenylhydrazone: m.p. 153° .

2 : 4-Dichlorophenylhydrazone: m.p. 211° .

Di-Me acetal: m.p. $62-3^\circ$.

Di-Et acetal: m.p. $98-9^\circ$.

Chattaway, Clemo, *J. Chem. Soc.*, 1923, 123, 3060.

Gnehm, Bänziger, *Ber.*, 1896, 29, 876.

4 : 5-Dichloro-o-nitrobenzaldehyde.

Yellow prisms from C_6H_6 . M.p. 73° .

M.L.B., D.R.P. 254,467, (*Chem. Zentr.*, 1913, I, 199).

2 : 5-Dichloro-m-nitrobenzaldehyde.

Phenylhydrazone: m.p. 171° .

p-Nitrophenylhydrazone: m.p. $290-2^\circ$ decomp.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 2381.

2 : 6-Dichloro-m-nitrobenzaldehyde.

Yellow prisms from CS_2 . M.p. 76° . Sol. EtOH. Insol. H_2O .

α -*Oxime*: m.p. $156-7^\circ$. *Acetyl deriv.*, m.p. 119° .

β -*Oxime*: m.p. $154-5^\circ$.

2 : 4-Dichlorophenylhydrazone: m.p. 170° .

Meisenheimer, Theilacker, Beisswenger, *Ann.*, 1932, 495, 254.

4 : 6-Dichloro-m-nitrobenzaldehyde.

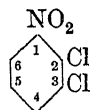
Cryst. from ligroin. M.p. 75° . Sol. EtOH, C_6H_6 . Spar. sol. ligroin. Insol. H_2O .

2 : 4-Dichlorophenylhydrazone: m.p. 237° .

Geigy, D.R.P. 198,909, (*Chem. Zentr.*, 1908, II, 214).

Chattaway, Clemo, *J. Chem. Soc.*, 1923, 123, 3060.

2 : 3-Dichloronitrobenzene



$C_6H_3O_2NCl_2$

MW, 192

Needles from pet. ether or AcOH. F.p. 59.9° . M.p. $61-2^\circ$. B.p. $257-8^\circ$. Sol. EtOH, Et₂O, AcOH, C_6H_6 . D^{14}_D 1.721. Red. \rightarrow 2 : 3-dichloroaniline.

Holleman, de Mooy, *Rec. trav. chim.*, 1915, 35, 9.

2 : 4-Dichloronitrobenzene.

Needles from EtOH. F.p. 30.5° . M.p. 34° . B.p. $258-9^\circ$, $154^\circ/15$ mm. Sol. Et₂O. D^{15}_D 1.4434. $Zn + HCl \rightarrow$ 2 : 4-dichloroaniline. Alc. $NH_3 \rightarrow$ 5-chloro-2-nitroaniline.

Holleman, *Rec. trav. chim.*, 1912, 31, 280.

2 : 5-Dichloronitrobenzene.

Prisms or plates from EtOH. Plates from AcOEt. M.p. 56° . B.p. 267° . Sol. Et₂O, CS_2 , $CHCl_3$, C_6H_6 , hot EtOH. Volatile in steam. D^{15}_D 1.4390. $Zn + HCl \rightarrow$ 2 : 5-dichloroaniline. Alc. $NH_3 \rightarrow$ 4-chloro-2-nitroaniline. $NaOH + MeOH \rightarrow$ 4-chloro-2-nitroanisole.

Crauw, *Rec. trav. chim.*, 1931, 50, 766.

Holleman, den Hollander, van Haeften, *Rec. trav. chim.*, 1921, 40, 325.

Kiprianow, Mikhailenko, *Chem. Abstracts*, 1931, 25, 5033.

Ganopol'skiĭ, *Chem. Abstracts*, 1936, 30, 6347.

2 : 6-Dichloronitrobenzene.

Cryst. from EtOH or CS_2 . F.p. 70.05° . M.p. 72.5° . B.p. $130^\circ/8$ mm. D^{17}_D 1.603. $Zn + HCl \rightarrow$ 2 : 6-dichloroaniline.

Holleman, Reiding, *Rec. trav. chim.*, 1904, 23, 368.

Körner, Contardi, *Atti accad. Lincei*, 1909, 18, i, 100.

3 : 4-Dichloronitrobenzene.

(a) Needles from EtOH or CCl_4 . M.p. 43° . B.p. $255-6^\circ$. D^{15}_D 1.4558. $Zn + HCl \rightarrow$ 3 : 4-dichloroaniline. Alc. $NH_3 \rightarrow$ 2-chloro-4-nitroaniline.

(b) Liq. Changes to solid form (a) at 15° .

McMaster, Magill, *J. Am. Chem. Soc.*, 1928, 50, 3038.

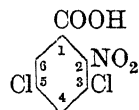
3 : 5-Dichloronitrobenzene.

Monoclinic prisms or leaflets from AcOH or EtOH. F.p. 63.2° . M.p. 65.4° . D^{14}_D 1.692. Volatile in steam. $Zn + HCl \rightarrow$ 3 : 5-dichloroaniline.

Willstätter, Schudel, *Ber.*, 1918, 51, 784.

Körner, Contardi, *Atti accad. Lincei*, 1914, 22, i, 823.

3 : 5-Dichloro-o-nitrobenzoic Acid



$C_7H_3O_4NCl_2$

MW, 236

Cubes from C_6H_6 . Needles from EtOH.Aq. M.p. 194° .

Asinger, *Monatsh.*, 1933, 63, 386.

3 : 6-Dichloro-o-nitrobenzoic Acid.

Plates from C_6H_6 . M.p. $143-4^\circ$.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 2382.

4 : 5-Dichloro-*o*-nitrobenzoic Acid.

Cryst. from C_6H_6 . M.p. 165° . Sol. H_2O .
Spar. sol. C_6H_6 .

Ruggli, Zaeslin, *Helv. Chim. Acta*, 1936, 19, 437.

4 : 6-Dichloro-*o*-nitrobenzoic Acid.

Cryst. from C_6H_6 . M.p. $189-90^\circ$.

Ruggli, Zaeslin, *Helv. Chim. Acta*, 1936, 19, 439.

2 : 5-Dichloro-*m*-nitrobenzoic Acid.

Needles from AcOH. M.p. 220° .

Hodgson, Beard, *J. Chem. Soc.*, 1927, 2381.

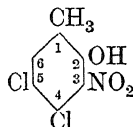
2 : 6-Dichloro-*m*-nitrobenzoic Acid.

Cryst. from toluene or chlorobenzene. M.p. $150-2^\circ$. Spar. sol. H_2O . Insol. C_6H_6 .

Nitrile: $C_7H_5O_2N_2Cl_2$. MW, 217. Prisms from EtOH. M.p. $106-7^\circ$.

Lehmstedt, Schrader, *Ber.*, 1937, 70, 1531.

Meisenheimer, Theilacker, Beisswenger, *Ann.*, 1932, 495, 255.

4 : 5-Dichloro-3-nitro-*o*-cresol

$C_7H_5O_3NCl_2$ MW, 222

Yellow needles. M.p. 69° . Sol. EtOH, C_6H_6 , AcOH. Spar. sol. pet. ether.

Acetyl: m.p. $93-4^\circ$.

Zincke, *Ann.*, 1918, 417, 210.

3 : 6-Dichloro-5-nitro-*o*-cresol.

Pale yellow cryst. from ligroin. M.p. 135° . Insol. H_2O . Volatile in steam.

Acetyl: yellow needles from C_6H_6 . M.p. 98° .

Kehrmann, Silva, Keleti, *Ber.*, 1915, 48, 2034.

2 : 6-Dichloro-4-nitro-*m*-cresol.

Prisms from C_6H_6 . M.p. 144° . Sol. EtOH, $CHCl_3$, C_6H_6 .

Raiford, *J. Am. Chem. Soc.*, 1914, 36, 675.

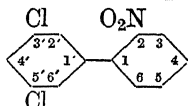
Bureš, *Chem. Abstracts*, 1928, 22, 63.

2 : 4-Dichloro-6-nitro-*m*-cresol.

Prisms from C_6H_6 . M.p. 143° decomp. Sol. EtOH, $CHCl_3$, C_6H_6 .

Kehrmann, Silva, Keleti, *Ber.*, 1915, 48, 2031.

Bureš, *Chem. Zentr.*, 1927, II, 1346.

3' : 5'-Dichloro-2-nitrodiphenyl

$C_{12}H_7O_2NCl_2$ MW, 268

Yellow needles. M.p. 75° .

Hinkel, Hey, *J. Chem. Soc.*, 1928, 2790.

4 : 4'-Dichloro-2-nitrodiphenyl.

Yellow needles from CCl_4 . M.p. 102° .

Le Fèvre, Turner, *J. Chem. Soc.*, 1926, 2045.

4 : 2'-Dichloro-3-nitrodiphenyl.

Yellow prisms. M.p. 91° .

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 1193.

2' : 4'-Dichloro-3-nitrodiphenyl.

Needles from MeOH or AcOH. Aq. M.p. 115° .

Blackey, Scarborough, *J. Chem. Soc.*, 1927, 3004.

3' : 5'-Dichloro-3-nitrodiphenyl.

Cryst. from MeOH. M.p. 162° .

Hinkel, Dippy, *J. Chem. Soc.*, 1930, 1389.

2 : 4'-Dichloro-4-nitrodiphenyl.

Yellow cryst. M.p. 125° .

Finzi, Mangini, *Gazz. chim. ital.*, 1935, 65, 638; 1932, 62, 1193.

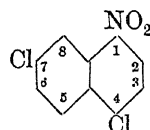
3' : 5'-Dichloro-4-nitrodiphenyl.

Yellow needles. M.p. 146° .

Hinkel, Hey, *J. Chem. Soc.*, 1928, 2790.

4 : 5-Dichloro-2-nitrodiphenyl Ether.

See under 4 : 5-Dichloro-2-nitrophenol.

4 : 7-Dichloro-1-nitronaphthalene

$C_{10}H_5O_2NCl_2$ MW, 242

Yellow needles. M.p. 119° . Sol. hot EtOH, hot AcOH.

Cleve, *Bull. soc. chim.*, 1878, 29, 499.

Armstrong, Wynne, *Chem. News*, 1890, 61, 94.

4 : 8-Dichloro-1-nitronaphthalene.

Needles from EtOH. M.p. 142° . Sol. ord. org. solvents. Volatile in steam.

Kalle, D.R.P. 343,147, (*Chem. Abstracts*, 1923, 17, 1244).

Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 50.

5 : 8-Dichloro-1-nitronaphthalene.

Yellow cryst. from EtOH. M.p. 93° . Mod. sol. hot EtOH.

Kalle, D.R.P. 343,147, (*Chem. Abstracts*, 1923, 17, 1244).

Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 50.

6 : 8-Dichloro-1-nitronaphthalene.

M.p. $116-5^\circ$.

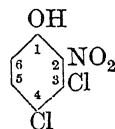
Hodgson, Turner, *J. Chem. Soc.*, 1942, 723.

1 : 4-Dichloro-2-nitronaphthalene.

Yellow needles from AcOH. M.p. 116.5°.

Hodgson, Crook, *J. Chem. Soc.*, 1936, 1502.**4 : 8-Dichloro-2-nitronaphthalene.**Yellow needles from C₆H₆. M.p. 132°.Friedländer, Karamessinis, Schenk, *Ber.*, 1922, 55, 47.Kalle, D.R.P. 343,147, (*Chem. Abstracts*, 1923, 17, 1244).**Dichloronitrophenetole.**

See under Dichloronitrophenol.

3 : 4-Dichloro-2-nitrophenolC₆H₃O₃NCl₂

MW, 208

Yellow needles from pet. ether. M.p. 76°.

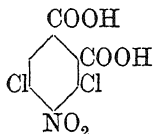
Me ether : 3 : 4-dichloro-2-nitroanisole. C₇H₅O₃NCl₂. MW, 222. Needles from EtOH. M.p. 128°.Hodgson, Kershaw, *J. Chem. Soc.*, 1929, 2922.**3 : 5-Dichloro-2-nitrophenol.**

Yellow needles from pet. ether. M.p. 51°. Sol. ord. org. solvents.

Me ether : 3 : 5-dichloro-2-nitroanisole. Needles from MeOH. M.p. 75°.Hodgson, Wignall, *J. Chem. Soc.*, 1927, 2218.**3 : 6-Dichloro-2-nitrophenol.**

Yellow prisms from pet. ether. M.p. 70°.

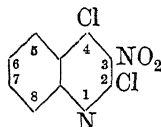
Me ether : 3 : 6-dichloro-2-nitroanisole. Prisms from EtOH. M.p. 70°. Volatile in steam.Hodgson, Kershaw, *J. Chem. Soc.*, 1929, 2923.**4 : 5-Dichloro-2-nitrophenol.***Me ether* : 4 : 5-dichloro-2-nitroanisole. M.p. 90°. B.p. 260° slight decomp.*Phenyl ether* : 4 : 5-dichloro-2-nitrodiphenyl ether. C₁₂H₇O₃NCl₂. MW, 284. M.p. 69–70°.Groves, Turner, Sharp, *J. Chem. Soc.*, 1929, 523.Holleman, *Rec. trav. chim.*, 1921, 40, 77.**4 : 6-Dichloro-2-nitrophenol.**Pale yellow cryst. from AcOH. M.p. 122–3°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. D₁₉ 1.822. Sublimes below m.p. The alkali salts are obtained as orange to red coloured needles. The NH₄, Na, K, and Mg salts are sol. H₂O, EtOH.*Me ether* : 4 : 6-dichloro-2-nitroanisole. Yellow needles. M.p. 44°. Sol. EtOH, Et₂O.*Et ether* : 4 : 6-dichloro-2-nitrophenetole. C₈H₇O₃NCl₂. MW, 236. Prisms. M.p. 29°. Sol. EtOH, Et₂O.*Acetyl* : m.p. 77°.*m-Nitrobenzoyl* : m.p. 149–50°.Groves, Turner, Sharp, *J. Chem. Soc.*, 1929, 522.Datta, Mitter, *J. Am. Chem. Soc.*, 1919, 41, 2035.**5 : 6-Dichloro-2-nitrophenol.***Me ether* : 5 : 6-dichloro-2-nitroanisole. M.p. 73°.Holleman, *Rec. trav. chim.*, 1921, 40, 77.**2 : 4-Dichloro-3-nitrophenol.**Pale yellowish green needles from pet. ether. M.p. 70–2°. M.p. 85–7° after intensive drying. *p-Toluenesulphonyl* : m.p. 122°.Groves, Turner, Sharp, *J. Chem. Soc.*, 1929, 522.**4 : 6-Dichloro-3-nitrophenol.**Needles from H₂O. M.p. 105–6°. K salt is spar. sol. H₂O.*Benzoyl* : m.p. 111–12°.*m-Nitrobenzoyl* : m.p. 154°.*o-Nitro-p-toluenesulphonyl* : m.p. 103°.Groves, Turner, Sharp, *J. Chem. Soc.*, 1929, 517.**2 : 5-Dichloro-4-nitrophenol.**Needles from H₂O. Prisms from EtOH. M.p. 117°. Sol. EtOH, Et₂O. Mod. volatile in steam.*Me ether* : 2 : 5-dichloro-4-nitroanisole. C₇H₅O₃NCl₂. MW, 222. Yellow needles. M.p. 101°.*Acetyl* : m.p. 89°.Kehrmann, *Ber.*, 1888, 21, 3319.Holleman, van Haeften, *Rec. trav. chim.*, 1921, 40, 77.Fries, *Ann.*, 1927, 454, 247.**2 : 6-Dichloro-4-nitrophenol.**Pale brown cryst. M.p. 125° decomp. Sol. Et₂O, CHCl₃, hot EtOH. Spar. sol. H₂O, C₆H₆. Spar. volatile in steam. $k = 2.1 \times 10^{-4}$ at 25°. The NH₄, Na, K, and Mg salts are obtained as yellow needles and are sol. H₂O.*Me ether* : 2 : 6-dichloro-4-nitroanisole. M.p. 98°.*Et ether* : 2 : 6-dichloro-4-nitrophenetole. C₈H₇O₃NCl₂. MW, 236. M.p. 35°. Sol. EtOH, Et₂O. Insol. H₂O.Datta, Mitter, *J. Am. Chem. Soc.*, 1919, 41, 2036.Holleman, *Rec. trav. chim.*, 1918, 37, 99; 1921, 40, 77.**3 : 5-Dichloro-4-nitrophenol.**Pale yellow needles from H₂O. M.p. 150–1°. Sol. ord. org. solvents.*Me ether* : 3 : 5-dichloro-4-nitroanisole. Needles from MeOH. M.p. 70°.*Acetyl* : m.p. 99°.Hodgson, Wignall, *J. Chem. Soc.*, 1927, 2218.

3 : 5-Dichloro-4-nitrophthalic Acid

$C_8H_3O_6NCl_2$ MW, 280

Needles from xylene. M.p. 165° decomp.
Sol. H_2O , EtOH. Insol. C_6H_6 .

Crossley, *J. Chem. Soc.*, 1904, **85**, 277.

2 : 4-Dichloro-3-nitroquinoline

$C_9H_4O_2N_2Cl_2$ MW, 243

Needles from EtOH. M.p. 102°. Sol. EtOH, AcOEt, $CHCl_3$, C_6H_6 . Volatile in steam. Vesicant. $Sn + HCl \rightarrow$ 3-aminoquinoline.

Gabriel, *Ber.*, 1918, **51**, 1509.

4 : 7-Dichloro-8-nitroquinoline.

M.p. 149–51°.

Surrey, Hammer, *J. Am. Chem. Soc.*, 1946, **68**, 1244.

5 : 7-Dichloro-8-nitroquinoline.

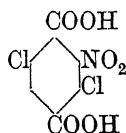
Plates from EtOH or prisms from $CHCl_3$. M.p. 168–5°. Sol. Et_2O , $CHCl_3$, hot EtOH. Sol. hot conc. acids.

B_2, H_2PtCl_6 : yellow needles. M.p. 255°.

Claus, Ammelburg, *J. prakt. Chem.*, 1895, **51**, 418.

Dichloronitrosophenol.

See under Dichloro-*p*-benzoquinone.

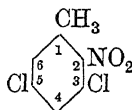
3 : 6-Dichloro-2-nitroterephthalic Acid

$C_8H_3O_6NCl_2$ MW, 280

Yellow needles from H_2O . M.p. 225–6° decomp. Sol. H_2O , EtOH, Et_2O .

Di-Me ester: $C_{10}H_7O_6NCl_2$. MW, 308. Plates from MeOH.Aq. M.p. 207–8° decomp.

Levy, Andreocci, *Ber.*, 1888, **21**, 1961.

3 : 5-Dichloro-*o*-nitrotoluene

$C_7H_5O_2NCl_2$ MW, 206

Needles from EtOH or AcOH. M.p. 61–2°. Red. \rightarrow 3 : 5-dichloro-*o*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1901, **79**, 1134.

4 : 5-Dichloro-*o*-nitrotoluene.

Needles from EtOH or AcOH. M.p. 63–4°. Red. \rightarrow 4 : 5-dichloro-*o*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1901, **79**, 1133; 1902, **81**, 1333, 1349.

4 : 6-Dichloro-*o*-nitrotoluene.

Plates. M.p. 60°.

I.G., D.R.P. 507,792, (*Chem. Abstracts*, 1931, **25**, 716).

Cohen, McCandlish, *J. Chem. Soc.*, 1905, **87**, 1266.

2 : 5-Dichloro-*m*-nitrotoluene.

Needles from EtOH. M.p. 55°. Volatile in steam. Red. \rightarrow 2 : 5-dichloro-*m*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1902, **81**, 1330.

2 : 6-Dichloro-*m*-nitrotoluene.

Needles from EtOH–AcOH. M.p. 53°. Red. \rightarrow 2 : 6-dichloro-*m*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1901, **79**, 1132; 1902, **81**, 1346.

4 : 5-Dichloro-*m*-nitrotoluene.

Yellow needles from EtOH. M.p. 50°. Red. \rightarrow 4 : 5-dichloro-*m*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1902, **81**, 1338.

4 : 6-Dichloro-*m*-nitrotoluene.

Needles from EtOH. M.p. 54–5° (49–50°). Red. \rightarrow 4 : 6-dichloro-*m*-toluidine.

Blanksma, *Rec. trav. chim.*, 1910, **29**, 415.
Dadswell, Kenner, *J. Chem. Soc.*, 1927, 585.

5 : 6-Dichloro-*m*-nitrotoluene.

Needles. M.p. 83°. Red. \rightarrow 5 : 6-dichloro-*m*-toluidine.

Wynne, Greeves, *Proc. Chem. Soc.*, 1895, **11**, 152.

2 : 3-Dichloro-*p*-nitrotoluene.

Needles from EtOH–AcOH. M.p. 51°. Red. \rightarrow 2 : 3-dichloro-*p*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1901, **79**, 1128; 1902, **81**, 1347.

2 : 5-Dichloro-*p*-nitrotoluene.

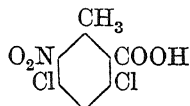
Needles from EtOH– Et_2O . M.p. 51°. Red. \rightarrow 2 : 5-dichloro-*p*-toluidine.

Cohen, Dakin, *J. Chem. Soc.*, 1901, **79**, 1128; 1902, **81**, 1347.

2 : 6-Dichloro-*p*-nitrotoluene.

Needles from EtOH. M.p. 63–4° (65°). B.p. 278–9°. Stable to boiling $KMnO_4$.

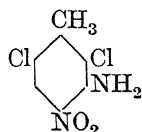
Levy, Stephen, *J. Chem. Soc.*, 1931, 78.
Davies, *J. Chem. Soc.*, 1922, **121**, 812.

3 : 5-Dichloro-6-nitro-*o*-toluic Acid

$C_8H_5O_4NCl_2$ MW, 250

Needles from H_2O . M.p. 187–9°. Sol. EtOH, hot H_2O . Spar. sol. C_6H_6 .

Crossley, *J. Chem. Soc.*, 1904, 85, 281.

2 : 6-Dichloro-4-nitro-*m*-toluidine

$C_7H_6O_2N_2Cl_2$ MW, 221

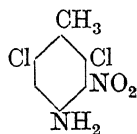
Deep yellow plates from C_6H_6 . Brown prisms from EtOH. M.p. 136°.

N-Acetyl : 2 : 6-dichloro-4-nitro-*m*-acet-toluidide. M.p. 185°.

N-Chloroacetyl : m.p. 170°.

N-Benzoyl : m.p. 215°.

Davies, Leeper, *J. Chem. Soc.*, 1926, 1414.

2 : 6-Dichloro-3-nitro-*p*-toluidine

$C_7H_6O_2N_2Cl_2$ MW, 221

Orange needles. M.p. 130–1°.

N-Acetyl : 2 : 6-dichloro-3-nitro-*p*-acet-toluidide. Needles. M.p. 180°.

Davies, *J. Chem. Soc.*, 1922, 121, 814.

1 : 9-Dichlorononane (Nonamethylene chloride)



$C_9H_{18}Cl_2$ MW, 197

B.p. 258–62° part. decomp., 138–9°/17 mm.

v. Braun, Danziger, *Ber.*, 1912, 45, 1972.

1 : 5-Dichloro-octane



$C_8H_{18}Cl_2$ MW, 185

B.p. 105–7°/16 mm.

v. Braun, Schmitz, *Ber.*, 1906, 39, 4366.

1 : 8-Dichloro-octane (Octamethylene chloride)

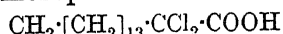


$C_8H_{18}Cl_2$ MW, 185

B.p. 240–2°. Solidifies to mass of leaflets in freezing mixture.

Ssolonina, *Chem. Zentr.*, 1899, I, 26.

1 : 1-Dichloropalmitic Acid



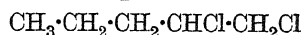
$C_{16}H_{30}O_2Cl_2$ MW, 325

Cryst. from Et_2O . M.p. 35–7°.

Ethylamide : m.p. 40–1°.

Anilide : m.p. 49–52°.

v. Braun, Jostes, Munch, *Ann.*, 1927, 453, 137.

1 : 2-Dichloro-*n*-pentane

$C_5H_{10}Cl_2$ MW, 141

B.p. 146°/739 mm. D_{25}^{25} 1.0767. n_D^{25} 1.4448.

Koelsch, McElvain, *J. Am. Chem. Soc.*, 1929, 51, 3393.

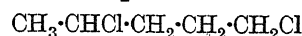
Tischenko, Shchigel'skaya, *Chem. Zentr.*, 1938, II, 2576.

1 : 3-Dichloro-*n*-pentane.

$C_5H_{10}Cl_2$ MW, 141

B.p. 80.4°/60 mm. D_4^{20} 1.0834. n_D^{20} 1.4485.

Hass, Huffman, *J. Am. Chem. Soc.*, 1941, 63, 1233.

1 : 4-Dichloro-*n*-pentane

$C_5H_{10}Cl_2$ MW, 141

B.p. 88.1°/60 mm., 58–60°/15 mm. D_4^{20} 1.0840. n_D^{20} 1.4503.

Fröbe, Hochstetter, *Monatsh.*, 1902, 23, 1087.

Hass, Huffman, *J. Am. Chem. Soc.*, 1941, 63, 1233.

1 : 5-Dichloro-*n*-pentane (Pentamethylene chloride)

$C_5H_{10}Cl_2$ MW, 141

B.p. 179–80°, 102–4°/60 mm., 79–80°/21 mm. D_4^{20} 1.1028. n_D^{20} 1.4563. Sol. EtOH, Et_2O , $CHCl_3$, CS_2 . Insol. H_2O .

v. Braun, *Ber.*, 1904, 37, 2918.

v. Braun, Sobiecki, *Ber.*, 1911, 44, 1469.

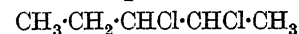
Hass, Huffman, *J. Am. Chem. Soc.*, 1941, 63, 1233.

2 : 2-Dichloro-*n*-pentane

$C_5H_{10}Cl_2$ MW, 141

B.p. 128–9°, 36–7°/20 mm. D^{20} 1.040.

Bourguel, *Compt. rend.*, 1923, 177, 823.

2 : 3-Dichloro-*n*-pentane

$C_5H_{10}Cl_2$ MW, 141

B.p. 138–9°, 50–1°/20 mm.

Fröbe, Hochstetter, *Monatsh.*, 1902, 23, 1085.

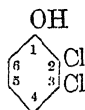
Tischenko, Shchigel'skaya, *Chem. Zentr.*, 1938, II, 2576.

2 : 4-Dichloro-*n*-pentane
 $\text{C}_5\text{H}_{10}\text{Cl}_2$ MW, 141
B.p. 147–50°. D_{20}^{25} 1.063. n_D^{25} 1.447.Pariselle, *Compt. rend.*, 1912, 154, 712.**3 : 3-Dichloropentanone-2.**

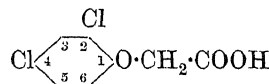
See Methyl 1 : 1-dichloropropyl Ketone.

Dichlorophenetole.

See under Dichlorophenol.

2 : 3-Dichlorophenol
 $\text{C}_6\text{H}_4\text{OCl}_2$ MW, 163
Cryst. from pet. ether. M.p. 57°. Sol. EtOH, Et₂O.*Me ether* : 2 : 3-dichloroanisole. $\text{C}_7\text{H}_6\text{OCl}_2$. MW, 177. M.p. 31°.Holleman, *Rec. trav. chim.*, 1918, 37, 102.**2 : 4-Dichlorophenol.**Needles. M.p. 45°. B.p. 210°. Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Spar. sol. H_2O . Alk. salts unstable. $k = 3.1 \times 10^{-8}$ at 25°.*Me ether* : 2 : 4-dichloroanisole. Prisms. M.p. 28°. B.p. 233°/740 mm., 125°/10 mm. Sol. EtOH, Et₂O.*Et ether* : 2 : 4-dichlorophenetole. $\text{C}_8\text{H}_8\text{OCl}_2$. MW, 191. B.p. 237°. Sol. EtOH, Et₂O.*Acetyl* : b.p. 244–5°. Sol. EtOH, Et₂O.*Benzoyl* : m.p. 96°.*Carbonate* : $\text{C}_6\text{H}_3\text{Cl}_2\cdot\text{O}\cdot\text{CO}\cdot\text{O}\cdot\text{C}_6\text{H}_3\text{Cl}_2$. Exists in two forms. (α -) Needles, m.p. 123°. (β -) Needles, m.p. 89°.Holleman, *Rec. trav. chim.*, 1918, 37, 97.Lickoscherstov, *Chem. Abstracts*, 1930, 24, 836.Ebel et al., *J. Chem. Education*, 1947, 24, 449.**2 : 5-Dichlorophenol.**Prisms from pet. ether. M.p. 58°. B.p. 211°/744 mm. Sol. EtOH, Et₂O, C_6H_6 . Spar. sol. H_2O .*Me ether* : 2 : 5-dichloroanisole. M.p. 24°. B.p. 140°/40 mm. Sol. EtOH, Et₂O. Volatile in steam.*Benzoyl* : m.p. 69°.Kohn, Fink, *Monatsh.*, 1931, 58, 78.**2 : 6-Dichlorophenol.**Needles. M.p. 67°. B.p. 219–20°, 80–5°/4 mm. Sol. EtOH, Et₂O.*Me ether* : 2 : 6-dichloroanisole. M.p. 10°. B.p. 105–6°/20 mm.*Propionyl* : b.p. 113–15°/0.5 mm. D_{20}^{25} 1.2844. n_D^{25} 1.5210.*Benzoyl* : m.p. 74–4.5°.Holleman, *Rec. trav. chim.*, 1918, 37, 96.Huston, Neeley, *J. Am. Chem. Soc.*, 1935, 57, 2177.Tanaka, Kutani, *Chem. Zentr.*, 1927, II, 51.Tarbell, Fanta, *J. Am. Chem. Soc.*, 1943, 65, 2169.**3 : 4-Dichlorophenol.**Needles from C_6H_6 -pet. ether. M.p. 68°. B.p. 253.5°/767 mm.*Me ether* : 3 : 4-dichloroanisole. $\text{C}_7\text{H}_6\text{OCl}_2$. MW, 177. M.p. – 8°.Holleman, *Rec. trav. chim.*, 1918, 37, 102.**3 : 5-Dichlorophenol.**

M.p. 68°. B.p. 233–4°, 122–4°/8 mm. Sol. EtOH.

Me ether : 3 : 5-dichloroanisole. Cryst. from EtOH or pet. ether. M.p. 39° (68°).*Acetyl* : needles from EtOH.Aq. M.p. 38°.*Benzoyl* : needles from EtOH.Aq. M.p. 55°.Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2078.Holleman, *Rec. trav. chim.*, 1918, 37, 103.**2 : 4-Dichlorophenoxyacetic Acid (2 : 4-D)**
 $\text{C}_8\text{H}_6\text{O}_3\text{Cl}_2$ MW, 221
Cryst. from C_6H_6 . M.p. 141° (138°). Selective weed-killer.*Me ester* : $\text{C}_9\text{H}_8\text{O}_3\text{Cl}_2$. MW, 235. B.p. 119°/11 mm.*Propyl ester* : $\text{C}_{11}\text{H}_{12}\text{O}_3\text{Cl}_2$. MW, 263. B.p. 109.5–111.5°/0.5 mm.*Isopropyl ester* : b.p. 139–40°/1 mm.*Butyl ester* : $\text{C}_{12}\text{H}_{14}\text{O}_3\text{Cl}_2$. MW, 277. B.p. 146–7°/1 mm.*Isobutyl ester* : b.p. 133–4°/1 mm.*Amide* : $\text{C}_8\text{H}_7\text{O}_2\text{NCl}_2$. MW, 220. Needles from C_6H_6 or EtOH. M.p. 130°.Pokorny, *J. Am. Chem. Soc.*, 1941, 63, 1542.Synerholm, Zimmerman, *Chem. Abstracts*, 1946, 40, 1474.Newman, Fones, Renoll, *J. Am. Chem. Soc.*, 1947, 69, 718.Ebel et al., *Chem. Abstracts*, 1947, 41, 7388.**Dichlorophenylacethydrazide.**

See under Dichlorophenylhydrazine.

 α : α -Dichlorophenylacetic Acid (Phenyl-dichloroacetic acid)
 $\text{C}_8\text{H}_8\text{O}_2\text{Cl}_2$ MW, 205
Plates. M.p. 69° (50–55°). Very sol. H_2O , EtOH, Et₂O. Deliquescent.

Et ester : $C_{10}H_{10}O_2Cl_2$. MW, 233. B.p. 263–6°.

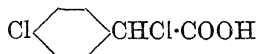
Amide : $C_8H_7ONCl_2$. MW, 204. Cryst. from ligroin or C_6H_6 . M.p. 111–2°. Insol. H_2O .

Nitrile : $C_8H_5NCl_2$. MW, 186. B.p. 223–4°.

Claissen, *Ber.*, 1879, 12, 630.

Radziszewski, *Ber.*, 1869, 2, 209.

α : 4-Dichlorophenylacetic Acid.

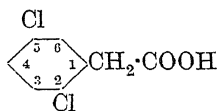


$C_8H_6O_2Cl_2$ MW, 205

M.p. 75–6°.

Haller *et al.*, *J. Am. Chem. Soc.*, 1945, 67, 1591.

2 : 5-Dichlorophenylacetic Acid.



$C_8H_6O_2Cl_2$ MW, 205

M.p. 106·5–7°.

Amide : m.p. 156–7°.

King, McMillan, *J. Am. Chem. Soc.*, 1946, 68, 2335.

2 : 6-Dichlorophenylacetic Acid.

Cryst. from EtOH.Aq. M.p. 157–8°.

Austin, Johnson, *J. Am. Chem. Soc.*, 1932, 54, 647.

3 : 4-Dichlorophenylacetic Acid.

Needles. M.p. 82–2·5°.

May, Mosettig, *J. Org. Chem.*, 1946, 11, 627.

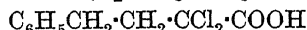
Dichlorophenylarsine.

See Phenylchloroarsine.

Dichlorophenylbenzhydrazide.

See under Dichlorophenylhydrazine.

α : α -Dichloro- γ -phenylbutyric Acid



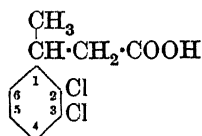
$C_{10}H_{10}O_2Cl_2$ MW, 233

Cryst. from pet. ether. M.p. 90°.

Ethylamide : b.p. 187–8°/12 mm.

v. Braun, Jostes, Munch, *Ann.*, 1927, 453, 139.

β -2 : 3-Dichlorophenylbutyric Acid (2 : 3-Dichloro- β -methylhydrocinnamic acid)



$C_{10}H_{10}O_2Cl_2$ MW, 233

Prisms from AcOH.Aq. M.p. 115°.

Chloride : $C_{10}H_9OCl_3$. MW, 251·5. B.p. 180°/15 mm.

Mayer, Philipps, Ruppert, Schmitt, *Ber.* 1928, 61, 1972.

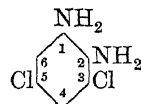
β -2 : 5-Dichlorophenylbutyric Acid (2-Dichloro- β -methylhydrocinnamic acid).

M.p. 71°. B.p. 180°/15 mm.

Chloride : b.p. 160°/15 mm.

Mayer, Philipps, Ruppert, Schmitt, *Ber.*, 1928, 61, 1972.

3 : 5-Dichloro-*o*-phenylenediamine



$C_6H_6N_2Cl_2$ MW, 177

Needles. M.p. 60·5°.

Witt, *Ber.*, 1874, 7, 1604.

3 : 6-Dichloro-*o*-phenylenediamine.

Needles. M.p. 98°. Sol. EtOH, Et₂O. Spar. sol. pet. ether.

Macleod, Pfund, Kilpatrick, *J. Am. Chem. Soc.*, 1922, 44, 2270.

2 : 5-Dichloro-*m*-phenylenediamine.

Needles from H₂O. M.p. 100°. Sol. EtOH, hot H₂O.

1 : 3-N-Diacetyl : needles from EtOH. M.p. above 260°.

1 : 3-N-Dibenzoyl : prisms from AcOEt. M.p. 220°.

Morgan, Norman, *J. Chem. Soc.*, 1902, 81, 1382.

4 : 6-Dichloro-*m*-phenylenediamine.

Needles from EtOH.Aq. M.p. 136–7° (138–9°).

1 : 3-N-Diacetyl : m.p. above 260°.

1 : 3-N-Dibenzoyl : needles from C_6H_6 or $CHCl_3$. M.p. 187°.

Morgan, *J. Chem. Soc.*, 1900, 77, 1206.

Emerson, Ringwald, *J. Am. Chem. Soc.*, 1941, 63, 2843.

2 : 5-Dichloro-*p*-phenylenediamine.

Prisms from H₂O. M.p. 170°. Spar. sol. EtOH, H₂O. $CrO_3 \rightarrow$ 2 : 5-dichloro-*p*-benzoquinone.

1 : 4-N-Diacetyl : m.p. 294–6°.

Noelting, Kopp, *Ber.*, 1905, 38, 3515.

2 : 6-Dichloro-*p*-phenylenediamine.

Needles. M.p. 123·5°. Sol. most ord. org. solvents.

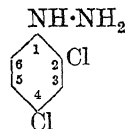
1-N-Acetyl : plates from H₂O. M.p. 218°.

4-N-Acetyl : needles from H₂O. M.p. 200°.

1 : 4-N-Diacetyl : cryst. from H₂O. M.p. 254°.

Morgan, Cleage, *J. Chem. Soc.*, 1918, 113, 594.

Witt, *Ber.*, 1875, 8, 145.

2 : 4-Dichlorophenylhydrazine $C_6H_6N_2Cl_2$

MW, 177

Needles from Et_2O or light petroleum. M.p. 94° . Unstable in air. K_2CrO_4 or Fehling's \rightarrow *m*-dichlorobenzene + N_2 .

B.HCl: plates. Decomp. about 210° .

N-Acetyl: 2 : 4-dichlorophenylacetylhydrazide.

$Cl_2C_6H_3 \cdot NH \cdot NH \cdot COCH_3$. Prisms. M.p. 157° .

N-Benzoyl: 2 : 4-dichlorophenylbenzhydrazide.

$Cl_2C_6H_3 \cdot NH \cdot NH \cdot COC_6H_5$. Needles. M.p. 168° .

Chattaway, Pearce, *J. Chem. Soc.*, 1915, 107, 32.

2 : 5-Dichlorophenylhydrazine.

Needles from H_2O . M.p. 105° .

Zettel, *Ber.*, 1893, 26, 2472.

3 : 5-Dichlorophenylhydrazine.

Plates from $EtOH$. M.p. 118° . Sol. $EtOH$. Turns brown and decomposes in air. Hot K_2CrO_4 or Fehling's \rightarrow *m*-dichlorobenzene + N_2 .

B.HCl: decomp. about 190° without melting.

N-Acetyl: 3 : 5-dichlorophenylacetylhydrazide.

$Cl_2C_6H_3 \cdot NH \cdot NH \cdot COCH_3$. Prisms. M.p. 175.5° .

N-Benzoyl: 3 : 5-dichlorophenylbenzhydrazide. $Cl_2C_6H_3 \cdot NH \cdot NH \cdot COC_6H_5$. Plates. M.p. 221.5° .

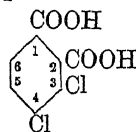
Chattaway, Ellington, *J. Chem. Soc.*, 1916, 109, 587.

Dichlorophenylpropionic Acid.

See Dichlorohydratropic Acid and Dichlorohydrocinnamic Acid.

3 : 3-Dichloro-1-phenylpropylene.

See Cinnamylidene chloride.

3 : 4-Dichlorophthalic Acid $C_8H_4O_4Cl_2$

MW, 235

Plates from H_2O . M.p. 195° (rapid heat.) \rightarrow anhydride. Sol. H_2O , Et_2O .

Anhydride: $C_8H_2O_3Cl_2$. MW, 217. M.p. 121° . B.p. 329° .

Villiger, *Ber.*, 1909, 42, 3541.

3 : 5-Dichlorophthalic Acid.

Needles. M.p. 164° . Sol. H_2O , $EtOH$, Et_2O . Spar. sol. C_6H_6 , $CHCl_3$. Sublimes to the anhydride.

Di-Et ester: $C_{12}H_{12}O_4Cl_2$. MW, 291. B.p. $312-13^\circ$.

Anhydride: needles. M.p. 89° .

Imide: 3 : 5-dichlorophthalimide.

$C_8H_3O_2NCl_2$. MW, 216. Yellow needles from $EtOH$. M.p. 208° .

Anil: 3 : 5-dichlorophthalanil. $C_{14}H_7O_2NCl_2$. MW, 292. Yellow needles from $EtOH$. M.p. 150.5° .

Crossley, le Sueur, *J. Chem. Soc.*, 1902, 81, 1533.

3 : 6-Dichlorophthalic Acid.

Plates from H_2O . Begins to lose H_2O above 100° with formation of anhydride: change is more rapid at higher temps. Sol. $EtOH$, Et_2O , hot H_2O . k (first) = 3.45×10^{-2} at 25° ; (second) = 2.8×10^{-4} at 25° .

Mono-Et ester: $C_{10}H_8O_4Cl_2$. MW, 263. M.p. $130-1^\circ$. Sol. $EtOH$. Spar. sol. H_2O . $k = 1.5 \times 10^{-2}$ at 25° .

Di-Et ester: m.p. 60° .

Anhydride: m.p. 194.5° . B.p. 339° .

Imide: 3 : 6-dichlorophthalimide. Needles from H_2O . M.p. 242° .

Anil: 3 : 6-dichlorophthalanil. Needles. M.p. 191° .

Villiger, *Ber.*, 1909, 42, 3539.

4 : 5-Dichlorophthalic Acid.

Needles from H_2O . M.p. about 200° (rapid heat.) \rightarrow anhydride.

Mono-Et ester: needles from $CHCl_3$. M.p. $133-4^\circ$.

Anhydride: m.p. $187-8^\circ$. B.p. 313° .

Villiger, *Ber.*, 1909, 42, 3546.

Dichlorophthalic Anhydride.

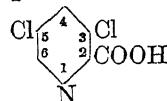
See under Dichlorophthalic Acid.

3 : 3-Dichlorophthalide.

See Phthaloyl chloride.

Dichlorophthalimide.

See under Dichlorophthalic Acid.

3 : 5-Dichloropicolinic Acid $C_6H_3O_2NCl_2$

MW, 192

Needles from H_2O . M.p. 152° decomp.

Me ester: $C_7H_5O_2NCl_2$. MW, 206. Needles from H_2O or $MeOH$. M.p. 82° .

Amide: $C_6H_4ON_2Cl_2$. MW, 191. Needles from H_2O . M.p. 176° .

Graf, Stauch, *J. prakt. Chem.*, 1937, 148, 13.

4 : 5-Dichloropicolinic Acid.

Needles from hot H_2O . M.p. $179-80^\circ$.

Graf, *J. prakt. Chem.*, 1932, 133, 49.

4 : 6-Dichloropicolinic Acid.

Needles from $EtOH$. Aq. M.p. $101-2^\circ$. Sol. $EtOH$. Spar. sol. H_2O .

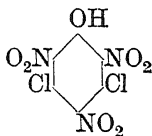
Et ester: $C_8H_7O_2NCl_2$. MW, 220. M.p. 75° .

Azide: m.p. 74° .

Hydrazide: plates from $EtOH$. Aq. M.p. 154° .

Graf, *J. prakt. Chem.*, 1932, 133, 40.

Dichloropicric Acid (3 : 5-Dichloro-2 : 4 : 6-trinitrophenol)



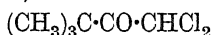
$C_6H_3O_7N_3Cl_2$ MW, 298

Cryst. from $CHCl_3$, CCl_4 or $AcOH$. M.p. $139-40^\circ$ (135°). Sol. $EtOH$, Et_2O , hot H_2O . Mod. sol. pet. ether. Explosive. Bitter taste. $Na_2CO_3 \cdot Aq. \rightarrow$ trinitrophenol.

Blanksma, *Rec. trav. chim.*, 1908, 27, 36.

Willstätter, Schudel, *Ber.*, 1918, 51, 787.

1 : 1-Dichloropinacolin (Dichloromethyl tert.-butyl ketone)



$C_6H_{10}OCl_2$ MW, 169

Cryst. from pet. ether. M.p. 51° .

Hill, Kropa, *J. Am. Chem. Soc.*, 1933, 55, 2510.

1 : 1-Dichloropropane (Propylidene chloride)



$C_3H_6Cl_2$ MW, 113

B.p. $85-7^\circ$. D^{20}_4 1.443. Alc. $KOH \rightarrow CH_3 \cdot CH \cdot CHCl$.

Reboul, *Ann. chim. phys.*, 1878, 14, 458.

1 : 2-Dichloropropane (Propylene dichloride, propylene chloride)



$C_3H_6Cl_2$ MW, 113

B.p. $97-8^\circ$. D^{14}_4 1.4656. n^{20}_D 1.4388.

Goudet, Schenker, *Helv. Chim. Acta*, 1927, 10, 135.

1 : 3-Dichloropropane (Trimethylene chloride)



$C_3H_6Cl_2$ MW, 113

B.p. $120-4^\circ$. D^{18}_4 1.4896. Alc. $KOH \rightarrow$ allyl chloride.

Reboul, *Ann. chim. phys.*, 1878, 14, 493.

Hass, McBee, *Can. P.* 374,247 (*Chem. Zentr.*, 1938, II, 3005).

2 : 2-Dichloropropane (Isopropylidene chloride, acetone dichloride, chloroacetol)



$C_3H_6Cl_2$ MW, 113

B.p. $70-5^\circ$. D^{15}_4 1.4066. n^{20}_D 1.4093. Alc. $KOH \rightarrow CH_2 \cdot CCl \cdot CH_3 \rightarrow$ allylene.

Friedel, Ladenburg, *Ann.*, 1867, 142, 315.

γ : γ -Dichloro- α -propenylbenzene.

See Cinnamylidene chloride.

1 : 2-Dichloropropionaldehyde

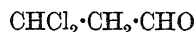


$C_3H_4OCl_2$ MW, 127

B.p. $48^\circ/14$ mm. D^{20}_4 1.400. n^{20}_D 1.4762.

Moureu, Boismenu, *Ann. chim.*, 1921, 15, 209.

2 : 2-Dichloropropionaldehyde

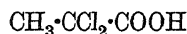


$C_3H_4OCl_2$ MW, 127

Needles. M.p. $111-12^\circ$. Sol. Et_2O , $CHCl_3$, ligroin.

Spring, Tart, *Bull. soc. chim.*, 1890, 3, 402.

1 : 1-Dichloropropionic Acid



$C_3H_4O_2Cl_2$ MW, 143

B.p. $185-90^\circ$. Sol. H_2O , $EtOH$. Volatile in steam. $Zn + H_2SO_4 \rightarrow$ propionic acid. Alc. KOH at the boil \rightarrow chloroacrylic acid.

Me ester: $C_4H_6O_2Cl_2$. MW, 157. B.p. $143-4^\circ$.

Et ester: $C_5H_8O_2Cl_2$. MW, 171. B.p. 160° .

Anhydride: $C_6H_6O_3Cl_4$. MW, 268. B.p. $196-200^\circ$.

Chloride: $C_3H_3OCl_3$. MW, 161.5. B.p. $105-15^\circ$.

Amide: $C_3H_5ONCl_2$. MW, 142. M.p. $117-18^\circ$. Sol. $EtOH$. Spar. sol. H_2O . Sublimes.

Nitrile: $C_3H_3NCl_2$. MW, 124. B.p. 105° . Sol. $EtOH$, Et_2O . Hyd. to the acid by dil. H_2SO_4 .

Beckurts, Otto, *Ber.*, 1876, 9, 1877.

1 : 2-Dichloropropionic Acid



$C_3H_4O_2Cl_2$ MW, 143

M.p. 50° . B.p. 210° part. decomp. $130-3^\circ/26$ mm. Dil. alkalis \rightarrow 1-chloroacrylic acid.

Me ester: b.p. $72-5^\circ/21$ mm.

Et ester: b.p. $183-4^\circ$. D^{20}_4 1.2461. n^{20}_D 1.44815.

β -Chloroethyl ester: $C_5H_7O_2Cl_3$. MW, 205.5. B.p. $123-6^\circ/22$ mm. n^{20}_D 1.4739.

tert.-Butyl ester: $C_7H_{12}O_2Cl_2$. MW, 199. B.p. $65-6^\circ/25$ mm. D^{20}_4 1.150. n^{20}_D 1.4423.

Cyclohexyl ester: $C_9H_{14}O_2Cl_2$. MW, 225. B.p. $95-7^\circ/2$ mm. n^{20}_D 1.4752.

Phenyl ester: $C_9H_8O_2Cl_2$. MW, 219. B.p. $130-5^\circ/18$ mm. n^{20}_D 1.5262.

Chloride: b.p. $52-4^\circ/16$ mm.

Werigo, Melikoff, *Ber.*, 1877, 10, 1499.

Marvel, Dec, Cooke, Cowan, *J. Am. Chem. Soc.*, 1940, 62, 3496.

2 : 2-Dichloropropionic Acid



$C_3H_4O_2Cl_2$ MW, 143

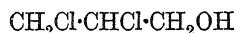
M.p. 56°. Sol. H₂O, EtOH, Et₂O, C₆H₆.
Alc. KOH → 2-chloroacrylic acid.

Et ester : b.p. 171-5°.

Amide : m.p. 140°. Sol. H₂O, EtOH.

Otto, *Ann.*, 1887, 239, 266.

2 : 3-Dichloropropyl Alcohol (*Glycerol*
2 : 3-dichlorohydrin, β-dichlorohydrin, allyl alcohol
dichloride)



C₃H₆OCl₂ MW, 129

B.p. 182°, 81-81.5°/13.5 mm. D₄¹¹ 1.3681.

HNO₃ → 1 : 2-dichloropropionic acid.

Benzoyl : b.p. 180-3°/24 mm. D₀⁰ 1.290.

p-Nitrobenzoyl : m.p. 37-8°.

Phenylurethane : m.p. 72-3°.

Et ether : C₅H₁₀OCl₂. MW, 143. B.p. 165°.

Read, Hurst, *J. Chem. Soc.*, 1922, 121,
996.

3 : 3-Dichloropropyl Alcohol



C₃H₆OCl₂ MW, 129

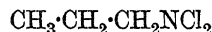
B.p. 82-3°/20 mm. D₂₅²⁵ 1.316. n_D²⁵ 1.467.

Acetyl : b.p. 85°/18 mm. D₂₅²⁵ 1.250. n_D²⁵ 1.445.

I.G., B.P. 465,467, (*Chem. Zentr.*, 1937,
II, 1445).

Kirrmann, Pacaud, Dosque, *Bull. soc.*
chim., 1934, 1, 860.

N-Dichloropropylamine (*Propyldichloro-*
amine)

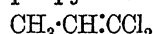


C₃H₇NCl₂ MW, 128

Yellow oily liq. B.p. 117°. D₄²³ 1.1454.
n_D²³ 1.45248.

Berg, *Ann. chim. phys.*, 1894, 3, 316, 321.

1 : 1-Dichloropropylene



C₃H₄Cl₂ MW, 111

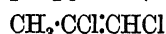
B.p. 76-7° (78°). D₀⁰ 1.203. CrO₃ → acetic
acid. Adds Br₂.

Wohl, Roth, *Ber.*, 1907, 40, 215.

du Pont, B.P. 471,187, (*Chem. Zentr.*,
1938, I, 1218).

Henne, Whaley, *J. Am. Chem. Soc.*, 1942,
64, 1157.

1 : 2-Dichloropropylene (*Allylene dichloride*)

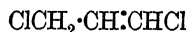


C₃H₄Cl₂ MW, 111

B.p. 75°.

Friedel, Silva, *Jahresber. Fortschr. Chem.*,
1872, 322.

1 : 3-Dichloropropylene (*3-Chloroallyl*
chloride)



C₃H₄Cl₂ MW, 111

B.p. 107-9°. D₂₅²⁵ 1.218. KOH.Aq. →
HO·CH₂·CH·CHCl.

α-Form (*trans*)-.

B.p. 104.3°, 57.5°/150 mm. D₄²⁰ 1.224. n_D²⁰
1.4682.

β-Form (*cis*)-.

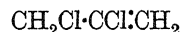
B.p. 112°, 64.8°/150 mm. D₄²⁰ 1.217. n_D²⁰
1.4730.

Hill, Fischer, *J. Am. Chem. Soc.*, 1922, 44,
2582.

Hatch, Moore, *J. Am. Chem. Soc.*, 1944, 66,
285.

Hatch, Roberts, *J. Am. Chem. Soc.*, 1946,
68, 1196.

2 : 3-Dichloropropylene (*2-Chloroallyl*
chloride)



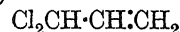
C₃H₄Cl₂ MW, 111

B.p. 94°. D₂₅²⁵ 1.204. Conc. HCl →
CH₂Cl·CCl₂·CH₃.

Pfeffer, Fittig, *Ann.*, 1865, 135, 359.

Henne, Haeckl, *J. Am. Chem. Soc.*, 1941,
63, 2692.

3 : 3-Dichloropropylene (*Allylidene chloride*,
acrolein chloride)

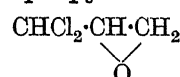


C₃H₄Cl₂ MW, 111

B.p. 84°. D₂₄²⁴ 1.170.

Hübner, Geuther, *Ann.*, 1860, 114, 36.

3 : 3-Dichloropropylene oxide

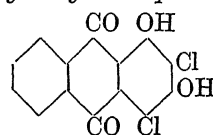


C₃H₄OCl₂ MW, 127

B.p. 170°. Gradually decomp. on exposure to
air.

Cloëz, *Ann. chim. phys.*, 1886, 9, 170.

2 : 4-Dichloropurpuroxanthin (*2 : 4-Di-*
chloro-1 : 3-dihydroxyanthraquinone)



C₁₄H₆O₄Cl₂ MW, 309

Yellow cryst. from phenol. M.p. 236-8°. Spar. sol. EtOH, Et₂O, C₆H₆. Orange red sol. in NaOH.Aq.

Mettler, *Ber.*, 1912, 45, 803.

2 : 3-Dichloropyridine



C₅H₃NCl₂ MW, 148

M.p. 46-7°. Volatile in steam.

Graf, *J. prakt. Chem.*, 1932, 134, 183.

2 : 4-Dichloropyridine.

B.p. 184°, 98°/18 mm. Prac. insol. dil. acids. Volatile in steam.

Graf, Lederer-Ponzer, Freiberg, *Ber.*, 1931, 64, 24.

2 : 5-Dichloropyridine.

M.p. 60°. Volatile in steam.

Binz, R  th, *Ann.*, 1931, 486, 78.

2 : 6-Dichloropyridine.

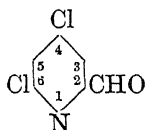
Plates from EtOH.Aq. M.p. 87-8°. Sol. hot EtOH. Insol. H₂O.

Sell, Dootson, *J. Chem. Soc.*, 1900, 77, 238.

3 : 5-Dichloropyridine.

Leaflets from EtOH.Aq. M.p. 64-5°.

Meyer, Graf, *Ber.*, 1928, 61, 2214.

4 : 6-Dichloropyridine-2-aldehyde

C₆H₃ONCl₂ MW, 176

M.p. 74°. Sol. EtOH, C₆H₆, CHCl₃. Spar. sol. cold pet. ether.

Phenylhydrazine: yellow needles from EtOH.Aq. M.p. 195-7°.

Graf, Weinberg, *J. prakt. Chem.*, 1932, 134, 180.

5 : 6-Dichloropyridine-3-aldehyde.

Needles from pet. ether. M.p. 69-70°. Sol. EtOH, C₆H₆, CHCl₃. Spar. sol. cold pet. ether, H₂O.

Phenylhydrazone: yellow needles from EtOH. M.p. 158°.

Graf, Weinberg, *J. prakt. Chem.*, 1932, 134, 183.

2 : 6-Dichloropyridine-4-aldehyde.

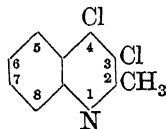
M.p. 46-7°. Sol. EtOH, C₆H₆, CHCl₃.

Phenylhydrazone: yellow needles from EtOH. M.p. 157-8°.

Graf, Weinberg, *J. prakt. Chem.*, 1932, 134, 185.

Dichloro-  -pyridone.

See Dichloro-2-hydroxypyridine.

3 : 4-Dichloroquinaldine (3 : 4-Dichloro-2-methylquinoline)

C₁₀H₇NCl₂ MW, 212

M.p. 322°. Spar. sol. EtOH, AcOH.

v. Braun, Heymons, Schnitzspahn, *Ber.*, 1930, 63, 3197.

4 : 8-Dichloroquinaldine.

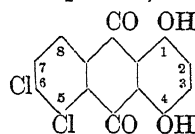
M.p. 87-8°. Sublimes at 70°/2 mm.

Krahler, Burger, *J. Am. Chem. Soc.*, 1942, 64, 2417.

5 : 8-Dichloroquinaldine.

M.p. 46°. B.p. 300°.

Gnehm, *Ber.*, 1884, 17, 755.

5 : 6-Dichloroquinizarin (5 : 6-Dichloro-1 : 4-dihydroxyanthraquinone)

C₁₄H₆O₄Cl₂ MW, 309

Red needles from AcOH. M.p. 239° (208°). Blue sols in alkalis.

1 : 4-*Diacetyl*: yellow needles from EtOH. M.p. 170° (140°).

Waldmann, Hartisch, *J. prakt. Chem.*, 1931, 130, 99.

Frey, *Ber.*, 1912, 45, 1362.

5 : 7-Dichloroquinizarin.

Red needles. M.p. 231-2°. Sol. xylene. Mod. sol. EtOH, AcOH. Bluish-violet sols in alkalis.

Waldmann, Hartisch, *J. prakt. Chem.*, 1931, 130, 99.

5 : 8-Dichloroquinizarin.

Brownish-red needles from xylene. M.p. 275.5° (266°). Bluish-violet sols in alkalis.

1 : 4-*Diacetyl*: yellow needles from EtOH. M.p. 180° (170°).

Di-Me ether: C₁₆H₁₀O₄Cl₂. MW, 337. M.p. 313.5°.

Waldmann, Mathiowetz, *J. prakt. Chem.*, 1930, 126, 251.

Frey, *Ber.*, 1912, 45, 1359.

6 : 7-Dichloroquinizarin.

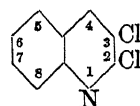
Reddish-brown plates from xylene. M.p. 295.5° (288°).

1 : 4-*Diacetyl*: yellow needles. M.p. 125°.

Di-Me ether: orange red needles from chloro-benzene. M.p. 239°.

Waldmann, Mathiowetz, *J. prakt. Chem.*, 1930, 126, 253.

Frey, *Ber.*, 1912, 45, 1363.

2 : 3-Dichloroquinoline

C₉H₅NCl₂ MW, 198

M.p. 104-5°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin. Insol. H₂O.

Baeyer, *Ber.*, 1879, 12, 1320.

2 : 4-Dichloroquinoline.

M.p. 67°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. H₂O. Volatile in steam.

Baeyer, Bloem, *Ber.*, 1882, 15, 2150.

Brooker, Smith, *J. Am. Chem. Soc.*, 1937, 59, 72.

2 : 6-Dichloroquinoline.

Needles from Et₂O. M.p. 161.5° (156°). Sol. EtOH, Et₂O. Volatile in steam. Very weak base.

Fischer, *Ber.*, 1902, 35, 3683.

Bachman, Cooper, *J. Org. Chem.*, 1944, 9, 302.

2 : 7-Dichloroquinoline.

Needles from EtOH. M.p. 120° (98-9°). Sublimes at 100°/2 mm. Sol. EtOH, Et₂O. Volatile in steam. Weak base.

Fischer, *Ber.*, 1902, 35, 3683.

Lutz, Ashburn, Rowlett, *J. Am. Chem. Soc.*, 1946, 68, 1322.

3 : 4-Dichloroquinoline.

M.p. 69-70°.

Picrate : m.p. 179-80°.

Surrey, Cutling, *J. Am. Chem. Soc.*, 1946, 68, 2570.

4 : 5-Dichloroquinoline.

M.p. 115.5-116.5°.

Surrey, Hammer, *J. Am. Chem. Soc.*, 1946, 68, 113.

4 : 6-Dichloroquinoline.

M.p. 104°.

Bachman, Cooper, *J. Org. Chem.*, 1944, 9, 302.

Tarbell, *J. Am. Chem. Soc.*, 1946, 68, 1277.

4 : 7-Dichloroquinoline.

Cryst. from MeOH. M.p. 86.4-7.4°. B.p. 148°/10 mm.

Surrey, Hammer, *J. Am. Chem. Soc.*, 1946, 68, 113.

Drake *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 1214.

Price, Royston, Roberts, *ibid.*, 1204.

4 : 8-Dichloroquinoline.

M.p. 155-6°.

Tarbell, *J. Am. Chem. Soc.*, 1946, 68, 1277.

5 : 6-Dichloroquinoline.

Needles. M.p. 85°. Sol. EtOH, Et₂O.

Claus, Schedler, *J. prakt. Chem.*, 1894, 49, 364.

5 : 7-Dichloroquinoline.

Needles from EtOH. M.p. 117°. Sol. EtOH, Et₂O.

B, HCl : m.p. 216°.

B₂H₂SO₄ : m.p. anhyd. 162°, hydrate 81°.

Methiodide : yellow needles. M.p. 255-7°. Sol. hot H₂O.

Claus, Ammelburg, *J. prakt. Chem.*, 1895, 51, 415.

5 : 8-Dichloroquinoline.

Needles from EtOH. M.p. 97-8°. Sol. EtOH, Et₂O. Volatile in steam.

B₂H₂PtCl₆ : orange needles. M.p. 252° decomp.

Claus, Schöller, *J. prakt. Chem.*, 1893, 48, 147.

I.G., F.P. 727,528, (*Chem. Zentr.*, 1932, II, 3307).

6 : 8-Dichloroquinoline.

Needles from EtOH. M.p. 104-5°. Sol. EtOH, Et₂O. Volatile in superheated steam.

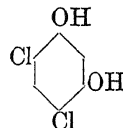
Claus, Schedler, *J. prakt. Chem.*, 1894, 49, 370.

I.G., F.P. 727,528, (*Chem. Zentr.*, 1932, II, 3307).

7 : 8-Dichloroquinoline.

Needles. M.p. 85.5°. Sol. EtOH, Et₂O.

Claus, Kayser, *J. prakt. Chem.*, 1893, 48, 279.

4 : 6-Dichlororesorcinol

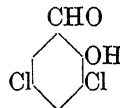
C₆H₄O₂Cl₂ MW, 179

M.p. 112-3° (108-9°). B.p. 254°. Sublimes.

Di-Me ether : C₈H₈O₂Cl₂. MW, 307. Needles from EtOH. M.p. 118°. Sol. Et₂O, boiling EtOH. Prac. insol. cold AcOH.

Dibenzoyl : prisms from EtOH. M.p. 127°.

Moore, Day, Suter, *J. Am. Chem. Soc.*, 1934, 56, 2458.

3 : 5-Dichlorosalicylaldehyde (3 : 5-Dichloro-o-hydroxybenzaldehyde)

C₇H₄O₂Cl₂ MW, 191

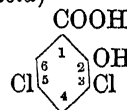
Yellowish rhombic cryst. from AcOH. M.p. 95°. Insol. H₂O. Sol. caustic alkalis.

Oxime : m.p. 195-6°. Sol. EtOH, Et₂O.

Semicarbazone : m.p. 227° decomp.

Biltz, Stepf, *Ber.*, 1904, 37, 4027.

Duff, *J. Chem. Soc.*, 1941, 547.

3 : 5-Dichlorosalicylic Acid (3 : 5-Dichloro-o-hydroxybenzoic acid)

C₇H₄O₃Cl₂

MW, 207

Rhombic prisms. M.p. 219.5° (223°). Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Sublimes with part. decomp. FeCl₃ → deep violet col. $k = 4.64 \times 10^{-3}$ at 25°. Soda lime → 2 : 4-dichlorophenol.

Me ester: C₈H₆O₃Cl₂. MW, 221. Needles. M.p. 147° (150°).

Et ester: C₉H₈O₃Cl₂. MW, 235. M.p. 57°. B.p. 159°/11 mm. Sol. hot EtOH.

Phenyl ester: 3 : 5-dichlorosalol. C₁₃H₈O₃Cl₂. MW, 283. Rhombic cryst. M.p. 118.5°. Sol. Et₂O, hot EtOH. Insol. H₂O.

Chloride: C₇H₃O₂Cl₃. MW, 225.5. Needles. M.p. 79°. Sol. CHCl₃. Unstable.

Amide: C₇H₅O₂NCl₂. MW, 206. Needles. M.p. 209°. Sol. EtOH.

Nitrile: C₇H₃ONCl₂. MW, 188. Needles from EtOH.Aq. M.p. 139°. Insol. H₂O, ligroin.

Me ether: C₈H₆O₃Cl₂. MW, 221. Prisms from EtOH.Aq. M.p. 166.5–167°.

Leulier, Pinet, *Bull. soc. chim.*, 1927, **41**, 1363.

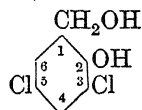
Likhoshershtov, Petrov, Voskresenskaya, *Chem. Abstracts*, 1938, **32**, 6633.

3 : 6-Dichlorosalicylic Acid.

M.p. 187°.

I.G., D.R.P. 537,453, (*Chem. Zentr.*, 1932, II, 1079).

3 : 5-Dichlorosaligenin (3 : 5-Dichloro-2-hydroxybenzyl alcohol)



C₇H₆O₂Cl₂ MW, 193

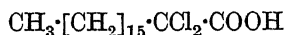
Needles from C₆H₆. M.p. 82°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆.

Diacyl: m.p. 130°.

Mettler, *Ber.*, 1906, **39**, 2939.

Zinke, Ziegler, *Ber.*, 1941, **74**, 1729.

1 : 1-Dichlorostearic Acid



C₁₈H₃₄O₂Cl₂ MW, 353

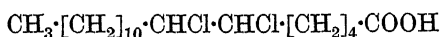
M.p. 51–3°.

Ethylamide: m.p. 45–9°.

Anilide: cryst. from Et₂O. M.p. 54°.

v. Braun, Jostes, Munch, *Ann.*, 1927, **453**, 138.

5 : 6-Dichlorostearic Acid

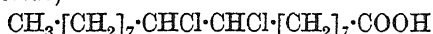


C₁₈H₃₄O₂Cl₂ MW, 353

Cryst. from EtOH. M.p. 74–5°.

Chernoyarova, *Chem. Abstracts*, 1947, **41**, 421.

8 : 9-Dichlorostearic Acid (*Oleic acid dichloride*)



C₁₈H₃₄O₂Cl₂ MW, 353

Plates from EtOH. M.p. 32°.

Piotrowski, *Ber.*, 1890, **23**, 2531.

Dichlorostilbene.

See Tolane dichloride.

$\alpha : \beta$ -Dichlorostyrene (*Phenylacetylene dichloride*, $\alpha\beta$ -dichlorovinylbenzene, 1 : 2-dichloro-1-phenylethylene)

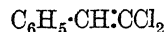


C₈H₆Cl₂ MW, 173

B.p. 221°. Cl → $\alpha\alpha\beta\beta$ -tetrachloroethylbenzene. NH₃ at 200° → 2 : 5-diphenylpyrazine.

Peratoner, *Gazz. chim. ital.*, 1892, **22**, ii, 74.

$\beta : \beta$ -Dichlorostyrene (ω -Dichlorostyrene, 2 : 2-dichloro-1-phenylethylene, $\beta\beta$ -dichlorovinylbenzene)

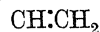


C₈H₆Cl₂ MW, 173

B.p. 225°, 103–4°/15 mm. D₄¹⁵ 1.2651. n_D¹⁵ 1.5899. Cl → $\alpha\beta\beta\beta$ -tetrachloroethylbenzene.

Biltz, *Ann.*, 1897, **296**, 259.

2 : 3-Dichlorostyrene



C₈H₆Cl₂ MW, 173

B.p. 92–4°/4.5 mm. D₂₀²⁰ 1.2849. n_D²⁰ 1.5848.

Marvel et al., *J. Am. Chem. Soc.*, 1946, **68**, 861.

2 : 4-Dichlorostyrene.

B.p. 81°/6 mm. D₄²⁵ 1.243. n_D²⁵ 1.5828.

Marvel et al., *J. Am. Chem. Soc.*, 1946, **68**, 861.

2 : 5-Dichlorostyrene.

B.p. 72–3°/2 mm. D₄²⁰ 1.4045. n_D²⁰ 1.5798.

Brooks, *J. Am. Chem. Soc.*, 1944, **66**, 1295.

2 : 6-Dichlorostyrene.

B.p. 64–5°/3 mm. D₄²⁰ 1.2631. n_D²⁰ 1.5752.

Marvel et al., *J. Am. Chem. Soc.*, 1946, **68**, 861.

3 : 4-Dichlorostyrene.

B.p. 69–70°/4 mm., 95°/5 mm. D₄²⁰ 1.256. n_D²⁰ 1.5857.

Brooks, *J. Am. Chem. Soc.*, 1944, **66**, 1295.

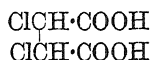
Marvel et al., *J. Am. Chem. Soc.*, 1946, **68**, 861.

3 : 5-Dichlorostyrene.

B.p. 59°/1 mm. D₄²⁵ 1.225. n_D²⁵ 1.5745.

Marvel et al., *J. Am. Chem. Soc.*, 1946, **68**, 861.

1 : 2-Dichlorosuccinic Acid

C₄H₄O₄Cl₂ MW, 187

(1) Meso-dichlorosuccinic acid. Prisms. M.p. 217–8° decomp. Sol. EtOH, Et₂O, CHCl₃, Me₂CO. Spar. sol. C₆H₆, ligroin. Cold KOH → chlorofumaric acid. Boiling aq. Na salt → chloromaleic acid Na salt. Ac₂O at 150° → chloromaleic anhydride.

Di-Me ester: C₆H₈O₄Cl₂. MW, 215. M.p. 31.5–32°.

Di-Et ester: C₈H₁₂O₄Cl₂. MW, 243. Needles. M.p. 61–2°. Sol. EtOH, Et₂O. Volatile in steam.

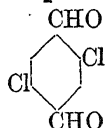
Kirchoff, *Ann.*, 1894, 280, 211.

(2) *dl*-Dichlorosuccinic acid, isodichlorosuccinic acid. Prisms. M.p. 175° decomp. Sol. H₂O, Et₂O. Spar. sol. EtOH. Boiling aq. sol. → chlorofumaric acid.

Anhydride: C₄H₂O₃Cl₂. MW, 169. M.p. 95°. Dist. → chloromaleic acid + HCl.

van der Riet, *Ann.*, 1894, 280, 219.

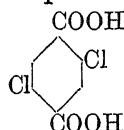
2 : 5-Dichloroterephthalaldehyde

C₈H₄O₂Cl₂ MW, 203

M.p. 158° (150°).

Cassella, D.R.P. 360,414, (*Chem. Zentr.*, 1923, II, 406).

2 : 5-Dichloroterephthalic Acid

C₈H₄O₄Cl₂ MW, 235

Needles from hot H₂O. M.p. 306°. Sol. EtOH, hot H₂O. Sublimes.

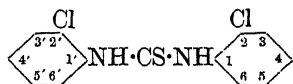
Di-Me ester: C₁₀H₈O₄Cl₂. MW, 263. Leaflets. M.p. 137–8°.

Dichloride: C₈H₂O₆Cl₄. MW, 272. Prisms from ligroin. M.p. 81°.

Levy, Andreocci, *Ber.*, 1888, 21, 1959.

I.G., D.R.P. 512,227, (*Chem. Abstracts*, 1931, 25, 970).

2 : 2'-Dichlorothiocarbanilide (2 : 2'-Dichloro-sym.-diphenylthiourea)

C₁₃H₁₀N₂Cl₂S MW, 297

Rhombic cryst. from CS₂. M.p. 130.5° (145–6°).

Grosch, *Ber.*, 1899, 32, 1088.

Fry, *J. Am. Chem. Soc.*, 1913, 35, 1544.

3 : 3'-Dichlorothiocarbanilide.

M.p. 121–2°.

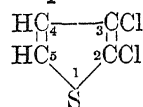
Fry, *J. Am. Chem. Soc.*, 1913, 35, 1544.

4 : 4'-Dichlorothiocarbanilide.

Needles from EtOH. M.p. 168°.

Fry, *J. Am. Chem. Soc.*, 1913, 35, 1544.

2 : 3-Dichlorothiophene

C₄H₂Cl₂S MW, 153

M.p. –26.2°. B.p. 173–4° corr. n_D^{25} 1.56650.

Steinkopf, Kohler, *Ann.*, 1937, 532, 271.

2 : 4-Dichlorothiophene.

M.p. –34°. B.p. 174–5°. n_D^{25} 1.56866.

Steinkopf, Kohler, *Ann.*, 1937, 532, 275.

2 : 5-Dichlorothiophene.

M.p. –43.4°. B.p. 161–2° corr. (170°). n_D^{19} 1.56077.

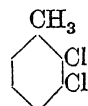
Steinkopf, Kohler, *Ann.*, 1937, 532, 264.

3 : 4-Dichlorothiophene.

M.p. +1°. B.p. 184.5–5.5°. $n_D^{19.6}$ 1.58206.

Steinkopf, Kohler, *Ann.*, 1937, 532, 278.

2 : 3-Dichlorotoluene

C₇H₆Cl₂ MW, 161

B.p. 207–8° (204–6°). KMnO₄ → 2 : 3-dichlorobenzoic acid.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1128.

2 : 4-Dichlorotoluene.

M.p. –13.5°. B.p. 199.9–200.5°/770 mm., 61–2°/3 mm. D_{20}^{20} 1.2498. n_D^{22} 1.5480, n_D^{20} 1.5511. Ox → 2 : 4-dichlorobenzoic acid.

Wahl, *Compt. rend.*, 1936, 202, 2161.

2 : 5-Dichlorotoluene.

M.p. 5°. B.p. 198–200° (194°). D_{20}^{20} 1.2535. Ox. → 2 : 5-dichlorobenzoic acid.

Crauw, *Rec. trav. chim.*, 1931, 50, 772.

2 : 6-Dichlorotoluene.

B.p. 199–200° (198°). Ox. → 2 : 6-dichlorobenzoic acid.

Cohen, Dakin, *J. Chem. Soc.*, 1901, 79, 1131.

3 : 4-Dichlorotoluene.

M.p. –16°. B.p. 207–8°/770 mm. D_{20}^{20} 1.2541. n_D^{22} 1.5490. Ox. → 3 : 4-dichlorobenzoic acid.

Wahl, *Compt. rend.*, 1936, 202, 2161.

3 : 5-Dichlorotoluene.

M.p. 26°. B.p. 201–2°. Sublimes. Ox. \longrightarrow
3 : 5-dichlorobenzoic acid.

Wahl, *Compt. rend.*, 1936, 202, 2161.

 ω -Dichlorotoluene.

See Benzyldene chloride.

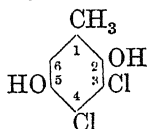
Dichlorotoluene.

See also Chlorobenzyl chloride.

N-Dichloro-*p*-toluenesulphonamide.

See Dichloramine-T.

3 : 4-Dichlorotoluhydroquinone (3 : 4-Di-chloro-2 : 5-dihydroxytoluene)



$C_7H_6O_2Cl_2$

MW, 193

Yellow. M.p. 120°.

Angeletti, Oliverio, *Gazz. chim. ital.*, 1940, 70, 789.

3 : 6-Dichlorotoluhydroquinone (3 : 6-Di-chloro-2 : 5-dihydroxytoluene).

Needles. M.p. 85°.

2 : 5-Diacetyl : m.p. 110–5°.

Kehrmann, *Ber.*, 1915, 48, 2032.

4 : 6-Dichlorotoluhydroquinone.

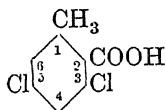
Needles. M.p. 171° (103°).

Diacetyl : m.p. 122–4°.

Raiford, *Am. Chem. J.*, 1911, 46, 426.

Southworth, *Ann.*, 1873, 168, 271.

Angeletti, Oliverio, *Gazz. chim. ital.*, 1940, 70, 342.

3 : 5-Dichloro-*o*-toluic Acid

$C_8H_6O_2Cl_2$

MW, 205

Needles from EtOH. M.p. 181°. Sol. EtOH, Et₂O. Spar. sol. H₂O.

Nitrile : 3 : 5-dichloro-2-cyanotoluene. $C_8H_5NCl_2$. MW, 186. Needles from EtOH. M.p. 92°. Volatile in steam.

Claus, Stapelberg, *Ann.*, 1893, 274, 293.

I.G., F.P. 642,906, (*Chem. Abstracts*, 1929, 23, 1511).

ω -Dichloro-*o*-toluic Acid (*o*-Carboxybenzylidene chloride, *o*-dichloromethylbenzoic acid).

Needles from C₆H₆. M.p. 155°.

Et ester : C₁₀H₁₀O₂Cl₂. MW, 233. B.p. 172°/42 mm. Decomp. on slow dist. at ord. press. \longrightarrow ethyl chloride + α -chlorophthalide.

Chloride : C₈H₅OCl₃. MW, 223.5. Prisms. M.p. 27–8°. B.p. 267–9°/740 mm., 151°/22 mm.

Amide : C₈H₇ONCl₂. MW, 204. Prisms. M.p. 117°.

Nitrile : see *o*-Cyanobenzylidene chloride.

Davies, Perkin, *J. Chem. Soc.*, 1922, 121, 2211.

4 : 6-Dichloro-*m*-toluic Acid.

Needles from H₂O. M.p. 170°. Sol. EtOH, Et₂O, CHCl₃.

Claus, Burstert, *J. prakt. Chem.*, 1890, 41, 557.

ω -Dichloro-*m*-toluic Acid (*m*-Carboxybenzylidene chloride, *m*-dichloromethylbenzoic acid).

Prisms from CHCl₃. M.p. 132°. Sol. CHCl₃, C₆H₆.

Chloride : needles. M.p. 48–9°. B.p. 280–2°/765 mm.

Nitrile : see *m*-Cyanobenzylidene chloride.

Davies, Perkin, *J. Chem. Soc.*, 1922, 121, 2212.

2 : 6-Dichloro-*p*-toluic Acid.

Leaflets from EtOH. M.p. 188°. Sol. EtOH, Et₂O, CHCl₃. Mod. sol. hot H₂O. Sublimes.

Claus, Beysen, *Ann.*, 1891, 266, 239.

3 : 6-Dichloro-*p*-toluic Acid.

Needles from EtOH. M.p. 187°. Sol. EtOH, Et₂O.

Claus, Davidsen, *Ann.*, 1891, 265, 346.

ω -Dichloro-*p*-toluic Acid (*p*-Carboxybenzylidene chloride, *p*-dichloromethylbenzoic acid).

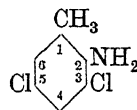
Prisms from C₆H₆. M.p. 151–8°.

Et ester : prisms. M.p. 45–6°.

Chloride : needles. M.p. 44–5°. B.p. 285–6°/745 mm.

Nitrile : see *p*-Cyanobenzylidene chloride.

Davies, Perkin, *J. Chem. Soc.*, 1922, 121, 2212.

3 : 5-Dichloro-*o*-toluidine

$C_7H_7NCl_2$

MW, 176

Needles. M.p. 58–60° (53°).

N-Acetyl : 3 : 5-dichloro-*o*-acet-toluidide. Needles from EtOH. M.p. 186°. Sol. EtOH, AcOH.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1348.

4 : 5-Dichloro-*o*-toluidine.

Plates from EtOH. M.p. 100–1°.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1333.

5 : 6-Dichloro-*o*-toluidine.

M.p. 33°. B.p. 288–90°/739 mm.

N-*Acetyl*: 5 : 6-dichloro-*o*-acet-toluidide.
Needles from EtOH.Aq. M.p. 144-5°.

Silvester, Wynne, *J. Chem. Soc.*, 1936, 694.

Badische, D.R.P. 217,896, (*Chem. Zentr.*, 1910, I, 701).

2 : 5-Dichloro-*m*-toluidine.

Needles from EtOH. M.p. 69-70°.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1330.

2 : 6-Dichloro-*m*-toluidine.

Needles from EtOH.Aq. M.p. 59-60°.

N-*Acetyl*: 2 : 6-dichloro-*m*-acet-toluidide.
Needles from EtOH. M.p. 120-2°.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1331.

4 : 6-Dichloro-*m*-toluidine.

Leaflets from MeOH. M.p. 88° (85°).

N-*Acetyl*: 4 : 6-dichloro-*m*-acet-toluidide.
Needles from H₂O. M.p. 156°.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1348.

5 : 6-Dichloro-*m*-toluidine.

Needles. M.p. 88°. B.p. 292°.

N-*Acetyl*: 5 : 6-dichloro-*m*-acet-toluidide.
M.p. 187°.

Wynne, Greeves, *Proc. Chem. Soc.*, 1895, 11, 151.

2 : 3-Dichloro-*p*-toluidine.

M.p. 48-50° (40-2°). B.p. 271-6°/40 mm.
Sol. EtOH.

N-*Acetyl*: 2 : 3-dichloro-*p*-acet-toluidide.
Needles from EtOH. M.p. 131°.

Silvester, Wynne, *J. Chem. Soc.*, 1936, 694.

Schumacher, Seib. A.G., D.R.P. 479,492,
(*Chem. Abstracts*, 1929, 23, 4712).

2 : 5-Dichloro-*p*-toluidine.

Leaflets from EtOH. M.p. 91-2°.

Cohen, Dakin, *J. Chem. Soc.*, 1902, 81, 1347.

Schumacher, Seib. A.G., D.R.P. 479,492,
(*Chem. Abstracts*, 1929, 23, 4712).

2 : 6-Dichloro-*p*-toluidine.

Needles from EtOH or pet. ether. M.p. 56-7°. Sol. EtOH. Slightly volatile in steam.

N-*Acetyl*: 2 : 6-dichloro-*p*-acet-toluidide.
Needles. M.p. 220°.

N-*Benzoyl*: 2 : 6-dichloro-*p*-benz-toluidide.
M.p. 179°.

Davies, *J. Chem. Soc.*, 1922, 121, 813.

Levy, Stephen, *J. Chem. Soc.*, 1931, 79.

3 : 5-Dichloro-*p*-toluidine.

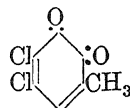
Needles from EtOH.Aq. M.p. 60°. Sol. EtOH, Et₂O. Spar. volatile in steam.

N-*Acetyl*: 3 : 5-dichloro-*p*-acet-toluidide.

M.p. 201°. Sol. EtOH, AcOH. Spar. sol. Et₂O.
Insol. H₂O. Sublimes.

Lellmann, Klotz, *Ann.*, 1886, 231, 322.

5 : 6-Dichloro-*o*-toluquinone



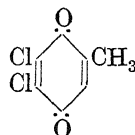
C₇H₄O₂Cl₂

MW, 191

Dark red needles. M.p. 83°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. pet. ether.

Zincke, Preiss, *Ann.*, 1918, 417, 217.

5 : 6-Dichloro-*p*-toluquinone



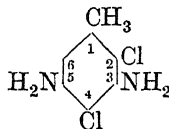
C₇H₄O₂Cl₂

MW, 191

Yellow. M.p. 83°.

Angeletti, Oliverio, *Gazz. chim. ital.*, 1940, 70, 789.

2 : 4-Dichloro-3 : 5-tolylenediamine



C₇H₈N₂Cl₂

MW, 191

Leaflets from ligroin. M.p. 110°.

Seelig, *Ann.*, 1887, 237, 164.

2 : 6-Dichloro-3 : 5-tolylenediamine.

Needles from EtOH. M.p. 137°.

Seelig, *Ann.*, 1887, 237, 164.

2 : 4-Dichloro-1 : 3 : 5-trinitrobenzene



C₆H₂O₆N₃Cl₂

MW, 282

Prisms from EtOH. M.p. 128°.

Sudborough, Picton, *J. Chem. Soc.*, 1906, 89, 591.

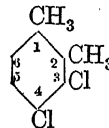
Dichlorotrinitrophenol.

See Dichloropicric Acid.

Dichloroveratrol.

See under Dichlorocatechol.

3 : 4-Dichloro-*o*-xylene



C₈H₈Cl₂

MW, 175

M.p. 9°. B.p. 234°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 1876 (*Bibl.*).

Hinkel, Ayling, Walters, *J. Chem. Soc.*,
1934, 1946.

3 : 5-Dichloro-*o*-xylene.

M.p. 3-4°. B.p. 226°, 129°/23 mm. D_{20}^{25} 1.2374. Dil. $\text{HNO}_3 \rightarrow$ 3 : 5-dichlorophthalic acid.

Crossley, *J. Chem. Soc.*, 1904, 85, 279.

3 : 6-Dichloro-*o*-xylene.

Leaflets from MeOH. M.p. 29°. B.p. 234°.

Hinkel, Ayling, Walters, *J. Chem. Soc.*,
1934, 1946.

4 : 5-Dichloro-*o*-xylene.

Needles from MeOH. M.p. 76°. B.p. 240°.

Hinkel, Ayling, Walters, *J. Chem. Soc.*,
1934, 1946.

2 : 4-Dichloro-*m*-xylene.

F.p. - 20°. B.p. 222-3°.

Koch, *Ber.*, 1890, 23, 2319.

I.G., D.R.P. 491,220, (*Chem. Abstracts*,
1930, 24, 2308).

4 : 6-Dichloro-*m*-xylene.

Leaflets. M.p. 68-9°. B.p. 223°. Sol. Et_2O , CHCl_3 , C_6H_6 . Mod. sol. EtOH.

Koch, *Ber.*, 1890, 23, 2319.

2 : 3-Dichloro-*p*-xylene.

M.p. - 2°. B.p. 230°. D_{20}^{25} 1.2332. Readily sulphonated.

Wahl, *Compt. rend.*, 1935, 200, 936.

2 : 5-Dichloro-*p*-xylene.

Needles or leaflets from EtOH. M.p. 71°. B.p. 224°/770 mm. Sulphonates with difficulty.

Wahl, *Compt. rend.*, 1935, 200, 936.

2 : 6-Dichloro-*p*-xylene.

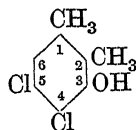
M.p. 15°. B.p. 222°/770 mm. Readily sulphonated.

Wahl, *Compt. rend.*, 1935, 200, 936.

ω -Dichloroxylylene.

See Xylylene dichloride and Methylbenzylidene chloride.

4 : 5-Dichloro-*o*-3-xylenol



$\text{C}_8\text{H}_8\text{OCl}_2$

MW, 191

Cryst. from pet. ether. M.p. 90° (95°).

Benzoyl: prisms from EtOH.Aq. M.p. 133°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 2529.

Hinkel, *J. Chem. Soc.*, 1924, 125, 1847.

3 : 5-Dichloro-*o*-4-xylenol.

Cryst. from pet. ether. M.p. 52°.

Benzoyl: cryst. from pet. ether. M.p. 89°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 2529.

3 : 6-Dichloro-*o*-4-xylenol.

Flat needles from pet. ether. M.p. 84°.

Benzoyl: flat needles from MeOH. M.p. 124°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 2529.

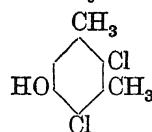
5 : 6-Dichloro-*o*-4-xylenol.

Cryst. from pet. ether. M.p. 102.5°.

Benzoyl: prisms from EtOH.Aq. M.p. 97.5°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 2529.

2 : 4-Dichloro-*m*-5-xylenol



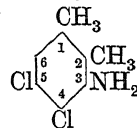
$\text{C}_8\text{H}_8\text{OCl}_2$

MW, 191

Cryst. from pet. ether. M.p. 95-6°.

Lesser, Gad, *Ber.*, 1923, 56, 975.

4 : 5-Dichloro-*o*-3-xylylidine



$\text{C}_8\text{H}_9\text{NCl}_2$

MW, 190

Needles from EtOH.Aq. M.p. 88°.

Acetyl: rosettes from EtOH.Aq. M.p. 197°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 1877.

4 : 6-Dichloro-*o*-3-xylylidine.

Needles from EtOH.Aq. M.p. 44°.

N-Acetyl: needles from Me_2CO . M.p. 188°.

Hinkel, Ayling, Walters, *J. Chem. Soc.*,
1934, 285.

3 : 5-Dichloro-*o*-4-xylylidine.

Rosettes from EtOH.Aq. M.p. 47.5°.

Acetyl: needles from H_2O . M.p. 196°.

Crossley, *J. Chem. Soc.*, 1904, 85, 278.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 1878.

3 : 6-Dichloro-*o*-4-xylylidine.

Needles from EtOH.Aq. M.p. 54°.

Acetyl: needles from EtOH.Aq. M.p. 146°.

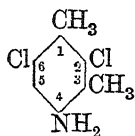
Hinkel, Ayling, Walters, *J. Chem. Soc.*,
1934, 1947.

5 : 6-Dichloro-*o*-4-xylylidine.

Needles from EtOH.Aq. M.p. 63°.

Acetyl: needles from EtOH.Aq. M.p. 147°.

Hinkel, Ayling, Bevan, *J. Chem. Soc.*,
1928, 1877.

2 : 6-Dichloro-*m*-4-xylidine $C_8H_9NCl_2$

MW, 190

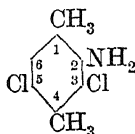
M.p. 56-7°.

I.G., D.R.P. 510,438; B.P. 278,729, 278,761, (*Chem. Zentr.*, 1931, I, 360).2 : 4-Dichloro-*m*-5-xylidine.

M.p. 71-2°.

I.G., F.P. 663,683; B.P. 300,504, (*Chem. Zentr.*, 1929, I, 1619).4 : 6-Dichloro-*m*-5-xylidine.

M.p. 88-90°.

I.G., F.P. 663,683; B.P. 300,504, (*Chem. Zentr.*, 1929, I, 1619).3 : 5-Dichloro-*p*-xylidine $C_8H_9NCl_2$

MW, 190

Needles from pet. ether. M.p. 48°. B.p. 160-2°/15 mm.

Acetyl: from EtOH.Aq. M.p. 172°.

Benzoyl: needles from EtOH. M.p. 179-80°.

Wahl, *Ann. chim.*, 1936, 5, 5.3 : 6-Dichloro-*p*-xylidine.

Needles from EtOH. M.p. 81°. B.p. 155-60°/15 mm.

Acetyl: m.p. 198°.

Benzoyl: m.p. 205°.

Wahl, *Ann. chim.*, 1936, 5, 5.5 : 6-Dichloro-*p*-xylidine.

From EtOH. M.p. 78-80°. B.p. 165-70°/15 mm.

Acetyl: m.p. 165° corr.

Benzoyl: m.p. 173° corr.

Wahl, *Ann. chim.*, 1936, 5, 5.

Dichroine

 $C_{16}H_{21}O_3N_3$

MW, 303

Constituent of Ch'ang shan (*Dichroa febrifuga*), a Chinese herb used antimalarially. Probably identical with febrifugine. Three forms: α -.Cryst. M.p. 136°. $KMnO_4 \rightarrow$ 4-quinazalone. At 145° \rightarrow γ -form. B, HCl : m.p. 210°. B_2, H_2SO_4 : m.p. 220°.

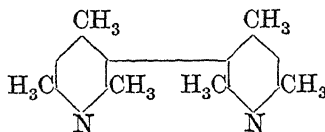
N-Nitroso: m.p. 182°.

 β -.Cryst. M.p. 145° \rightarrow γ -form. B, HCl : m.p. 220°. $B, 2HCl$: m.p. 236°.

N-Nitroso: m.p. 170°.

 γ -.Cryst. M.p. 160°. Forms salts of β -form.Chou, Fu, Kao, *J. Am. Chem. Soc.*, 1948, 70, 1765.

Dicollidyl (2 : 4 : 6 : 2' : 4' : 6'-Hexamethyldipyridyl-3 : 3')

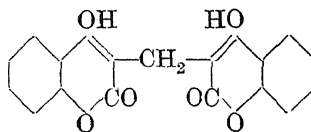
 $C_{16}H_{20}N_2$

MW, 240

M.p. 66-9°.

Meyer, Meyer, *J. prakt. Chem.*, 1921, 102, 294.

Dicoumarin (3 : 3'-Methylenebis-4-hydroxycoumarin)

 $C_{19}H_{12}O_6$

MW, 336

The hæmorrhagic agent causing "sweet-clover disease" in animals. Cryst. from cyclohexanone. M.p. 288-9°.

Diacetyl: cryst. from C_6H_6 . M.p. 250-2° decomp.Stahmann, Huebner, Link, *J. Biol. Chem.*, 1941, 138, 513.

Dicrotaline.

Alkaloid from *Crotalaria dura* (Wood and Evans) and *Crotalaria globifera* (E. Mey). M.p. about 170° decomp. Sol. dil. AcOH, HCl, $CHCl_3$, Et_2O .

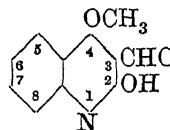
Hydrochloride: cryst. from EtOH. M.p. 258-60° decomp.

Onderstepoort, *Chem. Abstracts*, 1945, 39, 4116.

Dicrotyl.

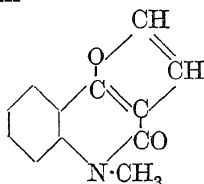
See 2 : 6-Octadiene.

Dictamnol (2-Hydroxy-4-methoxy-3-aldehydoquinoline)

 $C_{11}H_9O_3N$

MW, 203

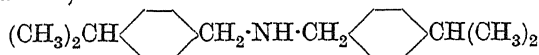
M.p. 260°.

Phenylhydrazone: yellow needles from EtOH. M.p. 228°.Asahina, Inubuse, *Ber.*, 1932, 65, 61.Asahina, Ohta, Inubuse, *Ber.*, 1930, 63, 2049. ψ -Dictamnin $C_{12}H_{19}O_2N$ MW, 199

Needles from EtOH.Aq. M.p. 225°. Sol. ord. org. solvents.

Asahina, Inubuse, *Ber.*, 1932, 65, 63.**Dictamnolactone.**

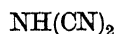
See Limonin.

Dictamnolic Acid $C_{28}H_{32}O_{10}$ or $C_{28}H_{34}O_{10}$ MW, 528 or 530From root of *Dictamnus*, Linn. M.p. 259–60°. Sol. most org. solvents. $[\alpha]_D^{25} +28^\circ$ in Me_2CO .Kaku, Ri, *J. Pharm. Soc. Japan*, 1935, 55, 219.**Dictamnolide** $C_{28}H_{30}O_9$ or $C_{28}H_{34}O_9$ MW, 510 or 512Lactone from root of *Dictamnus*, Linn. Prisms from AcOEt or Me_2CO . M.p. 303° decomp. $[\alpha]_D^{25} -43.3^\circ$ in Me_2CO .Kaku, Ri, *J. Pharm. Soc. Japan*, 1935, 55, 219.**Dicuminyllamine** (*Di-p-isopropylbenzylamine*) $C_{20}H_{27}N$ MW, 281Cryst. from EtOH-Et₂O. M.p. 168°. B.p. 280–300°/100 mm. Decomp. on dist. at ord. press. Sol. EtOH, Et₂O. Insol. H₂O.*B.HCl*: m.p. 222°. Sol. EtOH. Spar. sol. H₂O.Franzen, *J. prakt. Chem.*, 1905, 72, 215.**Di- ψ -cumyl.**

See 2 : 4 : 5 : 2' : 4' : 5'-Hexamethyldiphenyl.

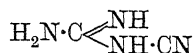
Di- ψ -cumylethylene.

See 2 : 4 : 5 : 2' : 4' : 5'-Hexamethylstilbene.

Dicyanamide (*Dicyanimide*) C_2HN_3 MW, 67

Free dicyanamide cannot be isolated owing to rapid conversion to amorphous polymer. Aq. sol.

Dict. of Org. Comp.—II.

unstable and shows powerful acidic properties. $HCl.Aq. \rightarrow$ biuret. H_2O at $150^\circ \rightarrow CO_2 + NH_3$. Forms salts with many metals.*NH₄ salt*: needles. M.p. 116°.*Na salt*: $NaN(CN)_2 + 1H_2O$. Sol. H_2O . Insol. EtOH. Aq. sol. neutral to litmus.*C₂H₅N₃.1H₂O*: white cryst.*C₂N₃Ag*: white powder. Insol. H_2O , HNO_3 , liq. NH_3 .*(C₂N₃)₂Hg*: white solid. Swells to bulky yellow solid on heating.*N-Me*: $C_3H_3N_3$. MW, 81. M.p. 221°.Franklin, *J. Am. Chem. Soc.*, 1922, 44, 497 (*Bibl.*).Burdick, *J. Am. Chem. Soc.*, 1925, 47, 1486.**Dicyandiamide** (*Cyanoguanidine*) $C_2H_4N_4$ MW, 84M.p. 207–9°. Mod. sol. H_2O , EtOH. Insol. Et₂O, C_6H_6 . Heat \rightarrow melamine + NH_3 . $Zn + HCl \rightarrow$ guanidine + methylamine. Forms salts with many metals.*K salt*: $K_2C_2H_2N_4$, spar. sol. H_2O . $KC_2H_3N_4$, sol. H_2O .Franklin, *J. Am. Chem. Soc.*, 1922, 44, 501 (*Bibl.*).Bell, *Chem. Abstracts*, 1927, 21, 2444.See also Barsky, U.S.P. 1,618,504, (*Chem. Abstracts*, 1927, 21, 1164).**Dicyandiamidine.**

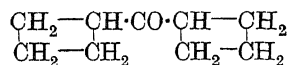
See Carbamylguanidine.

Dicyanimide.

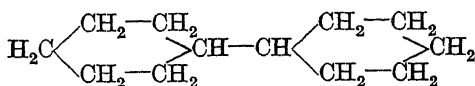
See Dicyanamide.

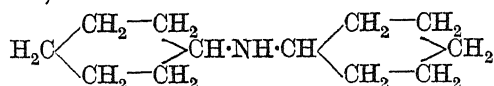
 ω : ω' -**Dicyanoxylylene.**

See under Phenylenediacetic Acid.

Dicyclobutyl Ketone $C_9H_{14}O$ MW, 138

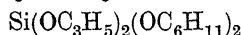
Liq. with peppermint odour. B.p. 204–5°. Forms bisulphite comp.

Colman, Perkin, *J. Chem. Soc.*, 1887, 51, 236.**Dicyclohexyl** (*Dodecahydrodiphenyl*) $C_{12}H_{22}$ MW, 166*Cis-cis*.M.p. 2.25° (4°). B.p. 233° (238°). D_4^{20} 0.8862 (D_4^{20} 0.8914). n_D^{20} 1.4766 (1.4842). Stable to oxidising agents.

*Trans-trans-*B.p. 217–9°. D_4^{20} 0.8592. n_D^{20} 1.4663.Gardiner, Borgstrom, *J. Am. Chem. Soc.*, 1929, **51**, 3375.Hückel, Neunhoeffer, Gerche, Frank, *Ann.*, 1930, **477**, 106.Zelinsky, Schiukin, Fatejew, *Chem. Zentr.*, 1933, II, 1675.Levina, Yur'eva, Loshkomoïnikov, *Chem. Abstracts*, 1937, **31**, 4654.Berlande, *Bull. soc. chim.*, 1942, **9**, 641.**Dicyclohexylamine** (*Dodecahydrodiphenylamine*) $C_{12}H_{23}N$

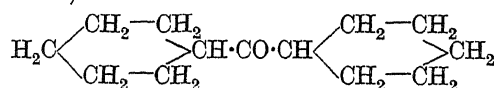
MW, 181

M.p. about 20°. B.p. 254–5° slight decomp., 156°/52 mm., 145°/30 mm., 135°/20 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. D_4^0 0.936, D^{13} 0.917, D^{18} 0.925. n_D^{18} 1.488. Has great tendency to form add. comps. even with neutral comps. e.g., H₂O, EtOH.

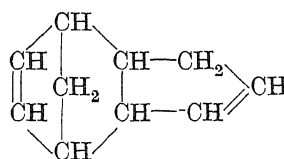
B, H₂O: m.p. 23°. Strong base.*B, EtOH*: m.p. 28°.*B, HCl*: needles from H₂O. M.p. about 350°.*B, HBr*: needles from H₂O. M.p. about 350°.*B, HI*: plates. Decomp. above 300°.*B, 2H₂SO₄*: needles. M.p. 187°.*Acetate*: needles from AcOH.Aq. M.p. 65°.*Acid oxalate*: prismatic needles. M.p. 206°.*N-Nitroso*: needles. M.p. 105°.*N-Acetyl*: prisms from Et₂O. M.p. 103°.*N-Benzoyl*: prisms from Et₂O. M.p. 153° (77°).*Picrate*: yellow prisms from EtOH. M.p. 173°.Fouque, *Ann. chim.*, 1921, **15**, 291.Carswell, Movrill, *Ind. Eng. Chem.*, 1937, **29**, 1247.Adkins, Winans, *J. Am. Chem. Soc.*, 1932, **54**, 310.**Dicyclohexyl diallyl orthosilicate** $C_{18}\text{H}_{32}\text{O}_4\text{Si}$

MW, 340

B.p. 128–9°/3 mm.

Peppard, Brown, Johnson, *J. Am. Chem. Soc.*, 1946, **68**, 70.**Dicyclohexyl Ketone** (*Dodecahydrobenzophenone*) $C_{13}\text{H}_{22}\text{O}$

MW, 194

B.p. 159°/20 mm. D_4^0 0.986. n_D^{14} 1.484.Sabatier, Maible, *Bull. soc. chim.*, 1905, **33**, 79.**Dicyclopentadiene** (4:7-Methylene-4:7:8:9-tetrahydroindene) $C_{10}\text{H}_{12}$

MW, 132

Endo-

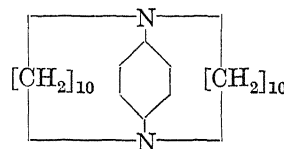
M.p. 32°. B.p. 170°, 88°/35 mm. Sol. EtOH, Et₂O, pet. ether. D_4^{33} 0.9766, n_D^{35} 1.5050. Heat (+ Fe) → cyclopentadiene.

Phenylazide add. comp.: needles from EtOH. M.p. 128–9°.

Exo-

B.p. 170–2°/763 mm., 51–3°/12 mm. D_{20} 0.977. n_D^{25} 1.5070.

Phenylazide add. comp.: prisms from EtOH. M.p. 123–4°.

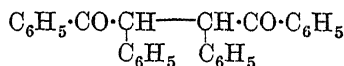
Rule, *J. Chem. Soc.*, 1908, **93**, 1560.Alder, Stein, *Ann.*, 1931, **485**, 211.Bartlett, Goldstein, *J. Am. Chem. Soc.*, 1947, **69**, 2553.**NN'-NN'-Di-decamethylene-p-phenylene-diamine** $C_{26}\text{H}_{44}\text{N}_2$

MW, 384

Oil. B.p. 185–90°/0.01 mm. Br in CHCl₃ → blue → reddish violet → brown col.

B, 2HCl: decomp. above 220°.*Picrate*: m.p. 220° decomp.Luttringhaus, Simon, *Ann.*, 1947, **557**, 120.**Didecyl Ketone.**

See Heneicosanone-11.

Didesyl ($\alpha\beta$ -Dibenzoyldibenzyl, sym.-diphenyl-dibenzoylthane) $C_{28}\text{H}_{22}\text{O}_2$

MW, 390

Exists in two stereoisomeric modifications.

(1) Didesyl.

Needles from C₆H₆. M.p. 254–5°. Insol. EtOH, Et₂O, alkalis, acids. Spar. sol. hot AcOH. Decomp. on dist. Gives no oxime or phenylhydrazone.

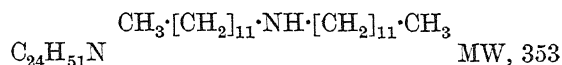
(2) Isodidesyl.

Prisms from EtOH. M.p. 161°. Sol. hot EtOH, hot C₆H₆. Decomp. on dist.

Knoevenagel, *Ber.*, 1888, **21**, 1358.

Di-diphenylene-ethane.

See Difluorenyl.

Didodecylamine

M.p. 55–6°. Sol. dioxan.

B.HCl: m.p. 207–8°.Wojcik, Adkins, *J. Am. Chem. Soc.*, 1934, 56, 2419.**Didymocarpene**

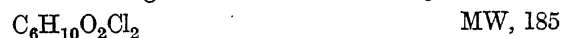
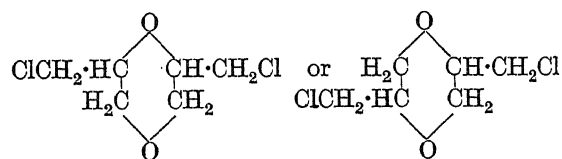
Sesquiterpene from leaves of *Didymocarpus pedicellata*. B.p. 136–7°/3 mm., 147–8°/12 mm. Sol. EtOH, Et₂O. $[\alpha]_D^{25} -3.7^\circ$ in EtOH. $D_4^{24} 0.8957$. $n_D^{29} 1.4988$. Identical with humulene, q.v.

Warsi, Siddiqui, *J. Indian Chem. Soc.*, 1939, 16, 423.Clemo, Harris, *J. Chem. Soc.*, 1951, 22.**Didymocarpinol**

From leaves of *Didymocarpus pedicellata*. M.p. 137°. Sol. Et₂O. $[\alpha]_D^{25} -65.5^\circ$ in EtOH.

Warsi, Siddiqui, *J. Indian Chem. Soc.*, 1939, 16, 423.**Didymocarpol**

From leaves of *Didymocarpus pedicellata*. White silky needles. M.p. 76°.

Warsi, Siddiqui, *J. Indian Chem. Soc.*, 1939, 16, 423.**Di-epichlorohydrin (Di-chloromethyl-dioxan)**

Monoclinic prisms. M.p. 112–13°. B.p. 232–3°. Sol. hot EtOH. Spar. sol. H₂O. Volatile in steam. Sublimes.

Stoehr, *J. prakt. Chem.*, 1897, 55, 84.**Diethanolamine.**

See 2 : 2'-Dihydroxydiethylamine.

Diethoxyacetic Acid.

See under Glyoxylic Acid.

2 : 5-Diethoxybenzaldehyde.

See under Gentisic Aldehyde.

Diethoxybenzidine.

See Di-o-phenetidine.

4 : 4'-Diethoxybenzil.See *p*-Phenetil.**Diethoxyethane.**

See Acetal and under Ethylene Glycol.

Diethoxyhydrazobenzene.

See Hydrazophenetole.

Diethoxymalonic Acid.

See under Mesoxalic Acid.

Diethoxymethane.

See under Formaldehyde.

3 : 3-Diethoxypentane.

See under Diethyl Ketone.

N : N'-Di-[*p*-ethoxyphenyl]-acetamidine.

See Holocaine.

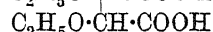
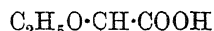
2 : 2-Diethoxypropane.

See under Acetone.

2 : 2-Diethoxypropyl Alcohol.

See under Hydroxyacetone.

sym.-Diethoxysuccinic Acid (Tartaric acid diethyl ether)



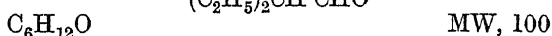
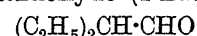
Prisms. M.p. 126–8°. Sol. H₂O, EtOH, Et₂O, CHCl₃. Spar. sol. C₆H₆. $[\alpha]_D^{20} + 66.31^\circ$ in H₂O.

Di-Et ester: C₁₂H₂₂O₆. MW, 262. B.p. 149–51°/15 mm. $D_4^{15} 1.046$. $[\alpha]_D^{20} + 93.23^\circ$.

Monoanilide: prisms from C₆H₆. M.p. 143–5°. $[\alpha]_D^{20} + 137^\circ$ in EtOH.

Purdie, Pitkeathly, *J. Chem. Soc.*, 1899, 75, 159.**Diethoxytribromoethane.**

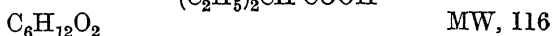
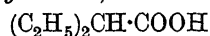
See under Bromal.

Diethylacetaldehyde (1-Ethylbutyraldehyde)B.p. 117–19°. $D_4^{17} 0.8085$. $n_D^{15} 1.40398$.

Semicarbazone: prisms from C₆H₆-pet. ether. M.p. 97.5–99.5°.

2 : 4-Dinitrophenylhydrazone: orange plates from pet. ether. M.p. 94.5–95° (129–30°).

Dimedone deriv.: prisms from MeOH. M.p. 102–2.5°.

Brunner, Farmer, *J. Chem. Soc.*, 1937, 1039.**Diethylacetic Acid (n-Pentane-3-carboxylic acid, 1-ethylbutyric acid)**

B.p. 190° (194–5°), 90°/13 mm. $D_4^{19} 0.9331$. $n_D^{19} 1.41788$. $k = 2.03 \times 10^{-5}$ at 25°. Heat of comb. 837.6 Cal.

Me ester: C₇H₁₄O₂. MW, 130. B.p. 135–7°/736 mm. $D_4^{125} 0.8886$. $n_D^{125} 1.40669$.

Et ester: C₈H₁₆O₂. MW, 144. B.p. 151°/751 mm. (148–9.5°). $D_4^{15} 0.8686$.

Anhydride: C₁₂H₂₂O₃. MW, 214. B.p. 230°, 120°/12 mm.

Chloride: diethylacetyl chloride. $C_6H_{11}OCl$. MW, 134.5. B.p. 134–7°.

Amide: diethylacetamide. $C_6H_{13}ON$. MW, 115. Needles from EtOH. M.p. 107°. B.p. 230–5°. Sol. H_2O .

Nitrile: diethylacetoneitrile. $C_6H_{11}N$. MW, 97. B.p. 144–6°. Sol. EtOH, Et_2O .

Fittig, *Ann.*, 1880, 200, 24.

Carbide and Carbon Chemicals Corp., F.P. 790,213, (*Chem. Abstracts*, 1936, 30, 2992).

Koch, Hilberath, *Ber.*, 1940, 73, 1171.

Diethylacetone.

See 3-Ethylpentanone-2.

Diethylacetylene.

See 3-Hexyne.

Diethylallylamine (Allyldiethylamine)



$C_7H_{15}N$ MW, 113

B.p. 110°/758 mm., 30–1°/22–3 mm. n_D^{20} 1.4209. Mod. sol. cold H_2O .

B.HBr: m.p. 189–90°.

B₂H₂PtCl₆: m.p. 128–30° (166°).

Rinne, *Ann.*, 1873, 168, 265.

Diethylamine



$C_4H_{11}N$ MW, 73

F.p. – 50°. B.p. 55.5°. Very sol. H_2O . D_4^{18} 0.7108. n_D^{18} 1.38730. Inflammable. Heat of comb. C_p 716.9 Cal. $k = 1.26 \times 10^{-3}$ at 25°.

Hemihydrate, B_2H_2O : f.p. – 19°.

B.HCl: diethylammonium chloride. Leaflets. M.p. 223.5°. B.p. 320–30°. Sol. H_2O , EtOH, $CHCl_3$. Insol. Et_2O . D_4^{21} 1.0475.

B.HBr: diethylammonium bromide. Leaflets. M.p. 213.5°. Sol. H_2O , EtOH, $CHCl_3$. Insol. Et_2O .

Oxalate: m.p. 220° (212°).

Picrate: m.p. 155°.

N-Benzoyl: see N-Diethylbenzamide.

N-Nitroso: see Diethylnitrosamine.

Garner, Tyrer, *J. Chem. Soc.*, 1916, 109, 174.

Diethylaminedicarboxylic Acid.

See Iminodipropionic Acid.

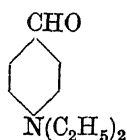
Diethylamine NN-disulphide.

See Dithiodiethylamine.

Diethylaminoacetic Acid.

See Diethylglycine.

Diethyl-p-aminobenzaldehyde



$C_{11}H_{15}ON$

MW, 177

Yellow needles from H_2O . M.p. 41°. B.p. 174°/7 mm. Sol. EtOH, Et_2O .

Oxime: m.p. 93°.

Semicarbazone: yellowish plates from EtOH. M.p. 214° decomp.

Phenylhydrazone: yellowish brown needles. M.p. 103°.

Anil: m.p. 108–9°.

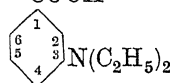
Ullmann, Frey, *Ber.*, 1904, 37, 860.

Duff, *J. Chem. Soc.*, 1945, 276.

Diethyl-o-aminobenzoic Acid.

See Diethylanthranilic Acid.

Diethyl-m-aminobenzoic Acid



$C_{11}H_{15}O_2N$

MW, 193

M.p. 90°.

Griess, *Ber.*, 1872, 5, 1040.

Diethyl-p-aminobenzoic Acid.

Yellowish leaflets from EtOH. M.p. 188° (193°).

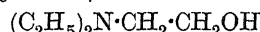
Ester: $C_{13}H_{19}O_2N$. MW, 221. Plates from EtOH. M.p. 43°. B.p. 312–14°. Sol. EtOH, Et_2O .

Amide: $C_{11}H_{15}ON_2$. MW, 192. White cryst. M.p. 136–7°. Sol. hot H_2O , hot EtOH.

Nitrile: $C_{11}H_{14}N_2$. MW, 174. M.p. 74–6°.

Michler, Gradmann, *Ber.*, 1876, 9, 1912.

2-Diethylaminoethyl Alcohol (Diethyl-2-hydroxyethyl-amine, diethylaminoethanol, 2-hydroxytriethylamine)



$C_6H_{15}ON$

MW, 117

B.p. 163°, 42–4°/8 mm. Sol. H_2O , Et_2O , C_6H_6 . D_4^{25} 0.8601. n_D^{25} 1.4400. Esters used as local anaesthetics.

Acetyl: b.p. 80°/20 mm.

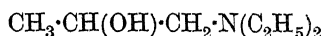
Benzoyl: b.p. 156–8°/19 mm.

p-Nitrophenylurethane: m.p. 59–60°.

Horne, Schreiner, *J. Am. Chem. Soc.*, 1932, 54, 2928.

Hartman, *Organic Syntheses*, 1934, XIV, 28.

1-Diethylaminoisopropyl Alcohol (Diethyl-2-hydroxypropyl-amine, diethylaminoisopropanol)



$C_7H_{17}ON$

MW, 131

dl.

B.p. 167–72°, 157.5–159°/756 mm., 62.5–3.5°/22 mm., (74°/16 mm.). D_4^{20} 0.8511.

Me ether: b.p. 46–7°/12 mm.

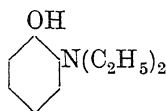
Et ether: b.p. 70–2°/18 mm.

Picrate: m.p. 89°.

d.-

B.p. 156.5–157°. $[\alpha]_D^{26} +46.7^\circ$ in EtOH.

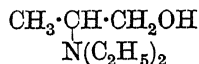
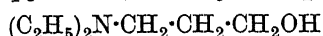
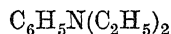
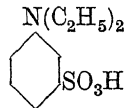
l.-

B.p. 157°. $[\alpha]_D^{24} -46.2^\circ$ in EtOH.Fournneau, Ruyal, *Bull. soc. chim.*, 1922, 31, 429.Goldfarb, *J. Am. Chem. Soc.*, 1941, 63, 2280.Raasch, Brode, *J. Am. Chem. Soc.*, 1942, 64, 1112.**Diethylaminophenetole.***See under* Diethylaminophenol.**Diethyl-*o*-aminophenol** (*o*-Hydroxydiethylaniline) $C_{10}H_{15}ON$ MW, 165B.p. 218–20°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. Volatile in steam.*Et ether*: diethyl-*o*-aminophenetole, diethyl-*o*-phenetidine. $C_{12}H_{19}ON$. MW, 193. B.p. 231–3°. Sol. EtOH, Et₂O. Insol. H₂O. Volatile in steam.Förster, *J. prakt. Chem.*, 1880, 21, 367.**Diethyl-*m*-aminophenol** (*m*-Hydroxydiethylaniline).

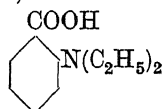
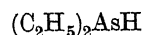
M.p. 78°. B.p. 276–80°, 201°/25 mm., 170°/15 mm., 148–52°/7–9 mm.

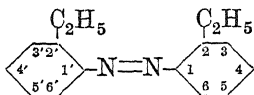
Et ether: diethyl-*m*-aminophenetole, diethyl-*m*-phenetidine. B.p. 286°.*Acetyl*: b.p. 160.5°/5 mm.*Benzoyl*: m.p. 22.5–23°. B.p. 236°/15 mm.*Me-urethane*: m.p. 85–6°. *Methiodide*: m.p. 140–3°.Meyenburg, *Ber.*, 1896, 29, 501.

Leonhardt, D.R.P. 49,060.

Haworth, Lamberton, Woodcock, *J. Chem. Soc.*, 1947, 182.**2-Diethylaminopropyl Alcohol** (*Diethyl-1-hydroxyisopropyl-amine*, 2-diethylaminopropanol) $C_7H_{17}ON$ MW, 131B.p. 166–9°/749 mm., 78°/12 mm. D_4^{27} 0.8665. n_D^{24} 1.4305.v. Braun, Leistner, Münch, *Ber.*, 1926, 59, 1954.**3-Diethylaminopropyl Alcohol** (*Diethyl-3-hydroxypropyl-amine*, 3-diethylaminopropanol) $C_7H_{17}ON$ MW, 131B.p. 189.5°, 122°/70 mm., 84°/20 mm., (87°/16 mm.). D_4^{21} 0.8600. n_D^{20} 1.4439.*Benzoyl*: b.p. 180–1°/22 mm.*Methiodide*: m.p. 175°.v. Braun, *Ber.*, 1916, 49, 970.Campbell, Campbell, *Proc. Indian Acad. Sci.*, 1939, 49, 101, (*Chem. Abstracts*, 1941, 35, 5460).Hromatka, *Ber.*, 1942, 75, 131. **γ -Diethylaminopropylbenzene.***See under* 3-Phenylpropylamine. **ω -Diethylaminotoluic Acid.***See N*-Diethylbenzylamine-carboxylic Acid.**Diethylammonium salts.***See under* Diethylamine.**Diethylaniline** $C_{10}H_{15}N$ MW, 149M.p. –38.8°. B.p. 215.5°, 147°/100 mm., 92°/10 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D_4^{20} 0.93507. Volatile in steam.*B,2HBr*: cryst. M.p. 37.3°.*B,HBr,Br₂*: orange red cryst. M.p. 81°.*Picrate*: yellow prisms. M.p. 142°.Johnson, Hill, Donleavy, *Ind. Eng. Chem.*, 1920, 12, 636.Billman, Radike, Mundy, *J. Am. Chem. Soc.*, 1942, 64, 2977.**Diethylaniline-*m*-sulphonic Acid** (*m*-Diethylaminobenzenesulphonic acid, diethylmetanilic acid) $C_{10}H_{15}O_3NS$ MW, 229

M.p. 270° decomp.

Michaelis, Godchaux, *Ber.*, 1890, 23, 557.**Diethylantranilic Acid** (*N*-Diethyl-*o*-aminobenzoic acid) $C_{11}H_{15}O_2N$ MW, 193M.p. 120–1°. Sol. H₂O, EtOH, AcOH. Spar. sol. Et₂O, C₆H₆.*B,HCl*: m.p. 172° decomp.*B,HI*: m.p. 160° decomp.*Nitrile*: *o*-cyanodiethylaniline. $C_{11}H_{14}N_2$. MW, 174. B.p. 165–75°/95 mm.Meyer, *Monatsh.*, 1904, 25, 488.**Diethylarsine** $C_4H_{11}As$ MW, 134B.p. 105° (96.5–97°). D_4^{27} 1.1338. n_D 1.4709. Ignites immediately in air.*Picrate*: m.p. 135–6°.Gryszkiewicz-Trochimowski, Sporczyński, *Chem. Abstracts*, 1930, 24, 1841.

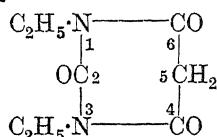
2 : 2'-Diethylazobenzene (*o*-Azoethylbenzene) $C_{16}H_{18}N_2$

MW, 238

Red needles from EtOH. M.p. 46.5°. Sol. hot EtOH.

Schultz, *Ber.*, 1884, 17, 473.**4 : 4'-Diethylazobenzene** (*p*-Azoethylbenzene).

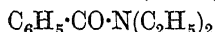
Orange red leaflets from EtOH. M.p. 63°. Sol. EtOH.

Schultz, *Ber.*, 1884, 17, 475.**1 : 3-Diethylbarbituric Acid** $C_8H_{12}O_3N_2$

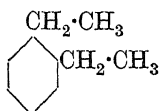
MW, 184

M.p. 52-3°. B.p. 167°/19 mm. Sol. EtOH, Et₂O, C₆H₆, AcOH, hot H₂O. Spar. sol. cold H₂O, pet ether.Sembritzki, *Ber.*, 1897, 30, 1815.Biltz, *Hamburger, Ber.*, 1916, 49, 652.**5 : 5-Diethylbarbituric Acid.**

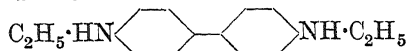
See Veronal.

N-Diethylbenzamide (*Benzoyldiethylamine*) $C_{11}H_{15}ON$

MW, 177

B.p. 280-2°. Sol. conc. HCl. D_4^{15} 1.019.Hallemann, *Ber.*, 1876, 9, 846.***o*-Diethylbenzene** $C_{10}H_{14}$

MW, 134

B.p. 184°, 66-7°/12 mm. D_4^{20} 0.8662. n_D^{20} 1.5026.Voswinkel, *Ber.*, 1888, 21, 3499.Karabinos, Serijan, Gibbons, *J. Am. Chem. Soc.*, 1946, 68, 2107.***m*-Diethylbenzene.**B.p. 181-2°. D_4^{20} 0.8602. n_D^{20} 1.4955. Volatile in steam.Voswinkel, *Ber.*, 1888, 21, 2829.Copenhaver, Reid, *J. Am. Chem. Soc.*, 1927, 49, 3157.***p*-Diethylbenzene.**B.p. 182-3°. D_4^{14} 0.8675. n_D^{14} 1.4978.Voswinkel, *Ber.*, 1889, 22, 315.Karabinos, Serijan, Gibbons, *J. Am. Chem. Soc.*, 1946, 68, 2107.**Diethylbenzene- ω : ω' -dicarboxylic Acid.**
See Phenylenedipropionic Acid.**sym.-N-Diethylbenzidine** (pp'-Diethyldi-aminodiphenyl) $C_{16}H_{20}N_2$

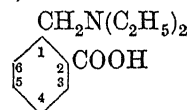
MW, 240

Plates or needles from EtOH. M.p. 115.5-116°. Sol. C₆H₆, hot EtOH, hot Et₂O.

sym.-N-Diacetyl : m.p. 166.5-167.5°.

Bamberger, Tichvinsky, *Ber.*, 1902, 35, 4182.**Diethylbenzylamine** $C_{11}H_{17}N$

MW, 163

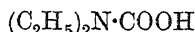
B.p. 211-12°, 94°/15 mm. Sol. H₂O. $k = 3.6 \times 10^{-5}$ at 25°. B_2, H_2PtCl_6 : m.p. 203°.Meyer, *Ber.*, 1877, 10, 310.Wegler, Frank, *Ber.*, 1936, 69, 2074.Prévost, de Maunz, *Compt. rend.*, 1943, 216, 771.**Diethylbenzylamine-*o*-carboxylic Acid**
(2-Diethylaminomethylbenzoic acid, ω -diethyl-amino-*o*-toluic acid) $C_{13}H_{17}O_2N$

MW, 207

Needles from Me₂CO. M.p. 105°. Sol. H₂O, EtOH. NaHg.Aq. \rightarrow *o*-toluic acid + diethylamine.*Amide* : $C_{12}H_{18}ON_2$. MW, 206. Cryst. from EtOH. M.p. 117°. Sol. EtOH, Et₂O, AcOH. $B, HAuCl_4$: m.p. 199°. B_2, H_2PtCl_6 : needles from EtOH.Aq. M.p. 189°.*Picrate* : needles from EtOH. M.p. 128°.Einhorn, *Ann.*, 1898, 300, 163.**Diethylbenzylamine-*p*-carboxylic Acid**
(4-Diethylaminomethylbenzoic acid, ω -diethyl-amino-*p*-toluic acid).Cryst. from EtOH-C₆H₆. M.p. 150°. Sol. EtOH.*Et ester* : $C_{14}H_{21}O_2N$. MW, 235. B.p. 277-80°. *Hydrochloride* : needles from EtOH. M.p. 210°.*Amide* : $C_{12}H_{18}ON_2$. MW, 206. Leaflets. M.p. 152°. *Hydrochloride* : m.p. 208°. B, HCl : leaflets from EtOH. M.p. 185°. $B, HAuCl_4$: leaflets. M.p. 156°. B_2, H_2PtCl_6 : orange prisms from H₂O. M.p. 202-3°.*Picrate* : yellow needles. M.p. 174-6°.Einhorn, Papastavros, *Ann.*, 1900, 310, 207.

Diethylbutadiene.

See 3 : 5-Octadiene.

Diethylcarbamic AcidC₅H₁₁O₂N MW, 117

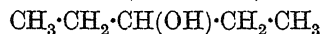
Unstable above - 15°.

Et ester: diethylurethane. C₇H₁₅O₂N. MW, 145. B.p. 167-9°, 63°/14 mm. D₄²⁰ 0.9276. n_D²⁰ 1.42057.

Chloride: N-diethylchloroformamide. C₅H₁₀ONCl. MW, 135.5. B.p. 186° (190-5°). H₂O → diethylamine + CO₂.

Amide: unsym.-diethylurea. C₅H₁₂ON₂. MW, 116. Needles from Et₂O. M.p. 74° (70°). Very sol. H₂O.

Nitrile: diethylcyanamide. C₅H₁₀N₂. MW, 98. B.p. 190°, 68°/10 mm.

Peters, *Ber.*, 1907, 40, 1482.v. Braun, *Ber.*, 1903, 36, 2287.**Diethylcarbinol (Pentanol-3)**C₅H₁₂O MW, 88B.p. 115.5°/754 mm. D₄²⁵ 0.8154. n_D²⁵ 1.4077.*Acetyl*: b.p. 131°.

3 : 5-Dinitrobenzoyl: needles from MeOH. Aq. M.p. 101° (97°).

p-Toluenesulphonyl: m.p. 43-4°.*α*-Naphthylurethane: m.p. 71-2°.Grignard, *Compt. rend.*, 1901, 132, 336.Skita, *Ber.*, 1915, 48, 1496.**Diethyl carbonate**C₅H₁₀O₃ MW, 118

B.p. 126°. D₄²⁰ 0.9751. n_D²⁰ 1.38456. Heat of comb. C_p 642.25 Cal.

Drushel, Knapp, *Chem. Zentr.*, 1916, I, 144.

N-Diethylchloroformamide.

See under Diethylcarbamic Acid.

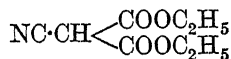
Diethylcyanamide.

See under Diethylcarbamic Acid.

Diethylcyanoacetic Acid.

See under Diethylmalonic Acid.

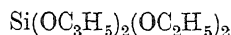
Diethyl cyanomalonate (Diethyl ester nitrile of methanetricarboxylic acid, cyanomalonate ester)

C₈H₁₁O₄N MW, 185

B.p. 120-30°/25 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D₄²⁰ 1.0931. n_D²⁰ 1.4263. k = 3.6 × 10⁻² at 25°. KOH at b.p. → malonic acid + CO₂ + NH₃.

Haller, *Ann. chim.*, 1889, 16, 428.**Diethylcyclohexylamine.**

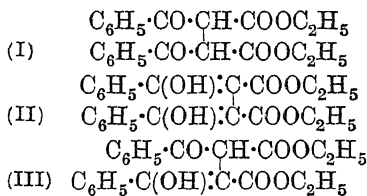
See Hexahydrodiethylaniline.

Diethyl diallyl orthosilicateC₁₀H₂₀O₄Si MW, 232B.p. 107.5-108.5°/34 mm. n_D²⁰ 1.4098.

Peppard, Brown, Johnson, *J. Am. Chem. Soc.*, 1946, 68, 70.

Diethyldiaminodiphenyl.

See Diethylbenzidine.

Diethyl dibenzoylsuccinate (Dibenzoyl-succinic ester)C₂₂H₂₂O₆ MW, 382

Exists in three tautomeric forms.

Diketo form. I.

Two stereoisomeric modifications are known.

β-Ester: monoclinic prisms. M.p. 128-30°. Sol. Et₂O, C₆H₆, CHCl₃. Spar. sol. EtOH, AcOH. D₂₀ 1.244. Alc. NaOH → dienol form.

γ-Ester: monoclinic prisms. M.p. 75°. More sol. than the *β*-ester. D₁₇ 1.250.

Dienol form. II.

α-Ester: monoclinic cryst. from hexane. M.p. 85°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. Gives yellow sols. in alkalis. FeCl₃ → deep bluish-violet col. *Diacetyl*: needles from EtOH. M.p. 106°. *Dibenzoyl*: needles, m.p. 204°.

Keto-enol form. III.

αβ-Ester: yellow oil, probably a mixture of stereoisomers. Sol. EtOH, Et₂O, etc. Spar. sol. H₂O. Gives yellow sols. in alkalis. D₄²⁰ 1.158. n_D²⁰ 1.5471.

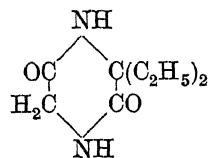
Knorr, *Ann.*, 1896, 293, 79; 1899, 306, 389.

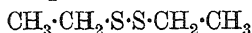
Lohaus, *Ann.*, 1934, 509, 130.**α : α'-Diethyldibenzylamine.**

See 1 : 1'-Diphenyldipropylamine.

Diethyl Diketone.

See Dipropionyl.

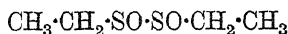
3 : 3-Diethyl-2 : 5-diketopiperazineC₈H₁₄O₂N₂ MW, 170Needles. M.p. 272°. Spar. sol. H₂O.Rosenmund, *Ber.*, 1909, 42, 4477.

Diethyl disulphide

$\text{C}_4\text{H}_{10}\text{S}_2$ MW, 122

Oil with garlic odour. B.p. $153-4^\circ$, $46^\circ/11$ mm. Spar. sol. H_2O . D_4^{20} 0.99267. n_D^{20} 1.50633.

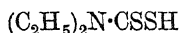
Courant, Richter, *Ber.*, 1885, 18, 3179.

Diethyl disulphoxide

$\text{C}_4\text{H}_{10}\text{O}_2\text{S}_2$ MW, 154

Liquid with garlic odour. B.p. $123-4^\circ/11$ mm. $D^{19.5}$ 1.199. Sn + alc. $\text{HCl} \rightarrow$ ethyl mercaptan. Volatile in steam.

Otto, *Ber.*, 1882, 15, 125.

Diethyldithiocarbamic Acid

$\text{C}_5\text{H}_{11}\text{NS}_2$ MW, 149

Free acid unstable and has not been isolated. Na and K salts sol. H_2O . Ox. (I, ferricyanide, etc.) \rightarrow tetraethylthiuram disulphide. Zn salt and organic amine salts (particularly the diethylamine salt) used as rubber vulcanisation accelerators.

Zn salt: m.p. 180° .

Cd salt: m.p. 251° decomp.

Ni salt: m.p. 236° .

Me ester: $\text{C}_6\text{H}_{13}\text{NS}_2$. MW, 163. M.p. 2° . B.p. 256° . D_4^{18} 1.0977, $D_4^{18.5}$ 1.0861. $n_D^{18.5}$ 1.5812.

Phenyl ester: $\text{C}_{11}\text{H}_{15}\text{NS}_2$. MW, 225. M.p. 46° .

Chloride: $\text{C}_5\text{H}_{10}\text{NCIS}$. MW, 151.5. M.p. 46.5° . B.p. $108^\circ/10$ mm.

Grodzki, *Ber.*, 1881, 14, 2754.

Diethylenediamine.

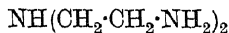
See Piperazine.

Diethylene dioxide.

See 1:4-Dioxan.

Diethylene Glycol.

See Dihydroxydiethyl Ether.

Diethylenetriamine ($\beta\beta'$ -Diaminodiethylamine)

$\text{C}_4\text{H}_{13}\text{N}_3$ MW, 103

B.p. 208° . Misc. with H_2O , EtOH.

Triacetyl: felted needles from EtOH. M.p. 220° .

Tribenzoyl: cryst. from CHCl_3 . M.p. 166° .

B_3HCl : feathery needles from EtOH. Aq. M.p. 233° .

Tripicrate: prisms from H_2O . M.p. 212° decomp.

Oxalate: prisms from H_2O . M.p. 183° .

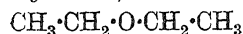
Citrate: rhombic prisms from H_2O . Effervesces at 206° .

Hofmann, *Proc. Roy. Soc.*, 1862, 11, 420.

Fargher, *J. Chem. Soc.*, 1920, 117, 1351.

1:1-Diethylethane.

See 3-Methylpentane.

Diethyl Ether (Ordinary ether, sulphuric ether, ethyl ether, diethyl oxide)

$\text{C}_4\text{H}_{10}\text{O}$ MW, 74

Two solid modifications. (1) Stable, f.p. -116.2° . (2) Labile, f.p. -123.3° . B.p. 34.5° . Misc. with EtOH in all proportions. Sol. to 7% in H_2O at 16° . Misc. with CHCl_3 , C_6H_6 . Sol. conc. H_2SO_4 , conc. HCl . 100 gms. dissolve 0.9 gms. H_2O at 10° . D_4^{20} 0.7135. n_D^{17} 1.35424. Vap. press. 185 mm/ 0° , 291 mm/ 10° , 442 mm/ 20° , 648 mm/ 30° . Crit. temp. 193.6° . Crit. press. 35.61 atm. Mol. b.p. elevation 21.6 . Excellent solvent for oils, fats, resins, etc. Also dissolves P, S, Br, I. Very inflammable and forms explosive mixture with air. Powerful anæsthetic. Reacts violently with Cl. $\text{HI} \rightarrow \text{C}_2\text{H}_5\text{I}$. CrO_3 or $\text{HNO}_3 \rightarrow$ acetic acid. Combines with Cl and Br at low temps. to give cryst. add. comps.

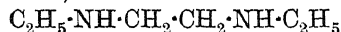
Krafft, *Ber.*, 1893, 26, 2831.

Senderens, *Compt. rend.*, 1931, 192, 1335.

Bruce, *Chem. Abstracts*, 1938, 32, 3331.

sym.-Diethylethylene.

See 3-Hexene.

sym.-Diethylethylenediamine (Ethylene-diethyldiamine)

$\text{C}_6\text{H}_{16}\text{N}_2$ MW, 116

B.p. $149-50^\circ$.

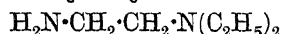
B_2HCl : m.p. $259-60^\circ$.

$\text{B}_2\text{HAuCl}_4, 1\text{H}_2\text{O}$: m.p. 220° .

$\text{B}_2\text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: m.p. $223-4^\circ$.

Hinsberg, Strupler, *Ann.*, 1895, 287, 222.

Schneider, *Ber.*, 1895, 28, 3077.

unsym.-Diethylethylenediamine

$\text{C}_6\text{H}_{16}\text{N}_2$ MW, 116

B.p. 145° , $75^\circ/20$ mm. D_4^{19} 0.827.

$\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 230° decomp.

Di-oxalate: needles from aq. oxalic acid. M.p. 178° decomp.

Mono-picrate: yellow plates from EtOH. M.p. 115° .

Di-picrate: m.p. 211° decomp.

α -Naphthylurea: m.p. 103.7° .

Ristenpart, *Ber.*, 1896, 29, 2526.

Cohen, Cooper, Marshall, *Proc. Roy. Soc.*, 1931, B, 108, 130.

Magidson, Grigorowsky, *Ber.*, 1936, 69, 401.

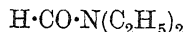
Bloom, Breslow, Hauser, *J. Am. Chem. Soc.*, 1945, 67, 539.

Amundsen, Krantz, *J. Am. Chem. Soc.*, 1941, 63, 305.

Hall, Turner, *J. Chem. Soc.*, 1945, 694.

Diethylethylene Glycol.

See Hexandiol-3:4.

N-Diethylformamide (*Formyldiethylamine*)

$\text{C}_5\text{H}_{11}\text{ON}$ MW, 101
B.p. 177–8°, 68°/15 mm. Sol. H_2O , EtOH, Et_2O . D^{19} 0.908.

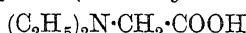
Wallach, *Ann.*, 1882, 214, 271.

Bouveault, *Bull. soc. chim.*, 1904, 31, 1322.

Brown, *J. appl. Chem.*, 1951, 1, *Suppl.* 2, 159.

1 : 3-Diethylglutaric Acid.

See Heptane-3 : 5-dicarboxylic Acid.

Diethylglycine (*N-Diethylaminoacetic acid*)

$\text{C}_6\text{H}_{13}\text{O}_2\text{N}$ MW, 131

Cryst. Volatilises on heating. Sol. EtOH. Volatile in steam.

Me ester : $\text{C}_7\text{H}_{15}\text{O}_2\text{N}$. MW, 145. B.p. 163.5°. Sol. cold H_2O , less sol. hot.

Et ester : $\text{C}_8\text{H}_{17}\text{O}_2\text{N}$. MW, 159. B.p. 177°, 76°/20 mm. Mod. sol. cold H_2O . D^{15} 0.919. *Ethionide* : m.p. 123–5°.

Benzyl ester : b.p. 149–50°/12 mm. *Hydrochloride* : m.p. 89°.

Amide : $\text{C}_6\text{H}_{14}\text{ON}_2$. MW, 130. Needles from AcOEt. M.p. 77°.

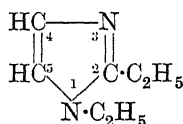
Nitrile : $\text{C}_6\text{H}_{12}\text{N}_2$. MW, 112. B.p. 170°, 70°/24 mm. *Hydrochloride* : needles from EtOH. M.p. 192°.

Heintz, *Ann.*, 1866, 140, 217.

Willstätter, *Ber.*, 1902, 35, 600.

Diethylglycollic nitrile.

See under Diethyl Ketone.

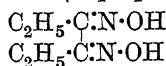
1 : 2-Diethylglyoxaline (1 : 2-Diethyliminazole)

$\text{C}_7\text{H}_{12}\text{N}_2$ MW, 124

B.p. 218–20°. Sol. H_2O , EtOH, Et_2O . D 0.9813.

B, ZnCl₂ : m.p. 172–3°.

Oddo, Mingoia, *Gazz. chim. ital.*, 1928, 58, 591.

Diethylglyoxime (*Dipropionyl dioxime*)

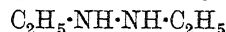
$\text{C}_6\text{H}_{12}\text{O}_2\text{N}_2$ MW, 144

Cryst. in needles from C_6H_6 . M.p. 185° (part. sublimation). Sol. EtOH, Et_2O . Spar. sol. H_2O , CHCl_3 . Insol. pet. ether. Forms orange red Ni deriv.

Ponzio, *J. prakt. Chem.*, 1901, 63, 367.

2 : 2-Diethylhydracrylic Acid.

See 2-Hydroxy-2-ethylvaleric Acid.

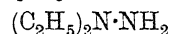
sym.-Diethylhydrazine (*Hydrazoethane*)

$\text{C}_4\text{H}_{12}\text{N}_2$ MW, 88

B.p. 85–6°. Sol. EtOH, Et_2O , C_6H_6 . HNO_2 → ethyl nitrite.

B, 2HCl : leaflets. M.p. 160° decomp.

Harries, *Ber.*, 1894, 27, 2279.

unsym.-Diethylhydrazine

$\text{C}_4\text{H}_{12}\text{N}_2$ MW, 88

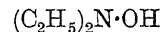
B.p. 96–9°. Sol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 . Hygroscopic. Reduces Fehling's.

Fischer, *Ann.*, 1879, 199, 308.

Hurd, Spence, *J. Am. Chem. Soc.*, 1927, 49, 271.

Diethyl-1-hydroxyisopropyl-amine.

See 2-Diethylaminopropyl Alcohol.

N-Diethylhydroxylamine ($\beta\beta$ -Diethylhydroxylamine)

$\text{C}_4\text{H}_{11}\text{ON}$ MW, 89

M.p. about 10°. B.p. 133°, 76°/86 mm., 41°/10 mm. Sol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 . D^{20} 0.8670. Reduces AgNO_3 and warm CuSO_4 . Weakly alkaline to litmus and phenolphthalein. Red. → diethylamine.

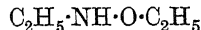
B, HCl : m.p. 72–3° (63°).

B, HBr : m.p. 55–6°.

B₂, (COOH)₂ : m.p. 138°.

Dunstan, Goulding, *J. Chem. Soc.*, 1899, 75, 800, 1009.

Gambarjan, *Ber.*, 1925, 58, 1777.

O:N-Diethylhydroxylamine ($\alpha\beta$ -Diethylhydroxylamine)

$\text{C}_4\text{H}_{11}\text{ON}$ MW, 89

B.p. 83°. Sol. H_2O , EtOH, Et_2O . D^0 0.829. Reduces AgNO_3 .

B, HCl : m.p. 123–4°.

B, (COOH)₂ : m.p. 112°.

B₂, H₂PtCl₆ : m.p. 158°.

Hecker, *Am. Chem. J.*, 1913, 50, 451.

Diethyl-hydroxypropyl-amine.

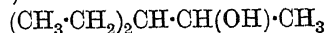
See 1-Diethylaminoisopropyl Alcohol and 3-Diethylaminopropyl Alcohol.

Diethylisoamylcarbinol.

See 6-Methyl-3-ethylheptanol-3.

Diethylisobutylcarbinol.

See 2-Methyl-4-ethylhexanol-4.

1 : 1-Diethylisopropyl Alcohol (3-Ethylpentanol-2)

$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 151–151.5°/743 mm., 82–82.5°/50 mm. D^4 0.8531. Odour resembling that of camphor.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, 145, 437.

Lucas, *J. Am. Chem. Soc.*, 1929, 51, 251.

Diethylisopropylcarbinol.

See 2-Methyl-3-ethylpentanol-3.

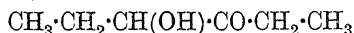
Diethylketene $\text{C}_6\text{H}_{10}\text{O}$

MW, 98

Solidifies to pale yellow cryst. in liq. air. B.p. 88–9.5° (91–2°/749 mm.). $D_4^{13.55}$ 0.8366, D_4^{20} 0.831, $D_4^{14.85}$ 0.8338. $n_D^{13.55}$ 1.41484, n_D^{20} 1.4112, $n_D^{14.85}$ 1.41355.

Staudinger, Maier, *Ann.*, 1913, 401, 292.Auwers, *Ber.*, 1918, 51, 1127.

Diethylketol (3-Hexanolone-4, ethyl 1-hydroxypropyl ketone, 3-hydroxy-4-ketohexane, propiopin, propionoin)

 $\text{C}_6\text{H}_{12}\text{O}_2$

MW, 116

dl-.

B.p. 132–5°/227 mm., 73°/20 mm., 57–8°/10 mm. D_4^{21} 0.956. n_D^{21} 1.4340. Partly polymerises on heating at ord. press.

Osazone : m.p. 161°.

Semicarbazone : m.p. 137°.

d-.

B.p. 71°/22 mm. $[\alpha]_{5461} + 88.2^\circ$.Urien, *Compt. rend.*, 1930, 191, 265.Corson, Benson, Goodwin, *J. Am. Chem. Soc.*, 1930, 52, 3988.Snell, McElvain, *Organic Syntheses*, 1943, Collective Vol. II, 114.

Diethyl Ketone (Pentanone-3, sym.-dimethylacetone, propione, 3-ketopentane)

 $\text{C}_5\text{H}_{10}\text{O}$

MW, 86

B.p. 101.5° (102–3°). Sol. EtOH, Et₂O. Sol. to 4.6% in H₂O at 20°. D_4^{19} 0.8159. n_D^{25} 1.3905. Heat of comb. C_p 741.6 Cal., C_v 740.5 Cal. $\text{CrO}_3 \rightarrow$ propionic + acetic acids. H + Ni at 140° \rightarrow diethylcarbinol. Forms bisulphite comp. with difficulty.

Oxime : m.p. 22.9°. B.p. 165°.

Semicarbazone : m.p. 139°.

Phenylhydrazone : b.p. 162–6°/24 mm.

o-Nitrophenylhydrazone : m.p. 60°.

m-Nitrophenylhydrazone : m.p. 105°.

p-Nitrophenylhydrazone : m.p. 144°.

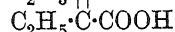
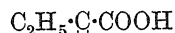
2 : 4-Dinitrophenylhydrazone : m.p. 156°.

Di-Et acetal : 3 : 3-diethoxypentane. $\text{C}_9\text{H}_{20}\text{O}_2$. MW, 160. B.p. 154°, 71°/44 mm., 49°/13 mm.

Cyanhydrin : diethylglycollic nitrile. $\text{C}_6\text{H}_{11}\text{ON}$. MW, 113. B.p. 184°, 97.5°/18.5 mm. Sol. EtOH, Et₂O. Insol. H₂O.

Ivanoff, *Bull. soc. chim.*, 1928, 43, 441.Dreyfus, B.P. 345,271, (*Chem. Abstracts*, 1932, 26, 156).Araki, *Chem. Zentr.*, 1933, II, 1860.

Diethylmaleic Acid (*Xeronic acid*, *pyrocinchonic acid*)

 $\text{C}_8\text{H}_{12}\text{O}_4$

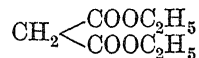
MW, 172

Free acid unknown.

Mono-amide : $\text{C}_8\text{H}_{13}\text{O}_3\text{N}$. MW, 171. NH_4 salt : powder. M.p. 136–7°.

Anilide : aniline salt : powder. M.p. 52–3°.

Anhydride : $\text{C}_8\text{H}_{10}\text{O}_3$. MW, 154. Pale yellow oil. B.p. 239–40°, 115°/13 mm. Very sol. EtOH, Et₂O, CHCl_3 , Me_2CO , C_6H_6 . Spar. sol. cold H₂O. Aq. sol. reacts acid.

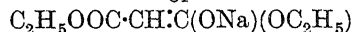
Anschütz, Volborth, *Ann.*, 1928, 461, 177.Küster, Haas, *Ann.*, 1906, 346, 18.**Diethyl malonate** (*Malonic ester*) $\text{C}_7\text{H}_{12}\text{O}_4$

MW, 160

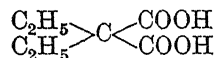
M.p. – 50°. B.p. 198.9°, 89°/13 mm., 73°/6 mm. D_4^{20} 1.0550. n_D^{20} 1.41428. Heat of comb. C_p 860.63 Cal. $\text{NH}_3 \rightarrow$ malonamide. Forms stable Na deriv. *ethyl sodiomalonate*,



or

Lux, *Ber.*, 1929, 62, 1827.Thielepape, Fulde, *Ber.*, 1933, 66, 1460.Ross, Ribbins, *Ind. Eng. Chem.*, 1937, 29, 1341.

Diethylmalonic Acid (n-Pentane-3 : 3-dicarboxylic acid)

 $\text{C}_7\text{H}_{12}\text{O}_4$

MW, 160

Prisms from H₂O. M.p. 125°. Sol. EtOH, Et₂O. Sol. H₂O to 65% at 16°. Spar. sol. CHCl_3 . k (first) = 7.5×10^{-3} at 25°; (second) = 0.18×10^{-6} at 100°. Heat of comb. C_p 832.9 Cal. At 170–80° \rightarrow diethylacetic acid.

Di-Me ester : $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 204–5°, 97–8°/22 mm. D_4^{24} 1.0315. $n_D^{24.5}$ 1.42528.

Di-Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 230°, 100°/12 mm. D_4^{20} 0.985–0.990. n_D^{17} 1.42516.

Diphenyl ester : $\text{C}_{19}\text{H}_{20}\text{O}_4$. MW, 312. B.p. 215–25°/15 mm.

Di-p-nitrobenzyl ester : cryst. from EtOH. M.p. 91°.

Dichloride : diethylmalonyl chloride. $\text{C}_7\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 197. B.p. 197°.

Mono-amide : $\text{C}_7\text{H}_{13}\text{O}_3\text{N}$. MW, 159. M.p. 146°. Sol. MeOH, EtOH, hot H₂O. Et ester : $\text{C}_9\text{H}_{17}\text{O}_3\text{N}$. MW, 187. M.p. 79°. B.p. 263°.

Diamide : diethylmalonamide. $\text{C}_7\text{H}_{14}\text{O}_2\text{N}_2$. MW, 158. M.p. 224°. B.p. 360°. Sublimes. Sol. hot H₂O. Spar. sol. EtOH.

Mono-nitrile: diethylcyanoacetic acid. $C_7H_{11}O_2N$. MW, 141. M.p. 66° (57°). B.p. $240-5^\circ$, $164^\circ/18$ mm. *Et ester*: $C_9H_{15}O_2N$. MW, 169. B.p. $215-6^\circ$, $100-1^\circ/15$ mm.

Dinitrile: diethylmalonitrile, 3:3-dicyanopentane. $C_7H_{10}N_2$. MW, 122. M.p. $44-5^\circ$. B.p. 195° , $92^\circ/24$ mm. Sol. ord. org. solvents. Spar. sol. hot H_2O .

Amide-nitrile: $C_7H_{12}ON_2$. MW, 140. M.p. 121° . Sol. EtOH, Et_2O , AcOEt, hot H_2O .

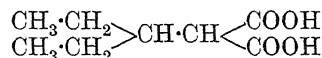
Conrad, *Ann.*, 1880, 204, 138.

Ges. für Elektrochem. Ind., D.R.P. 579,308, (*Chem. Abstracts*, 1933, 27, 4545).

Diethylmetanilic Acid.

See Diethylaniline-*m*-sulphonic Acid.

Diethylmethylmalonic Acid (2-Ethylbutane-1:1-dicarboxylic acid)



$C_8H_{14}O_4$ MW, 174

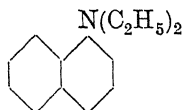
Cryst. from C_6H_6 , toluene, or pet. ether. M.p. 58° . Dist. \rightarrow diethylpropionic acid.

Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. $243-5^\circ$, $130^\circ/16$ mm.

Dianilide: needles. M.p. $219-20^\circ$.

Fichter, Kiefer, Bernoulli, *Ber.*, 1909, 42, 4712.

Diethyl-1-naphthylamine



$C_{14}H_{17}N$ MW, 199

B.p. 290° (285°), $155-65^\circ/30$ mm. D_{20}^{20} 1.015. n_D^{20} 1.5961. Sol. EtOH, Et_2O , C_6H_6 . Turns brown on standing.

sym-Trinitrobenzene add. comp.: scarlet needles. M.p. 95° .

Picrate: m.p. $152-4^\circ$.

Hibbert, Scarborough, *J. Chem. Soc.*, 1903, 83, 1337.

Emerson, Uraneck, *J. Am. Chem. Soc.*, 1941, 63, 749.

Diethyl-2-naphthylamine.

B.p. $316^\circ/717$ mm.

B, HCl : m.p. $177-8^\circ$ (175°). Sol. H_2O .

B, HI : m.p. $152-3^\circ$.

B_2, H_2PtCl_6 : m.p. 95° .

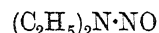
sym-Trinitrobenzene add. comp.: black prisms. M.p. 116° .

Morgan, *J. Chem. Soc.*, 1900, 77, 823.

O : O-Diethyl O-*p*-nitrophenyl thiophosphate.

See Parathion.

Diethylnitrosamine (N-Nitrosodiethylamine)



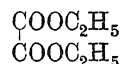
$C_4H_{10}ON_2$ MW, 102

Yellow oil. B.p. 177° . Sol. H_2O . D_4^{20} 0.9422. n_D^{20} 1.43864.

Geuther, Kreutzhage, *Ann.*, 1863, 128, 151.

Schmidt, Fischer, D.R.P. 343,249, (*Chem. Abstracts*, 1923, 17, 1247).

Diethyl oxalate (Oxalic acid diethyl ester, ethyl oxalate)



$C_6H_{10}O_4$ MW, 146

M.p. -40.6° . B.p. 185.4° , $121^\circ/98$ mm., $113^\circ/50$ mm., $97^\circ/20$ mm., $85^\circ/11$ mm. Misc. with EtOH in all proportions. Sol. Et_2O . Spar. sol. H_2O . D_4^{20} 1.0785. n_D^{20} 1.41011. Heat of comb. 716.2 Cal. $NH_3 \rightarrow$ oxamide.

Wahl, *Bull. soc. chim.*, 1925, 37, 713.

Jewel, Butts, *J. Am. Chem. Soc.*, 1931, 53, 3560.

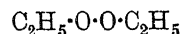
Kenyon, *Organic Syntheses*, Collective Vol. I, 258.

Clarke, Davis, *ibid.*, 256.

Thielepape, Fulde, *Ber.*, 1933, 66, 1458.

Mitchovitch, *Bull. soc. chim.*, 1937, 4, 1667.

Diethyl peroxide (Ethyl peroxide)



$C_4H_{10}O_2$ MW, 90

B.p. 65° . Misc. with EtOH, Et_2O . Spar. sol. H_2O . D_4^{20} 0.8235. $Zn + H_2SO_4$ in AcOH \rightarrow C_2H_5OH . Stable to $KMnO_4$ and CrO_3 . Forms explosive mixture with air.

Riecke, *Ber.*, 1929, 62, 225.

Strecker, Spitaler, *Ber.*, 1926, 59, 1774.

Demougouin, Landon, *Bull. soc. chim.*, 1935, 2, 27.

Diethylphenetidine.

See under Diethylaminophenol.

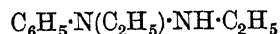
Diethylphenylcarbinol.

See 3-Phenylpentanol-3.

unsym.-Diethylphenylenediamine.

See Aminodiethylaniline.

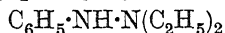
α : β -Diethylphenylhydrazine



$C_{10}H_{16}N_2$ MW, 164

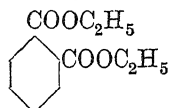
B.p. $111-15^\circ/12$ mm. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O . $Na + EtOH \rightarrow$ ethylaniline + ethylamine. Does not reduce Fehling's.

Bamberger, Tichvinsky, *Ber.*, 1902, 35, 4185.

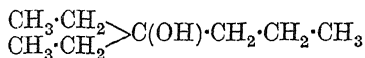
β : β -Diethylphenylhydrazine $C_{10}H_{16}N_2$ MW, 164

Yellow oil. B.p. 110–12°/14 mm. Reduces Fehling's and Tollen's reagent. $Zn + AcOH \rightarrow$ aniline + diethylamine.

Picrate : m.p. 131°.

Wieland, Fressel, *Ber.*, 1911, 44, 901.Diethyl phthalate (*Phthalic acid diethyl ester*) $C_{12}H_{14}O_4$ MW, 222

B.p. 295°, 172°/12 mm. D_4^{25} 1.232. n_D^{25} 1.50490. Used as solvent or fixative in perfumery (Salvarom).

I.G., U.S.P. 1,732,392, (*Chem. Abstracts*, 1930, 24, 131).Levaillant, *Compt. rend.*, 1930, 190, 54.Diethylpropylcarbinol (*3-Ethylhexanol-3, 3-hydroxy-3-ethyl-n-hexane*) $C_8H_{18}O$ MW, 130

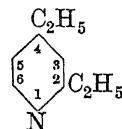
B.p. 160.5° (158–9°). Sol. ord. org. solvents. Insol. H_2O . D_4^{25} 0.8365. n_D^{25} 1.43216. $CrO_3 \rightarrow$ acetic, propionic, and butyric acids.

Clarke, Riegel, *J. Am. Chem. Soc.*, 1912, 34, 677.Huston, Bailey, *J. Am. Chem. Soc.*, 1946, 68, 1382.

Diethylpropylmethane.

See 3-Ethylhexane.

2 : 4-Diethylpyridine

 $C_9H_{13}N$ MW, 135B.p. 187–8°. D_4^{20} 0.9338. $B_2H_2PtCl_6$: orange prisms. M.p. 170–1°.

Picrate : m.p. 98–100°.

Ladenburg, *Ann.*, 1888, 247, 48.

2 : 6-Diethylpyridine.

B.p. 71–3°/17 mm.

Methiodide : m.p. 142°.

 $B \cdot H Au Cl_4$: m.p. 92°. $B_2H_2PtCl_6$: m.p. 211–2°.

Picrate : m.p. 115°.

Blaise, Montagne, *Compt. rend.*, 1925, 180, 1760.

3 : 4-Diethylpyridine.

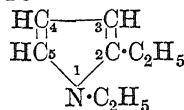
B.p. 207–9°/710 mm.

 $B \cdot H Au Cl_4$: yellow needles. M.p. 111–12°. $B_2H_2PtCl_6$: orange plates. M.p. 221° decomp.

Picrate : m.p. 139°.

Koenigs, Bernhart, *Ber.*, 1905, 38, 3050.

1 : 2-Diethylpyrrole

 $C_8H_{13}N$ MW, 123

B.p. 165–75°.

Ciamician, Zanetti, *Gazz. chim. ital.*, 1889, 19, 90, 294.

2 : 5-Diethylpyrrole.

B.p. 185–7°, 83–5°/17 mm.

Hess, Wissing, *Ber.*, 1914, 47, 1424.Dennstedt, *Ber.*, 1890, 23, 2565.Brooks, Markarian, U.S.P. 2,417,046, (*Chem. Abstracts*, 1947, 41, 3821).

3 : 4-Diethylpyrrole.

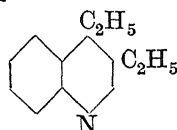
B.p. 83°/10 mm. Rapidly darkens in air.

Fischer, Guggemos, Schäfer, *Ann.*, 1939, 540, 42.

3 : 5-Diethylpyrrole.

B.p. 85–90°/12 mm. Darkens in air. Ehrlich's reagent \rightarrow deep red col.Fischer, Seidel, d'Ennequin, *Ann.*, 1933, 500, 178.

3 : 4-Diethylquinoline

 $C_{13}H_{15}N$ MW, 185

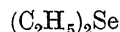
Yellow liq. B.p. 177–8°/25 mm. Volatile in steam.

 $B_2H_2PtCl_6$: yellowish red needles. M.p. 230° decomp.

Picrate : yellow needles. M.p. 179°.

Wohnlich, *Arch. pharm.*, 1913, 251, 546.

Diethyl selenide

 $C_4H_{10}Se$ MW, 137B.p. 108°. Insol. H_2O . D_4^{20} 1.2300. n_D^{20} 1.4768.

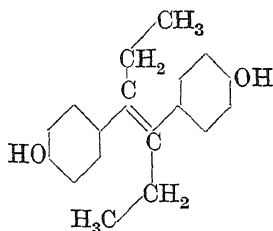
Dibromide : brown plates. M.p. 37° decomp.

$(C_4H_{10}Se)_2 \cdot PtCl_2$: (a) yellow to red needles. M.p. 55°. Sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$. (b) Yellow prisms or plates. M.p. 73°. Sol. $CHCl_3$, hot EtOH. Insol. Et₂O.

Baroni, *Atti accad. Lincei*, 1931, 14, 28.Pascal, *Compt. rend.*, 1913, 156, 1905.Rathka, *Ann.*, 1869, 152, 210.Pieverling, *Ann.*, 1877, 185, 332.

Diethylstilboestrol (4 : 4'-Dihydroxy- $\alpha\beta$ -diethylstilbene, stilboestrol, estromon)

Trans-.



$C_{18}H_{20}O_2$

MW, 268

Plates from EtOH.Aq. or C_6H_6 . M.p. 171° (167–8°). Possesses strong oestrogenic activity. Full activity in doses of 0.004 mg. subcutaneously or 0.001 mg. by mouth. Several times more potent than oestrone.

Diacetyl: prisms from EtOH. M.p. 123–4°.

Dipropionyl: plates from MeOH. M.p. 107–8°.

Dibutyryl: needles from MeOH. M.p. 88°.

Di-isobutyryl: plates. M.p. 86–7°.

Di-n-valeryl: needles from pet. ether. M.p. 89°.

Di-phenylacetyl: needles from EtOH. M.p. 100°.

Dipalmityl: plates from EtOH. M.p. 77–8°.

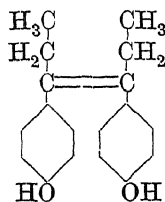
Dibenzoyl: needles from AcOEt. M.p. 210–211°.

Di- α -naphthoyl: prisms from AcOEt. M.p. 206–7°.

Di- β -naphthoyl: needles from AcOEt. M.p. 252–3°.

Di-Me ether: $C_{20}H_{24}O_2$. MW, 296. Plates from pet. ether. M.p. 124°.

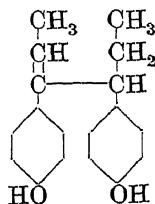
Cis-.



Free diol not isolated pure.

Dipropionyl: m.p. 79° (71–2°).

ψ -Diethylstilboestrol



Previously thought to be *cis*-diethylstilboestrol. Exists as geometric isomers, both racemic mixtures.

α -.

M.p. 153°.

Dibenzoyl: m.p. 126°.

Di-Me ether: m.p. 50°.

β -.

M.p. 143.5°.

Diacetyl: m.p. 74°.

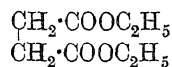
Dibenzoyl: m.p. 184°.

Dodds, Goldberg, Lawson, Robinson, *Proc. Roy. Soc.*, 1939, B, 127, 140; *Nature*, 1938, 141, 247; 1938, 142, 34, 211.

Jones, *Annual Reports of the Chemical Society* (London), 1943, 40, 137 (*Bibl.*).

Solmssen, *Chem. Reviews*, 1945, 37, 481, (*Bibl.*).

Diethyl succinate (*Succinic acid diethyl ester, ethyl succinate*)



$C_8H_{14}O_4$

MW, 174

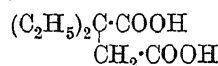
M.p. –21°. B.p. 217.7°, 105°/15 mm., 85–6°/6 mm. D_4^{20} 1.0402. n_D^{20} 1.42007. Heat of comb. 1007.7 Cal.

Fischer, Speier, *Ber.*, 1895, 28, 3255.

von Blancke, *Ann.*, 1931, 485, 283.

Thielepape, Fulde, *Ber.*, 1933, 66, 1460.

1 : 1-Diethylsuccinic Acid



$C_8H_{14}O_4$

MW, 174

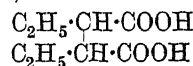
Cryst. M.p. 108°. k (first) = 1.44×10^{-4} at 25°.

Anhydride: $C_8H_{12}O_3$. MW, 156. B.p. 133°/19 mm.

Dutt, Thorpe, *J. Chem. Soc.*, 1924, 125, 2528.

Verkade, Hartmann, *Rec. trav. chim.*, 1933, 52, 952.

1 : 2-Diethylsuccinic Acid (*Hexane-3 : 4-dicarboxylic acid*)



$C_8H_{14}O_4$

MW, 174

Meso-. Para-diethylsuccinic Acid.

Plates or needles. M.p. 192° (rapid heat.), (205°). Sol. EtOH, Et₂O, Me₂CO. Mod. sol. H₂O. Spar. sol. CHCl₃, AcOH. Insol. C₆H₆, ligroin, CS₂. $k = 2.45 (2.35) \times 10^{-4}$ at 25°.

Di-Et ester: $C_{12}H_{22}O_4$. MW, 230. B.p. 235–7°/748 mm. D_6^{18} 0.9736.

Anhydride: b.p. 143°/24 mm., 125°/12 mm.

dL-. Anti-diethylsuccinic Acid.

Cryst. from H₂O. M.p. 130° (133°). Sol. EtOH, Et₂O, Me₂CO, AcOH, CHCl₃, hot H₂O.

Spar. sol. C_6H_6 . Insol. ligroin. $k = 3.43 (3.47) \times 10^{-4}$ at 25° .

Di-Et ester: b.p. $237-9^\circ/747$ mm. $D_4^{16} 0.9904$.

Anhydride: b.p. 48° /cathode ray vac.

d.

Cryst. from C_6H_6 . M.p. 126° . $[\alpha]_D^{20} + 28.9^\circ$, $[\alpha]_{5461}^{25} + 34.5^\circ$ in Me_2CO .

Anhydride: b.p. $108-9^\circ/11$ mm. $[\alpha]_D^{20} + 47.6^\circ$.

l.

Cryst. from C_6H_6 . M.p. 125° . $[\alpha]_{5461} - 34.3^\circ$.

Di-Me ester: $C_{10}H_{18}O_4$. MW, 202. B.p. $104^\circ/13$ mm.

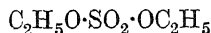
Hell, Mühlhauser, *Ber.*, 1880, 13, 475, 479.

Bischoff, *Ber.*, 1888, 21, 2102.

Wren, Haller, *J. Chem. Soc.*, 1937, 230.

Berner, Leonardsen, *Ann.*, 1939, 538, 26.

Diethyl sulphate (*Ethyl sulphate, sulphuric ethyl ester*)



$C_4H_{10}O_4S$ MW, 154

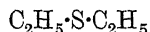
M.p. -24.5° . B.p. 208° slight decomp., $118^\circ/40$ mm., $96^\circ/15$ mm. Sol. EtOH, Et₂O. Insol. H₂O. $D_4^{18} 1.180$. $n_D^{18} 1.4010$. Decomp. slowly on heating above 140° or with warm H₂O. Hyd. by alkalis. Hot EtOH \longrightarrow diethyl ether. Alk. iodides \longrightarrow C_2H_5I . Used as ethylating agent.

Damiens, de Loisy, Piette, U.S.P. 1,599,119, (*Chem. Abstracts*, 1926, 20, 3460).

McLang, *Chem. Trade J.*, 1928, 83, 143.

Levillant, *Compt. rend.*, 1930, 190, 54.

Diethyl sulphide (*Ethyl sulphide*)



$C_4H_{10}S$ MW, 90

F.p. -102.05° . B.p. 92° . Insol. H₂O. $D_4^{20} 0.8368$. $n_D^{20} 1.44233$. Heat of comb. C_p 826.9 Cal. (liq.), 772.2 Cal. (vapour). HNO₃ \longrightarrow diethyl sulphoxide + diethyl sulphone. Red hot tube \longrightarrow thiophene. Forms large number of add. comps. with metallic salts, particularly Pt salts.

$C_4H_{10}S, HgCl_2$: m.p. $90^\circ (119^\circ)$.

$C_4H_{10}S, 2HgCl_2$: m.p. 127° .

$C_4H_{10}S, HgI_2$: m.p. 52° .

$2C_4H_{10}S, HgI_2$: m.p. $146-7^\circ$.

$2C_4H_{10}S, SnCl_4$: m.p. $101-2^\circ$.

$2C_4H_{10}S, SnBr_4$: m.p. 84° .

Hobson, *Ann.*, 1857, 102, 75.

Fincke, *Ber.*, 1894, 27, 1239.

Hunter, Partington, *J. Chem. Soc.*, 1931, 2067.

I.G., B.P. 450,760, (*Chem. Abstracts*, 1937, 31, 114).

Diethyl sulphide dicarboxylic Acid.

See Thiodipropionic Acid.

Diethyl sulphite (*Ethyl sulphite, sulphurous ethyl ester*)



$C_4H_{10}O_3S$ MW, 138

B.p. 158° , $69^\circ/30$ mm., $51^\circ/13$ mm. $D_4^0 1.1054$, $D_4^{20} 1.0829$. $n_D^{20} 1.41441$. Hyd. by KOH.Aq. At $200^\circ \longrightarrow SO_2$ + diethyl ether.

Warlitz, *Ann.*, 1867, 143, 74.

Voss, Blanke, *Ann.*, 1931, 485, 273.

Diethyl sulphone



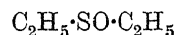
$C_4H_{10}O_2S$ MW, 122

Plates. M.p. $73-4^\circ (70^\circ)$. B.p. 248° . Sol. H₂O, C_6H_6 . Insol. pet. ether.

Pummerer, *Ber.*, 1910, 43, 1407.

Wood, Travis, *J. Am. Chem. Soc.*, 1928, 50, 1226.

Diethyl sulphoxide



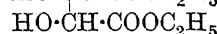
$C_4H_{10}OS$ MW, 106

M.p. $4-6^\circ$. B.p. $88-9^\circ/15$ mm.

Fichter, Wink, *Ber.*, 1912, 45, 1376.

Pummerer, *Ber.*, 1910, 43, 1407.

Diethyl tartrate



$C_8H_{14}O_6$ MW, 206

d.

M.p. 17° . B.p. 280° , $233^\circ/197$ mm., $150^\circ/11$ mm., $137^\circ/5$ mm. Sol. ord. org. solvents. $D_4^{20} 1.2036$. $n_D^{25} 1.4454$. $[\alpha]_D^{20} + 7.45^\circ$. Forms unstable Na deriv.

l.

B.p. $162^\circ/19$ mm. $D_4^{197} 1.2054$. $[\alpha]_D^{197} - 7.55^\circ$.

dl. (*racemic*).

Diethyl racemate. Physical properties identical with the *d*-tartrate (above).

Meso.

M.p. 55° .

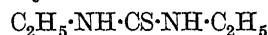
Fischer, Speier, *Ber.*, 1895, 28, 3255.

Anschütz, *Ber.*, 1885, 18, 1399.

Walden, *Z. physik. Chem.*, 1896, 20, 385.

Cioeca, Semproni, *Chem. Abstracts*, 1936, 30, 1028.

sym.-Diethylthiourea

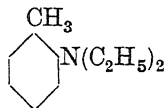


$C_5H_{12}N_2S$ MW, 132

Cryst. M.p. 144° . Sol. H₂O, EtOH.

Anschütz, *Ann.*, 1909, 371, 210, 216.

Dyson, Hunter, *Rec. trav. chim.*, 1926, 45, 421.

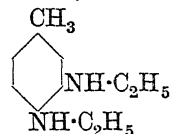
Diethyl-*o*-toluidine $C_{11}H_{17}N$

MW, 163

B.p. 209–10°.

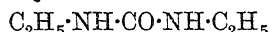
B, HI, H₂O: prisms. M.p. 72–3°.*B, HI, I₂*: steel-blue cryst. or brownish-black prisms from EtOH. M.p. 100°. Sol. EtOH, Et₂O, C₆H₆, CS₂.Reinhardt, Staedel, *Ber.*, 1883, 16, 29.See also B.D.C., B.P. 270,930, (*Chem.**Abstracts*, 1928, 22, 1594).**Diethyl-*m*-toluidine.**

B.p. 231–231.5°.

Weenberg, *Ber.*, 1892, 25, 1613.**Diethyl-*p*-toluidine.**B.p. 229°. D_{15}^{25} 0.9242.*B, HCl*: m.p. 157°.Reinhardt, Staedel, *Ber.*, 1883, 16, 29.**sym.-Diethyl-3 : 4-tolylenediamine (3 : 4-Tolylene-diethyldiamine)** $C_{11}H_{18}N_2$

MW, 178

Yellow oil. B.p. 265°.

Hinsberg, *Ann.*, 1891, 265, 191.**sym.-Diethylurea** $C_5H_{12}ON_2$

MW, 116

Needles from EtOH. M.p. 112° (108°). B.p. 263°. Sol. H₂O, EtOH, Et₂O.Anschütz, *Ann.*, 1909, 371, 215.Wurtz, *Compt. rend.*, 1851, 52, 417.**unsym.-Diethylurea.**

See under Diethylcarbamic Acid.

Diethylurethane.

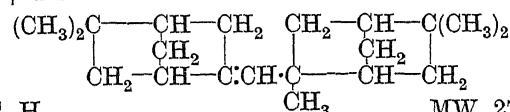
See under Diethylcarbamic Acid.

***N*-Diethylxylidine.**

See under Xylidine.

Diethynylpentane.

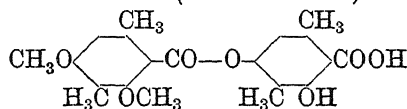
See 2 : 7-Nonadi-yne.

β-Difenchene $C_{20}H_{32}$

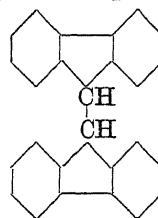
MW, 272

d-.
M.p. 83°. B.p. 171°/10 mm. Sol. C₆H₆. $[\alpha]_D^{20} + 67.7^\circ$ in C₆H₆.“Hydrochloride”: m.p. 79°. $[\alpha]_D^{21.5} - 35.7^\circ$ in C₆H₆.“Hydrobromide”: m.p. 76–8°. $[\alpha]_D^{20} - 66.1^\circ$ in C₆H₆.*l*-.
Cryst. from EtOH. M.p. 83°. B.p. 167–9°/8.5 mm. $[\alpha]_D^{22.2} - 66.3^\circ$ in CHCl₃.“Hydrochloride”: m.p. 79°. $[\alpha]_D^{21.5} + 35.7^\circ$ in C₆H₆.*dl*-.
Fine prisms from EtOH. M.p. 56–7°.

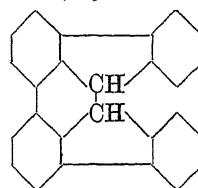
“Hydrochloride”: m.p. 80°.

Toivonen *et al.*, *J. prakt. Chem.*, 1941, 159, 70.**Diffractaic Acid (Dirhizonic acid)** $C_{20}H_{22}O_7$

MW, 374

Lichen acid from *Usnea diffracta*. Needles from C₆H₆. M.p. 189–90°. FeCl₃ → blue col. Na salt spar. sol.*Me ester*: $C_{21}H_{24}O_7$. MW, 388. M.p. 127–8°. No col. with FeCl₃.*Et ester*: $C_{22}H_{26}O_7$. MW, 402. M.p. 142°. Acetyl: m.p. 222°.*Propyl ester*: $C_{23}H_{28}O_7$. MW, 416. M.p. 127°. Acetyl: m.p. 94–5°.*Butyl ester*: $C_{24}H_{30}O_7$. MW, 430. M.p. 115°. Acetyl: m.p. 90°.*Isobutyl ester*: m.p. 114°. Acetyl: m.p. 80°.*Amyl ester*: $C_{25}H_{32}O_7$. MW, 444. M.p. 90°. Acetyl: m.p. 58–9°.*Isoamyl ester*: m.p. 93°. Acetyl: m.p. 88°.Asahina, Fuzikawa, *Ber.*, 1932, 65, 175, 583, 1668.Hesse, *J. prakt. Chem.*, 1906, 73, 120.Huzikawa, *J. Pharm. Soc. Japan*, 1940, 60, 177.**Difluorenyl (1 : 2-Di-diphenylene-ethane)** $C_{26}H_{18}$

MW, 330

Needles from hot EtOH–C₆H₆. M.p. 246°. Spar. sol. Et₂O, EtOH, C₆H₆, AcOH. K₂Cr₂O₇ in AcOH → fluorenone. Forms no picrate.Graebe, Stindt, *Ann.*, 1896, 291, 6.**Difluorenylene (Difluorenylene)** $C_{26}H_{16}$

MW, 328

Prisms. M.p. 218°.

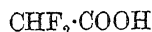
Picrate: reddish brown needles. M.p. 202-3°.

Dziwoniński, Suszko, *Chem. Abstracts*, 1923, 17, 1459.

Diffuorenyl Ether.

See under 9-Fluorenyl.

Diffuoroacetic Acid



$\text{C}_2\text{H}_2\text{O}_2\text{F}_2$ MW, 96

F.p. -0.35°. B.p. 134°, 67-70°/20 mm. Misc. with H_2O , EtOH, Et_2O , C_6H_6 . D_4^{20} 1.5359. $k = 5.72 \times 10^{-2}$. Heat of comb. C_v 135.1 Cal. Inflammable.

Et ester: $\text{C}_4\text{H}_6\text{O}_2\text{F}_2$. MW, 124. B.p. 99°. Insol. H_2O . $D_4^{17.5}$ 1.1800.

Chloride: C_2HOCIF_2 . MW, 114.5. Fuming liq. B.p. 25°.

Amide: $\text{C}_2\text{H}_5\text{ONF}_2$. MW, 95. Prisms from C_6H_6 . M.p. 52°. B.p. 108.6°/35 mm. Sol. H_2O , EtOH, Et_2O .

Swarts, *Chem. Zentr.*, 1903, II, 709.

Désirant, *Chem. Abstracts*, 1930, 24, 3493.

Henne, Alderson, Newman, *J. Am. Chem. Soc.*, 1945, 67, 918.

o-Difluorobenzene



$\text{C}_6\text{H}_4\text{F}_2$ MW, 114

M.p. -34°. B.p. 91-2°/751 mm. D_4^{18} 1.1599. n_D^{18} 1.44506.

Schiemann, Pillarskey, *Ber.*, 1929, 62, 3042.

m-Difluorobenzene.

M.p. -59°. B.p. 83°. D_4^{18} 1.1552. n_D^{18} 1.44035. Nitration \rightarrow 2 : 4-difluoronitrobenzene.

Swarts, *Rec. trav. chim.*, 1915, 35, 154.

Schiemann, Pillarskey, *Ber.*, 1929, 62, 3039.

p-Difluorobenzene.

M.p. -13°. B.p. 89°. D_4^{18} 1.1684. $n_D^{18.5}$ 1.4422. Nitration \rightarrow 2 : 5-difluoronitrobenzene.

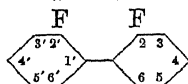
Swarts, *Chem. Abstracts*, 1914, 8, 681.

Schiemann, Pillarskey, *Ber.*, 1929, 62, 3039.

Difluorodichloromethane.

See Freon.

2 : 2'-Difluorodiphenyl



$\text{C}_{12}\text{H}_8\text{F}_2$ MW, 190

M.p. 117°.

Faber, *Chem. Zentr.*, 1933, II, 2815.

Schiemann, Rosdus, *Ber.*, 1932, 65, 741.

3 : 3'-Difluorodiphenyl.

M.p. 7-8°, to pale yellow liq. B.p. 130°/14 mm. D_4^{25} 1.192.

Schiemann, Rosdus, *Ber.*, 1932, 65, 742.

4 : 4'-Difluorodiphenyl.

Leaflets from H_2O . M.p. 94-5°. B.p. 254-5°. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 , AcOH. Volatile in steam.

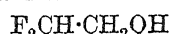
Balz, Schiemann, *Ber.*, 1927, 60, 1189.

Schiemann, Winkelmüller, *Organic Syntheses*, 1938, XVIII, 20.

Difluoroethane.

See Ethylene difluoride and Ethylidene fluoride.

Difluoroethyl Alcohol



$\text{C}_2\text{H}_4\text{OF}_2$ MW, 82

M.p. -28.2°. B.p. 95.5-96°. Misc. with H_2O and common org. solvents in all proportions. $D_4^{11.8}$ 1.31552, D_4^{17} 1.30839, $D_4^{35.4}$ 1.2819, $D_4^{78.4}$ 1.2199. $n_D^{11.8}$ 1.3345. Heat of comb. C_v 245.3 Cal.; C_p 245.3 Cal. CrO_3 or $\text{KMnO}_4 \rightarrow$ difluoroacetic acid.

Acetyl: difluoroethyl acetate. B.p. 106°. Spar. sol. H_2O . D_4^{18} 1.1781. Heat of comb. C_v 455.48 Cal.

Swarts, *Chem. Zentr.*, 1903, I, 436; *Rec. trav. chim.*, 1906, 25, 425.

1 : 1-Difluoroethylene (Vinylidene fluoride)



$\text{C}_2\text{H}_2\text{F}_2$ MW, 64

Colourless, odourless gas. Part. solidifies in solid CO_2 -acetone. Sol. 1½ vols. EtOH or CHCl_3 . Not oxidised by air or polymerised by sunlight.

Swarts, *Chem. Zentr.*, 1901, II, 804; *Bull. soc. chim.*, 1919, 25, 158.

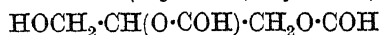
ω-Difluorotoluene.

See Benzylidene fluoride.

Difluorylene.

See Difluorenylene.

1 : 2-Diformin (Glycerol αβ-diformate)

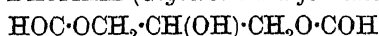


$\text{C}_5\text{H}_8\text{O}_5$ MW, 148

B.p. 151-3°/17 mm. Sol. EtOH, Me_2CO . Insol. C_6H_6 . D_4^0 1.3252. n_D^{17} 1.4503.

Delaby, Dubois, *Compt. rend.*, 1928, 187, 767.

1 : 3-Diformin (Glycerol αα'-diformate)



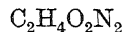
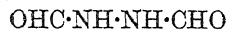
$\text{C}_5\text{H}_8\text{O}_5$ MW, 148

B.p. 144-6°/11 mm. Sol. EtOH, Me_2CO . Insol. C_6H_6 . D_4^0 1.3218. n_D^{18} 1.4486. Very hygroscopic.

Delaby, Dubois, *Compt. rend.*, 1928, 187, 767.

Diformyl.

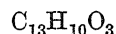
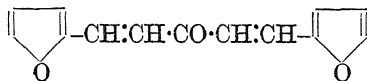
See Glyoxal.

Diformylhydrazine

MW, 88

Prisms. M.p. 160°. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . Forms cryst. mono- and di- Na derivs.

Pellizzari, *Atti accad. Lincei*, 1899, 8, i, 330.

Difurfurylideneacetone

MW, 214

Yellow prisms from ligroin. M.p. 60–1° (57–5°). Decomp. on standing in air. Sol. EtOH, Et_2O , CHCl_3 . Mod. sol. pet. ether.

Phenylhydrazone: m.p. 121–2°. Sols. fluoresce.

Maxim, Copuzeanu, *Chem. Abstracts*, 1935, 29, 4355.

Kasiwagi, *Chem. Abstracts*, 1926, 20, 3005.

Claisen, Ponder, *Ann.*, 1884, 223, 146.

Difuroyl.

See Furil.

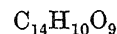
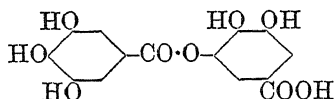
Difuryl Diketone.

See Furil.

Difurylglycollic Acid.

See Furilic Acid.

Digallic Acid (*m-Digallic acid*, 5 : 6-dihydroxy-3-carboxyphenyl ester of gallic acid)



MW, 322

Cryst. from EtOH. Aq. in needles with H_2O of cryst. M.p. 268–70° decomp. Dil. $\text{H}_2\text{SO}_4 \rightarrow$ gallic acid. $\text{FeCl}_3 \rightarrow$ blue-black col.

Me ester: $\text{C}_{15}\text{H}_{12}\text{O}_9$. MW, 336. Needles or plates from MeOH or H_2O . M.p. about 175° decomp.

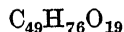
Penta-acetyl: needles from EtOH–AcOH. M.p. 211–14°.

Penta-benzoyl: needles from EtOH. M.p. 187–9°.

Penta-Me ether: $\text{C}_{18}\text{H}_{20}\text{O}_9$. MW, 392. Plates from AcOEt. M.p. 194–5°. *Me ester*: $\text{C}_{20}\text{H}_{22}\text{O}_9$. MW, 406. Needles from pet. ether. M.p. 127–8°.

Nierenstein, *Ber.*, 1910, 43, 630.

Fischer, Freudenberg, *Ber.*, 1913, 46, 1124.

Digilanid A

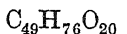
MW, 968

Glycoside of *Digitalis lanata*. Prisms from MeOH. M.p. 145–8° decomp. Spar. sol.

Dict. of Org. Comp.—II.

CHCl_3 . Insol. H_2O . $[\alpha]_D + 31.4^\circ$ in EtOH. Enzymic hyd. \rightarrow acetyldigitoxin + glucose.

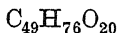
Stoll, Kreis, *Helv. Chim. Acta*, 1933, 16, 1088.

Digilanid B

MW, 984

Glycoside of *Digitalis lanata*. Prisms from MeOH. M.p. 245–8° decomp. Spar. sol. CHCl_3 . Insol. H_2O . $[\alpha]_D + 36.7^\circ$ in EtOH. Enzymic hyd. \rightarrow acetyldigitoxin + glucose.

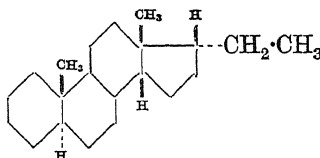
Stoll, Kreis, *Helv. Chim. Acta*, 1933, 16, 1088.

Digilanid C

MW, 984

Glycoside of *Digitalis lanata*. Prisms from MeOH. M.p. 245–8° decomp. Spar. sol. CHCl_3 . Insol. H_2O . $[\alpha]_D + 33.5^\circ$ in EtOH. Enzymic hyd. \rightarrow acetyldigoxin + glucose.

Stoll, Kreis, *Helv. Chim. Acta*, 1933, 16, 1088.

Diginane (14-Iso-17-isooallopregnane)

MW, 288

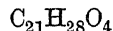
Cryst. M.p. 74–7°. $[\alpha]_D^{25} + 25.3^\circ$ in CHCl_3 .

Meyer, *Helv. Chim. Acta*, 1947, 30, 2024.

Press, Reichstein, *Helv. Chim. Acta*, 1947, 30, 2127.

Digine.

See Gitogenin.

Diginenin

MW, 344

Prisms from MeOH– Et_2O . M.p. 115°. $[\alpha]_D^{25} - 226^\circ$ in Me_2CO . $\text{C}(\text{NO}_2)_4$ in $\text{CHCl}_3 \rightarrow$ yellow col. Gives positive Legal test.

Mono-acetyl deriv.: leaflets from Me_2CO –pentane. M.p. 178°. Clears at 195–200°. *Semicarbazone*: prisms from MeOH. M.p. 262–3° decomp.

Diacetyl deriv.: needles from Et_2O –pentane. M.p. 177–8°. *Semicarbazone*: cryst. from AcOEt– Et_2O . M.p. 177–8°.

Oxime: prisms from EtOH. M.p. 219–20° decomp. Second form: octahedra, m.p. 235–6° decomp.

Semicarbazone: needles + H_2O from MeOH. M.p. 290–2° decomp.

Shoppee, Reichstein, *Helv. Chim. Acta*, 1940, 23, 975.

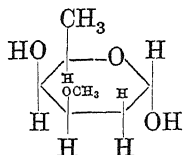
Diginin $C_{28}H_{40}O_7$

MW, 488

Glycoside from *Digitalis purpurea*. Prisms from EtOH.Aq. M.p. 155–83°. Sol. $CHCl_3$. Spar. sol. Et_2O , Me_2CO , $AcOEt$, CCl_4 . Prac. insol. H_2O . $[\alpha]_D^{24} - 223^\circ$ in $CHCl_3$. Dil. min. acids \rightarrow diginigenin (*q.v.*). No cardiac action.

Shoppee, Reichstein, *Helv. Chim. Acta*, 1940, 23, 975.

Karrer, *Chem. Zentr.*, 1936, II, 2727.

Diginose (2-Deoxy-3-methyl-d-fucose) $C_7H_{14}O_4$

MW, 162

Syrup. $[\alpha]_D^{25} + 56.2^\circ$ in H_2O . Br \rightarrow 2-deoxy-3-methyl-d-fuconic acid (S-benzylthiuronium salt, m.p. 130–1°. $[\alpha]_D^{19} - 10.8^\circ$ in H_2O).

Me-glycoside: $C_8H_{16}O_4$. MW, 176. Syrup. B.p. 50–70°/0.08 mm. $[\alpha]_D^{20} + 81.4^\circ$ in Me_2CO .

Tamm, Reichstein, *Helv. Chim. Acta*, 1948, 31, 1630.

Digitalin (*Digitalinum verum*) $C_{36}H_{56}O_{14}$

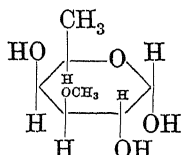
MW, 712

Glycoside of *Digitalis purpurea*, Linn., (foxglove). White cryst. powder. M.p. 229°. Sol. MeOH. Spar. sol. H_2O . Hyd. \rightarrow digitaligenin + digitalose + glucose. The mixed glycosides obtained from the plant are used in medicine under the name of Digitalis.

Mameli, *Giorn. chim. ind. applicata*, 1922, 4, 355.

Windaus, Haack, *Ber.*, 1929, 62, 475.

For this and other digitalis glycosides see Stoll, *The Cardiac Glycosides*, (The Pharmaceutical Press, London), 1937, and Heusser, *Fortschritte der Chemie Organischer Naturstoffe*, Vol. 7, 1950, 87.

Digitalose (3-Methyl-d-fucose) $C_7H_{14}O_5$

MW, 178

Needles from $AcOEt$. M.p. 106° (rising to 119° after 4 months). $[\alpha]_{5461}^{22} + 109^\circ$ in H_2O , rising to + 126°. Br \rightarrow digitalonic acid lactone, cryst. from $AcOEt$, m.p. 137°.

Osazone: yellow needles from $Me_2CO.Aq$. M.p. 179–80°.

α -*Triacetyl*: cryst. M.p. 115–17°. $[\alpha]_D^{17} + 160.8^\circ$ in $CHCl_3$.

β -*Triacetyl*: cryst. M.p. 96–7°. $[\alpha]_D^{17} + 50.4^\circ$ in $CHCl_3$.

Me-glycoside: b.p. 125–9°/0.2 mm. 2-*Benzyl*: b.p. 152–7°/0.1–0.2 mm.

Kiliani, *Ber.*, 1922, 55, 90.

Schmidt, Zeiser, *Ber.*, 1934, 67, 2127.

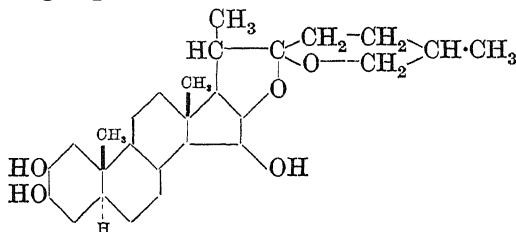
Lamb, Smith, *J. Chem. Soc.*, 1936, 445.

MacPhillamy, Elderfield, *J. Org. Chem.*, 1939, 4, 150.

Schmidt, Wernicke, *Ann.*, 1944, 556, 179.

Hauenstein, Reichstein, *Helv. Chim. Acta*, 1949, 32, 163.

Schmidt, Wernicke, *Ann.*, 1947, 558, 70.

Digitogenin

Suggested structure

 $C_{27}H_{44}O_5$

MW, 448

Cardiac aglycone. Needles from EtOH. M.p. 280–3°. $[\alpha]_D^{19} - 81^\circ$ in $CHCl_3$.

Triacetyl: m.p. 190°.

Tschesche, *Ber.*, 1935, 68, 1901.

Tschesche, Hagedorn, *Ber.*, 1936, 69, 797.

Digitonin $C_{55}H_{90}O_{29}$

MW, 1214

Glycoside in seeds of *Digitalis purpurea*, Linn., (foxglove). White cryst. M.p. 235° (sinters at 225°). Sol. EtOH. Spar. sol. H_2O to soapy, opalescent sol. Prac. insol. $CHCl_3$. $[\alpha]_D - 54.3^\circ$ in MeOH. Hyd. \rightarrow digitogenin + 2 mols. galactose + 2 mols. glucose. Forms insol. comp. with cholesterol: used for estimation of the latter in oils.

Windaus, *Z. physiol. Chem.*, 1925, 150, 205.

Mameli, *Giorn. chim. ind. applicata*, 1922, 4, 355.

Windaus, Haack, *Ber.*, 1929, 62, 475.

Gisvold, *J. Am. Pharm. Assocn.*, 1934, 23, 664.

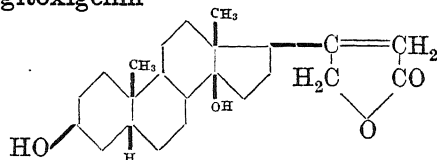
 ψ -Digitonin.

See Gitalin.

Digitoxic Acid.

See 2 : 3 : 4-Trihydroxycaproic Acid.

Digitoxigenin

 $C_{23}H_{34}O_4$

MW, 374

Cardiac aglycone. Cryst. from EtOH.Aq. M.p. 253°. $[\alpha]_D^{25} + 19.1^\circ$ in EtOH.

3-Monoacetyl: m.p. 217°.

3- β -d-Glucoside: tetra-acetyl deriv., cryst. + $1H_2O$ from dioxan. M.p. 242-6°. $[\alpha]_D^{25} - 4.9^\circ$ in 95% EtOH.

Windaus, Stein, *Ber.*, 1928, 61, 2436.

Jacobs, Gustus, *J. Biol. Chem.*, 1928, 78, 573.

Jacobs, Elderfeld, *J. Biol. Chem.*, 1935, 108, 497.

Kreis, U.S.P. 2,003,204, (*Chem. Abstracts*, 1935, 29, 4902).

Elderfield, Uhle, Fried, *J. Am. Chem. Soc.*, 1947, 69, 2235.

Fieser, Fieser, *Natural Products Related to Phenanthrene*, 3rd Ed., p. 515, (Reinhold Publishing Corporation, New York).

Digitoxin

 $C_{40}H_{70}O_{14}$

MW, 774

Secondary glycoside of *Digitalis purpurea*, Linn. (foxglove). White cryst. powder. M.p. anhyd. 255-6°. Sol. EtOH, Et₂O, CHCl₃. Insol. H₂O. $[\alpha]_D^{20} + 4.8^\circ$ in dioxan. Acid hyd. \rightarrow digitoxigenin + digitoxose.

Windaus, Freese, *Ber.*, 1925, 58, 2503.

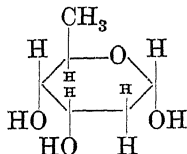
Mameli, *Giorn. chim. ind. applicata*, 1922, 4, 355.

Stoll, Kreis, *Helv. Chim. Acta*, 1935, 18, 137.

Stoll, Hoffmann, Kreis, *Z. physiol. Chem.*, 1935, 235, 249.

Windaus, Stein, *Ber.*, 1928, 61, 2436.

Digitoxose (2 : 6-Di-deoxy-d-allose)

 $C_6H_{12}O_4$

MW, 148

M.p. 108-9°. Sol. H₂O, Me₂CO. $[\alpha]_D^{25} + 46.3^\circ$ in H₂O. $[\alpha]_D^{25} + 37.1^\circ$ in MeOH.

Oxime: needles. M.p. 102°.

Phenylhydrazone: m.p. 204-9°.

Michel, *Ber.*, 1930, 63, 347.

Iselin, Reichstein, *Helv. Chim. Acta*, 1944, 27, 1203.

Gut, Prins, *Helv. Chim. Acta*, 1947, 30, 1223.

Diglycerol (2 : 3 : 2' : 3'-Tetrahydroxydi-propyl ether)

$HO \cdot CH_2 \cdot CH(OH) \cdot CH_2 \cdot O \cdot CH_2 \cdot CH(OH) \cdot CH_2OH$
 $C_6H_{14}O_5$ MW, 166

B.p. 265-70°/15 mm., 225°/3 mm. D_{20}^{20} 1.2774. n_D^{20} 1.4890. Sol. H₂O, EtOH. Insol. Et₂O.

Tetra-acetyl: b.p. 179°/2 mm. n_D^{20} 1.4440.

Levene, Walti, *J. Biol. Chem.*, 1928, 77, 693.

Wright, Du Puis, *J. Am. Chem. Soc.*, 1946, 68, 446.

Istin, *Chem. Abstracts*, 1947, 41, 2392.

Diglycolamidic Acid.

See Iminodiacetic Acid.

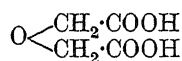
Diglycollamic Acid.

See under Diglycollic Acid.

Diglycollanilic Acid.

See under Diglycollic Acid.

Diglycollic Acid (Dimethyl ether dicarboxylic acid, di-carboxymethyl ether, anhydroglycollic acid)

 $C_4H_6O_5$

MW, 134

Monoclinic prisms + $1H_2O$ from H₂O. M.p. 148°. Decomp. on dist. Sol. H₂O, EtOH. Mod. sol. Et₂O. Hot alkalis \rightarrow acetic + oxalic acids. $k(\text{first}) = 1.1 \times 10^{-3}$ at 25°; (second) = 3.7×10^{-5} .

Mono-Me ester: $C_5H_8O_5$. MW, 148. B.p. 173-4°/12 mm.

Di-Me ester: $C_6H_{10}O_5$. MW, 162. M.p. 36°. B.p. 130°/13 mm.

Di-Et ester: $C_8H_{14}O_5$. MW, 190. B.p. 243-5°/710 mm., 129-130°/20 mm. (130°/12 mm.). Sol. EtOH, Et₂O.

Di-phenyl ester: $C_{16}H_{14}O_5$. MW, 286. Needles from MeOH. M.p. 80°.

Dichloride: $C_4H_4O_3Cl_2$. MW, 171. B.p. 116°/12 mm.

Mono-amide: diglycollamic acid. $C_4H_7O_4N$. MW, 133. Prisms. M.p. 135° (sinters at 125-30°).

Diamide: $C_4H_5O_3N_2$. MW, 132. Prisms from H₂O. Heat \rightarrow imide.

Anhydride: 2:6-diketodioxan. $C_4H_4O_4$. MW, 116. M.p. 97°. B.p. 120°/12 mm.

Imide: $C_4H_5O_3N$. MW, 115. Needles. M.p. 142°. Mod. sol. H₂O. Spar. sol. cold EtOH, cold Et₂O.

Anil: prisms from CHCl₃. M.p. 195°.

Mono-anilide: diglycollanilic acid. M.p. 118°.

Dianilide: needles. M.p. 152°.

Lossen, Eichloff, *Ann.*, 1905, 342, 121.

Anschutz, Biernaux, *Ann.*, 1893, 273, 65.

Diglycylalanine (Glycylglycyl-dl-alanine)

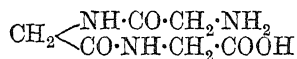
CH_3
 $H_2N \cdot CH_2 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot CH \cdot COOH$
 $C_7H_{13}O_4N_3$ MW, 203

Turns brown at 215°.

Fischer, *Ber.*, 1903, 36, 2987.

Abderhalden, Ehrenwall, *Fermentforschung*, 1931, 12, 376, (*Chem. Abstracts*, 1931, 25, 2741).

Diglycylglycine (*Triglycine, glycyl-glycyl-glycine*)



$\text{C}_6\text{H}_{11}\text{O}_4\text{N}_3$

MW, 189

Needles from EtOH.Aq. M.p. 246° decomp. Sol. hot H_2O . Insol. EtOH.Aq. k (acid) = 8.53×10^{-9} ; k (base) = 1.55×10^{-11} .

Me ester: $\text{C}_7\text{H}_{13}\text{O}_4\text{N}_3$. MW, 203. Needles or prisms from CHCl_3 -Et₂O. M.p. 111°. *Hydrochloride*: leaflets from MeOH. M.p. 204° decomp.

Et ester hydrochloride: plates from EtOH. M.p. 214-9°. Sol. H_2O . Spar. sol. EtOH.

Chloroacetyl deriv.: plates from H_2O . M.p. 224° decomp.

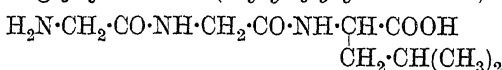
3:5-Dinitrobenzoyl deriv.: needles from H_2O . M.p. 236° decomp.

Tillmanns, Hirsch, Strache, *Biochem. Z.*, 1928, 199, 399.

Abderhalden, Schwab, *Z. physiol. Chem.*, 1927, 164, 271.

Fischer, *Ber.*, 1903, 36, 2983; 1904, 37, 2500; 1906, 39, 469.

Diglycyl-leucine (*Glycyl-glycyl-dl-leucine*)



$\text{C}_{10}\text{H}_{19}\text{O}_4\text{N}_3$

MW, 245

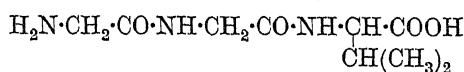
Cryst. M.p. 240° decomp. Gives soluble Cu salt.

Chloroacetyl deriv.: m.p. 176-7° decomp.

Fischer, *Ber.*, 1903, 36, 2990.

Abderhalden, Zeisset, *Fermentforschung*, 1929, 10, 544, (*Chem. Abstracts*, 1929, 23, 4232).

Diglycyl-valine (*Glycyl-glycyl-dl-valine*)



$\text{C}_9\text{H}_{17}\text{O}_4\text{N}_3$

MW, 231

M.p. 219-21° decomp.

Chloroacetyl deriv.: m.p. 169-71° decomp.

Abderhalden, Zeisset, *Fermentforschung*, 1929, 10, 544, (*Chem. Abstracts*, 1929, 23, 4232).

Digorid

$\text{C}_{43}\text{H}_{66}\text{O}_{15}$

MW, 822

Glucoside from leaves of *Digitalis orientalis*. Two modifications.

A.

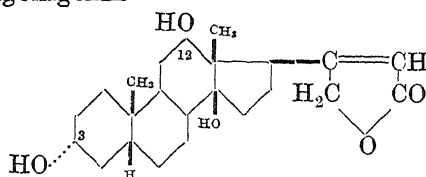
Needles from EtOH- CHCl_3 . M.p. 240° decomp. Sol. CHCl_3 , AcOEt, EtOH. $[\alpha]_D^{20} + 30.4^\circ$ in EtOH. H_2O , MeOH, HCl \rightarrow digoxigenin.

B.

Prisms from MeOH- CHCl_3 . M.p. 225° decomp. Sol. CHCl_3 . Insol. AcOEt. $[\alpha]_D^{20} + 18.9^\circ$ in Py. H_2O , MeOH, HCl \rightarrow digoxigenin.

Mannich, Schneider, *Arch. Pharm.*, 1941, 279, 223.

Digoxigenin



$\text{C}_{23}\text{H}_{34}\text{O}_5$

MW, 390

Cardiac aglycone. Prisms from AcOEt. M.p. 222° corr. Prisms + H_2O from EtOH.Aq. $[\alpha]_D^{20} + 27.0^\circ$ in MeOH. Reduces $\text{NH}_3 \cdot \text{AgNO}_3$. Loses H_2O on heating with dil. min. acid \rightarrow anhydrodigoxigenin.

3:12-Diacetyl: prisms from MeOH.Aq. M.p. 222-3° corr. $[\alpha]_D^{20} + 61.3^\circ$ in MeOH.

3-β-d-Glucoside: cryst. M.p. 268° decomp. $[\alpha]_D^{20} - 1.4^\circ$ in 95% EtOH. *Tetra-acetyl deriv.*: m.p. 194-9°. $[\alpha]_D^{20} - 3.3^\circ$ in 95% EtOH.

Smith, *J. Chem. Soc.*, 1930, 508, 2478; 1935, 1305.

Tschesche, Bohle, *Ber.*, 1936, 69, 793, 2497.

Steiger, Reichstein, *Helv. Chim. Acta*, 1938, 21, 828.

Mason, Hoehn, *J. Am. Chem. Soc.*, 1939, 61, 1614; 1938, 60, 2824.

Elderfield, Uhle, Fried, *J. Am. Chem. Soc.*, 1947, 69, 2235.

Digoxin

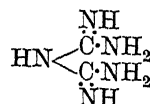
$\text{C}_{41}\text{H}_{64}\text{O}_{14}$

MW, 780

Secondary glycoside from *Digitalis lanata*. Cryst. from EtOH.Aq. or Py.Aq. M.p. 265° decomp. Insol. Me_2CO , AcOEt, CHCl_3 . $[\alpha]_D^{20} + 13.3^\circ$ in Py. Hyd. \rightarrow digitoxose + digoxigenin.

Smith, *J. Chem. Soc.*, 1930, 508.

Diguanide (*Biguanide, guanylguanidine*)



$\text{C}_2\text{H}_7\text{N}_5$

MW, 101

Prisms from EtOH. M.p. 130°. Sol. H_2O , EtOH. Aq. sol. reacts strongly alkaline and

slowly decomposes. Forms characteristic red Cu deriv.

B.HCl: needles. M.p. 235°.

B.2HCl: plates. M.p. 248°.

B.HNO₃: prisms. M.p. 192°.

B.CH₃COOH: m.p. 268°.

B.(COOH)₂: m.p. 210°.

Rackmann, *Ann.*, 1910, **376**, 169.

1 : 4-Diguanidinobutane.

See Arcaine.

Diguanidinodecane.

See Synthalin.

Di-hemimellityl.

See 3 : 4 : 5 : 3' : 4' : 5'-Hexamethyldiphenyl.

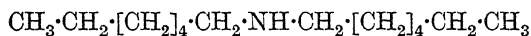
Diheptadecenyl Ketone.

See Oleone.

Diheptadecyl Ketone.

See Stearone.

Di-*n*-heptylamine



$\text{C}_{14}\text{H}_{31}\text{N}$ MW, 213

M.p. 1°. B.p. 271°, 130–40°/10 mm. Spar. sol. H_2O .

Trihydrate: m.p. 32–3°.

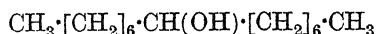
Picrate: m.p. 117–20°.

Wojeik, Adkins, *J. Am. Chem. Soc.*, 1934, **56**, 2419.

Sabatier, Mailhe, *Ann. chim. phys.*, 1909, **16**, 102.

King, Work, *J. Chem. Soc.*, 1940, 1314.

Di-*n*-heptylcarbinol (*Pentadecanol-8*)



$\text{C}_{15}\text{H}_{32}\text{O}$ MW, 228

Plates from EtOH.Aq. M.p. 49.5–50°.

Kipping, *J. Chem. Soc.*, 1893, **63**, 455.

Di-*n*-heptyl Ketone.

See Caprylone.

Di-*n*-hexylamine



$\text{C}_{12}\text{H}_{27}\text{N}$ MW, 185

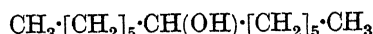
B.p. 109–115°/12 mm. Forms cryst. hydrochloride, spar. sol. H_2O .

m-Nitrobenzenesulphonyl: m.p. 119–20°.

Rupe, Glenz, *Helv. Chim. Acta*, 1922, **5**, 939.

Borrows *et al.*, *J. Chem. Soc.*, 1947, 197.

Di-*n*-hexylcarbinol (*7-Hydroxytridecane, tridecanol-7*)



$\text{C}_{13}\text{H}_{28}\text{O}$ MW, 200 $\text{C}_7\text{H}_{16}\text{O}$

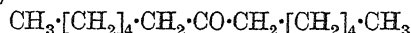
Plates from ligroin. M.p. 41–2°.

α -Naphthylurethane: needles from MeOH. M.p. 51°.

Kipping, *J. Chem. Soc.*, 1890, **57**, 536.

Tischer, *Ber.*, 1939, **72**, 297.

Di-*n*-hexyl Ketone (*Enanthone, tridecanone-7*)



$\text{C}_{13}\text{H}_{26}\text{O}$ MW, 198

Cryst. from EtOH in leaflets. M.p. 33°. B.p. 255°/766 mm. (264°). Sol. EtOH, Et_2O , CHCl_3 , ligroin. D^{20} 0.825.

p-Nitrophenylhydrazones: chocolate red needles. M.p. 97°.

Pickard, Kenyon, *J. Chem. Soc.*, 1912, **101**, 629.

ms-Dihydroacridine.

See Acridan.

Dihydroalliin (β -Propylsulphenylalanine, S-propylcysteine S-oxide)



$\text{C}_6\text{H}_{13}\text{O}_3\text{NS}$ MW, 179

Cryst. M.p. 164–8°. $[\alpha]_D^{25} + 33.0^\circ$ in H_2O .

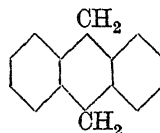
Anilinoformyl deriv.: m.p. 157–158.5°. $[\alpha]_D^{25} + 44.0^\circ$ in MeOH.

Stoll, Seebeck, *Helv. Chim. Acta*, 1948, **31**, 189.

Dihydroambrettolide.

See under Juniperic Acid.

9 : 10-Dihydroanthracene (*Anthracene 9 : 10-dihydride*)



$\text{C}_{14}\text{H}_{12}$ MW, 180

Prisms. M.p. 108°. B.p. 305°, 165–70°/13 mm. Sol. EtOH, Et_2O , C_6H_6 . Sublimes. Volatile in steam. D_4^{25} 0.8976. Sols. fluoresce blue. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ anthracene. $\text{CrO}_3 \rightarrow$ anthraquinone. Forms no picrate.

Maleic anhydride add. comp.: m.p. 258–61°.

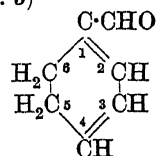
Clemmensen, *Ber.*, 1914, **47**, 684.

Clar, *Chem. Abstracts*, 1947, **41**, 6554.

Dihydrobenzacridine-14-carboxylic Acid.

See Tetrophane.

$\Delta^{1,3}$ -Dihydrobenzaldehyde (*1-Aldehydocyclohexadiene-1 : 3*)



$\text{C}_7\text{H}_8\text{O}$ MW, 108

B.p. 171°/744 mm. decomp., 121–2°/120 mm., 70°/14 mm. Spar. sol. H₂O. D⁰ 1.0327. Reduces warm Fehling's. KMnO₄ → benzoic acid. Dil. HNO₃ → benzaldehyde.

Oxime: leaflets from pet. ether. M.p. 43–4° (39°).

Semicarbazone: cryst. from EtOH.Aq. M.p. 182°.

Eichengrün, Einhorn, *Ber.*, 1890, 23, 2880.

Langenbeck *et al.*, *Ber.*, 1942, 75, 232.

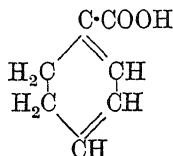
Dihydrobenzene.

See Cyclohexadiene.

Dihydrobenzofuran.

See Coumaran.

Δ^{1,3}-Dihydrobenzoic Acid (1:3-Cyclohexadiene-1-carboxylic acid)



C₇H₈O₂

MW, 124

Cryst. from EtOH.Aq. M.p. 94–5°. Sol. EtOH, hot H₂O. Volatile in steam. Reduces NH₃.AgNO₃.

Amide: C₇H₉ON. MW, 123. Needles from Et₂O. M.p. 105°. Sol. H₂O.

Einhorn, *Ber.*, 1893, 26, 454.

Dihydrobenzpyran.

See Chroman.

Dihydrobenzthiopyran.

See Thiochroman.

Dihydrobilirubin.

See Biliverdin.

Dihydrocaffeic Acid.

See 3:4-Dihydroxyhydrocinnamic Acid.

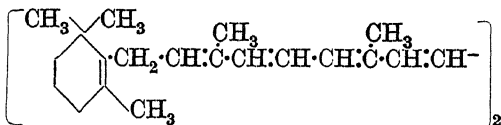
Dihydrocamphene.

See Isocamphane.

Dihydro-α-campholytic Acid.

See Lauronic Acid.

Dihydro-β-carotene



C₄₀H₅₈

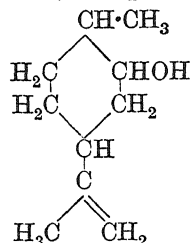
MW, 538

Glistening salmon red leaflets from pet. ether. M.p. 182°. Absorption maxima in CS₂ at 461 and 432 mμ. No vitamin A activity.

Karrer, Rügger, *Helv. Chim. Acta*, 1940, 23, 955.

Inhoffen, Pommer, Meth, *Ann.*, 1951, 572, 151.

Dihydrocarveol (Δ⁸⁽⁹⁾-p-Menthenol-2)



C₁₀H₁₈O

MW, 154

d-.

Viscous liq. with pleasant odour. B.p. 106.8–107.2°/15 mm. D₄¹⁶ 0.9223. *n*_D¹⁶ 1.4784. [α]_D¹⁶ + 34.2°.

p-Nitrobenzoyl: plates. M.p. 37°. [α]_D + 52.5° in CHCl₃.

3:5-Dinitrobenzoyl: m.p. 121.5–122°. [α]_D + 55.2° in CHCl₃.

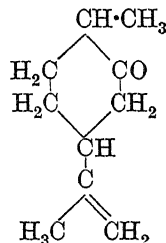
l-.

Occurs in caraway oil. B.p. 100–2°/7–8 mm. D₁₅¹⁵ 0.9368. *n*_D²⁰ 1.48364. [α]_D –6.25°.

Johnston, Read, *J. Chem. Soc.*, 1934, 236.

Wallach, Kruse, Kerkhoff, *Ann.*, 1893, 275, 111.

Dihydrocarvone (Δ⁸⁽⁹⁾-p-Menthenone-2)



C₁₀H₁₆O

MW, 152

l-.

B.p. 220–1°, 104°/18 mm., 75°/3 mm. D₂₅²⁵ 0.9253. *n*_D¹⁹ 1.47174. [α]_D –19° (–16°). Hot FeCl₃.Aq. → carvacrol. Heat, conc. H₂SO₄, or formic acid → carvenone.

Oxime: m.p. 88–9°. [α]_D²⁰ –9.25°.

Semicarbazone: m.p. 201–2°.

d-.

B.p. 221–2°. D₁₆¹⁶ 0.9308. *n*_D 1.47243. [α]_D + 17.5°.

Oxime: [α]_D²⁰ + 9.45°.

dl-.

Oxime: m.p. 115–16°.

Wallach, Kruse, Kerkhoff, *Ann.*, 1893, 275, 115.

Dihydrocarvone Hydrate.

See 8-p-Menthanolone-2.

Dihydrocatechol.

See Cyclohexandione-1:2.

Dihydrocholesterol.

See Cholesterol.

Dihydrocivetone.

See Cycloheptadecanone.

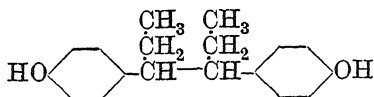
Dihydrocoumarone.

See Coumaran.

Dihydrocryptopine.

See under Cryptopine.

Dihydrodiethylstilboestrol (3 : 4-Di-[*p*-hydroxyphenyl]-hexane, 4 : 4'-dihydroxy- α : β -diethyldiphenylethane)

 $C_{18}H_{22}O_2$

MW, 270

Meso (Hexoestrol)-.

Needles from C_6H_6 . M.p. 185–6°. Potency similar to that of oestrone and oestradiol.

Di-Me ether: plates from $Me_2CO-MeOH$. M.p. 146°.

Diacetyl: m.p. 139°.

Dipropionyl: cryst. from pet. ether. M.p. 127–8°.

Dibutyryl: cryst. from pet. ether. M.p. 106–7°.

Dicaproyl: cryst. from pet. ether. M.p. 96–7°.

Disuccinyl: cryst. from $CHCl_3$ -pet. ether. M.p. 150–3°.

Dibenzoyl: cryst. from C_6H_6 . M.p. 236–7°.

dl-.

Cryst. from C_6H_6 -pet. ether. M.p. 128°. Potent only in massive doses.

Di-Me ether: m.p. 56°.

d-.

M.p. 80°. $[\alpha]_D^{25}$ 17.6° in 5% EtOH. More potent than the *dl*-. form.

l-.

M.p. 80°. $[\alpha]_D^{25}$ –17.6° in 5% EtOH. Less potent than the *dl*-. form.

Dodds, Goldberg, Lawson, Robinson, *Proc. Roy. Soc.*, 1939, B, 127, 153.

Bernstein, Wallis, *J. Am. Chem. Soc.*, 1940, 62, 2871.

Docken, Spielman, *J. Am. Chem. Soc.*, 1940, 62, 2163.

Carlisle, Crowfoot, *J. Chem. Soc.*, 1941, 6.

Campbell, Dodds, Lawson, Noble, *Lancet*, 1939, 237, II, 312.

S.C.I., B.P. 532,260, (*Brit. Chem. Abstracts*, 1941, III, 108).

Foreman, Miller, *J. Am. Chem. Soc.*, 1941, 63, 2240.

Wessely, Welleba, *Ber.*, 1941, 74, 777.

Jones, *Annual Reports of the Chemical Society (London)*, 1943, 40, 140 (*Bibl.*).

Solmsen, *Chem. Reviews*, 1945, 37, 481 (*Bibl.*).

Burckhalter, Sam, *J. Am. Chem. Soc.*, 1952, 74, 187.

Dihydrodioxole.

See 1 : 3-Dioxolan.

Dihydro- α -elemolic Acid.

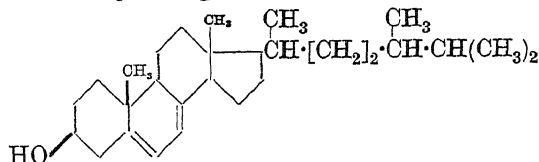
See Elemenolic Acid.

Dihydro- β -elemonic Acid.

See Elemenonic Acid.

7 : 8-Dihydroergosterol.

See Brassicasterol.

22-Dihydroergosterol $C_{28}H_{46}O$

MW, 398

Needles + H_2O from $AcOEt-MeOH$. M.p. 152–3°. $[\alpha]_D^{25}$ –109° in $CHCl_3$. Absorption spectrum and colour reactions similar to ergosterol. Irradiation \rightarrow vitamin D_4 .

Acetyl: plates from $Et_2O-EtOH$ or $AcOEt-EtOH$. M.p. 157–8°. $[\alpha]_D^{25}$ –75° in $CHCl_3$.

Windaus, Langer, *Ann.*, 1934, 508, 105.

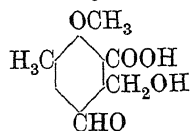
Windaus, Güntzel, *Ann.*, 1939, 538, 120.

Dihydroeugenol.

See Cœrulignol.

Dihydrofisetin.

See Fustin.

Dihydrogladiolic Acid (2-Methoxy-3-methyl-6-hydroxymethyl-5-aldehydobenzoic acid) $C_{11}H_{12}O_5$

MW, 224

Metabolic product of *Penicillium gladioli*. Colourless lustrous plates from $AcOEt-C_6H_6$. M.p. 135–6° decomp. Sol. H_2O , $AcOEt$, $EtOH$, Me_2CO . Spar. sol. Et_2O . Insol. C_6H_6 , light petroleum. Ox. \rightarrow gladiolic acid.

Me ester: $C_{12}H_{14}O_5$. MW, 238. Thick gum.

Lactone: dihydrogladiolide. $C_{11}H_{10}O_4$. MW, 206. Colourless needles. M.p. 172.5–173°.

Di-acetyl deriv.: needles. M.p. 70–70.5°. 2 : 4-Dinitrophenylhydrazones: orange prisms from $AcOEt$. M.p. above 320°.

Anil: plates. M.p. 161.5–162.5°.

Semicarbazone: cryst. + H_2O . M.p. 130° decomp.

2 : 4-Dinitrophenylhydrazones: m.p. above 360°.

Raistrick, Ross, *Biochem. J.*, 1952, 50,

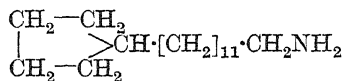
635.

Dihydrogranatenine.

See Granatanine.

Dihydroharmine.

See Harmaline.

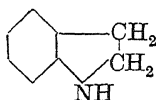
Dihydrohomohydnocarpylamine $\text{C}_{17}\text{H}_{35}\text{N}$

MW, 253

M.p. 13-5-15°. B.p. 187°/12 mm.

 B_2HCl : m.p. 122°.

N-Acetyl: m.p. 73°.

Naegeli, Stefanovitsch, *Helv. Chim. Acta*, 1928, 11, 648.Naegeli, Lendorff, *Helv. Chim. Acta*, 1932, 15, 73.**Dihydroindole (Indoline)** $\text{C}_8\text{H}_9\text{N}$

MW, 119

B.p. 228-30°, 70-5°/2 mm. Spar. sol. H_2O . D_4^{20} 1.069. n_D^{20} 1.5923. B_2HCl : needles. M.p. 219°.

N-Acetyl: needles from EtOH. M.p. 105°.

N-Benzoyl: m.p. 118°.

N-Benzenesulphonyl: m.p. 133°.

N-p-Toluenesulphonyl: prisms from EtOH.Aq. M.p. 99°.

N-Nitroso: m.p. 81-2°.

Picrate: m.p. 174°.

 $\text{B}_2\text{H}_2\text{PtCl}_6$: decomp. about 180°.Sugasawa, Satoda, Yanagisawa, *Chem. Zentr.*, 1938, II, 1410.Bennett, Hafez, *J. Chem. Soc.*, 1941, 287.Ferber, *Ber.*, 1929, 62, 189.**Dihydroisolaurelene.**

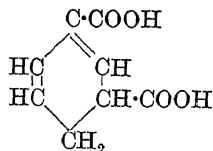
See 1 : 1 : 2-Trimethylcyclopentane.

Dihydroisophorol.

See 3 : 3 : 5-Trimethylcyclohexanol.

Dihydroisophorone.

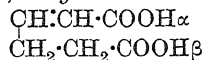
See 3 : 3 : 5-Trimethylcyclohexanone.

 $\Delta^{1,5}$ -Dihydroisophthalic Acid (1 : 5-Cyclohexadiene-1 : 3-dicarboxylic acid) $\text{C}_8\text{H}_8\text{O}_4$

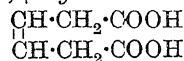
MW, 168

Cryst. from H_2O . M.p. 255°. Sol. EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 .Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 310.**Dihydrolaurelene.**

See 1 : 2 : 3-Trimethylcyclopentane.

 Δ^1 -Dihydromuconic Acid (1-Butylene-1 : 4-dicarboxylic acid, α -hydromuconic acid) $\text{C}_6\text{H}_8\text{O}_4$

MW, 144

Cis-.Cryst. from C_6H_6 . M.p. 81°.*Trans*-.Prisms from H_2O . M.p. 191°. β -Me ester: $\text{C}_7\text{H}_{10}\text{O}_4$. MW, 158. Plates from pet. ether. M.p. 60°. Di-Me ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 127°/14 mm.Farmer, Hughes, *J. Chem. Soc.*, 1934, 1938. Δ^2 -Dihydromuconic Acid (2-Butylene-1 : 4-dicarboxylic acid, β -hydromuconic acid) $\text{C}_6\text{H}_8\text{O}_4$

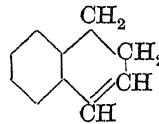
MW, 144

Prisms from H_2O . M.p. 195°. Sol. EtOH, hot H_2O . Spar. sol. Et_2O . $k = 1.02 \times 10^{-4}$ at 25°. Alk. $\text{KMnO}_4 \rightarrow$ malonic acid. $\text{NaHg} \rightarrow$ adipic acid. Less stable than Δ^1 -dihydromuconic acid into which it is converted by dil. NaOH . Di-Me ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. Needles. M.p. 5°. B.p. 260°/255 mm. Di-Et ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 163°/35 mm. Diamide : $\text{C}_6\text{H}_{10}\text{O}_2\text{N}_2$. MW, 142. Needles. M.p. 210° decomp. Sol. H_2O .Ruhemann, Elliott, *J. Chem. Soc.*, 1890, 57, 936.Neunhoeffer, *Ber.*, 1935, 68, 1778.Farmer, *J. Chem. Soc.*, 1923, 123, 2541.**Dihydromyrcene.**

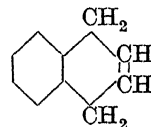
See 2 : 6-Dimethyl-2 : 6-octadiene.

Dihydromyrtanol.

See Myrtanol.

1 : 2-Dihydronaphthalene (Δ^1 -Dihydronaphthalene, naphthalene-1 : 2-dihydride) $\text{C}_{10}\text{H}_{10}$

MW, 130

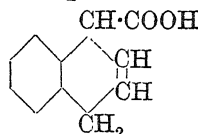
Leaflets. M.p. -8 to -7°. B.p. 84-5°/12 mm. D_4^{20} 0.9974. $n_D^{18.2}$ 1.58317.Straus, Lemmel, *Ber.*, 1921, 54, 32.1 : 4-Dihydronaphthalene (Δ^2 -Dihydronaphthalene, naphthalene-1 : 4-dihydride) $\text{C}_{10}\text{H}_{10}$

MW, 130

Plates. M.p. 24.5–25°. B.p. 94.5°/17 mm. D_4^{27} 0.9928. n_D^{27} 1.55489. Volatile in steam. Red heat \rightarrow naphthalene. Forms no picrate.

Straus, Lemmel, *Ber.*, 1913, 46, 236.

1 : 4-Dihydro-1-naphthoic Acid



$C_{11}H_{10}O_2$

MW, 174

d-.
Needles from pet. ether. M.p. 103°. $[\alpha]_D$ + 212.9° in $CHCl_3$, + 177.98° in C_6H_6 .

l-.
Needles from pet. ether. M.p. 103°. $[\alpha]_D$ - 212.55° in $CHCl_3$.

dl-.
Needles or plates from ligroin. M.p. 91° (86.5°). Sol. EtOH, Et₂O, CS₂. Spar. sol. C₆H₆, ligroin. $k = 1.14 \times 10^{-4}$ at 25°. Alkalis \rightarrow 3 : 4-dihydro-1-naphthoic acid.

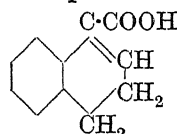
Et ester: $C_{13}H_{14}O_2$. MW, 202. B.p. 166–7°/17 mm. $D_4^{19.6}$ 1.0897. $n_a^{19.6}$ 1.53057.

l-Menthyl ester: prisms from AcOEt. M.p. 89°. $[\alpha]_D^{20}$ + 92.85° in AcOEt, + 89.60° in EtOH.

Auwers, Moller, *J. prakt. Chem.*, 1925, 109, 124.

Pickard, Yates, *J. Chem. Soc.*, 1906, 89, 1487.

3 : 4-Dihydro-1-naphthoic Acid



$C_{11}H_{10}O_2$

MW, 174

Needles from H₂O or AcOEt. M.p. 125° (120–1°). B.p. 305–6°/748 mm. $k = 7.8 \times 10^{-5}$ at 25°.

Et ester: b.p. 185–6°/17 mm. (170–2°/19 mm.). D_4^{20} 1.102. n_D^{25} 1.5561.

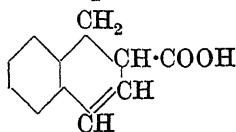
l-Menthyl ester: b.p. 226–7.5°. $[\alpha]_D^{20}$ - 69.2° in EtOH.

Fieser, Holmes, *J. Am. Chem. Soc.*, 1936, 58, 2321.

Auwers, Moller, *J. prakt. Chem.*, 1925, 217, 144.

Baeyer, Schoder, *Ann.*, 1891, 266, 180.

1 : 2-Dihydro-2-naphthoic Acid



$C_{11}H_{10}O_2$

MW, 174

d-.
Cryst. from H₂O. M.p. 101°. $[\alpha]_D$ + 158.71° in $CHCl_3$.

dl-.
Prisms or needles from H₂O. M.p. 105–6° (101.5°). $k = 5.7 \times 10^{-5}$ at 25°. Boiling aq. NaOH \rightarrow 1 : 4-dihydro-2-naphthoic acid. Alk. $K_3Fe(CN)_6 \rightarrow$ 2-naphthoic acid.

Et ester: b.p. 152–3°/12 mm. D_4^{20} 1.085. $n_a^{18.2}$ 1.54587.

l-Menthyl ester: $[\alpha]_D^{20}$ - 53.1° in C_6H_6 .

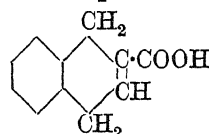
Amide: $C_{11}H_{11}ON$. MW, 173. M.p. 140–50°.

Auwers, Moller, *J. prakt. Chem.*, 1925, 109, 124.

Derick, Kamm, *J. Am. Chem. Soc.*, 1916, 38, 400.

Baeyer, Besemfelder, *Ann.*, 1891, 266, 188.

1 : 4-Dihydro-2-naphthoic Acid



$C_{11}H_{10}O_2$

MW, 174

Plates from EtOH.Aq. or C₆H₆. M.p. 162–3°. Sol. EtOH, Et₂O. Spar. sol. C₆H₆, ligroin, CS₂. $k = 2.5 \times 10^{-5}$ at 25°.

Et ester: b.p. 163°/12 mm. D_4^{20} 1.202. $n_a^{16.2}$ 1.54880.

l-Menthyl ester: b.p. 218°/10.5 mm. $[\alpha]_D^{20}$ - 41.4° in C₆H₆.

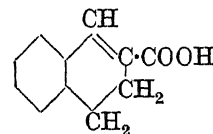
Amide: m.p. 168°.

Auwers, Moller, *J. prakt. Chem.*, 1925, 109, 124.

Baeyer, Besemfelder, *Ann.*, 1891, 266, 192.

Derick, Kamm, *J. Am. Chem. Soc.*, 1916, 38, 400.

3 : 4-Dihydro-2-naphthoic Acid



$C_{11}H_{10}O_2$

MW, 174

Cryst. from MeOH.Aq. M.p. 120°. $k = 2.9 \times 10^{-5}$ at 25°.

Et ester: b.p. 159–60°/12 mm. D_4^{20} 1.093. n_a^{18} 1.57134.

Amide: m.p. 155°.

Auwers, Moller, *J. prakt. Chem.*, 1925, 109, 124.

Derick, Kamm, *J. Am. Chem. Soc.*, 1916, 38, 400.

Dihydro-ocimene.

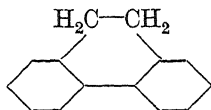
See 2 : 6-Dimethyl-2 : 6-octadiene.

Dihydropenicillin-I.

See Amylpenicillin.

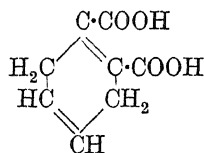
Dihydropenicillin-F.

See Amylpenicillin.

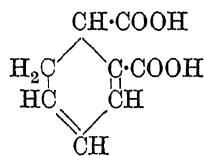
9 : 10 - Dihydrophenanthrene (*Phenanthrene 9 : 10-dihydrate, phenanthrene*) $C_{14}H_{12}$

MW, 180

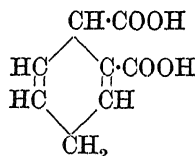
Needles from MeOH. M.p. 34.5–35°. B.p. 168–9°/15 mm. Forms no picrate.

Schroeter, Müller, Huang, *Ber.*, 1929, 62, 649.Durland, Adkins, *J. Am. Chem. Soc.*, 1937, 59, 136. **$\Delta^{1,4}$ -Dihydrophthalic Acid** (1 : 4-Cyclohexadiene-1 : 2-dicarboxylic acid) $C_8H_8O_4$

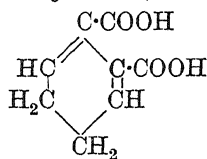
MW, 168

Prisms from H_2O . M.p. 153°. Mod. sol. hot H_2O . Slowly converted to anhydride at temps. above 100°. $MnO_2 + H_2SO_4 \rightarrow$ phthalic acid.*Anhydride*: $C_8H_6O_3$. MW, 150. Leaflets. M.p. 147°. B.p. 135°/0.001 mm.Alder, Backendorf, *Ber.*, 1938, 71, 2205.Flaig, *Chem. Abstracts*, 1947, 41, 6192. **$\Delta^{2,4}$ -Dihydrophthalic Acid** (1 : 3-Cyclohexadiene-1 : 6-dicarboxylic acid) $C_8H_8O_4$

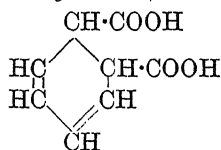
MW, 168

Prisms from H_2O or EtOH. M.p. 179–80°. $k = 1.55 \times 10^{-4}$ at 25°.*Anhydride*: cubes from $CHCl_3$. M.p. 102–4°.Baeyer, *Ann.*, 1892, 269, 139.Flaig, *Chem. Abstracts*, 1947, 41, 6192. **$\Delta^{2,5}$ -Dihydrophthalic Acid** (1 : 4-Cyclohexadiene-1 : 6-dicarboxylic acid) $C_8H_8O_4$

MW, 168

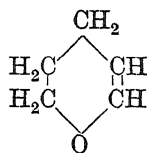
Anhydride: plates from C_6H_6 -pet. ether. M.p. 73–4°.Abati, *Chem. Zentr.*, 1907, I, 886. **$\Delta^{2,6}$ -Dihydrophthalic Acid** (1 : 3-Cyclohexadiene-2 : 3-dicarboxylic acid) $C_8H_8O_4$

MW, 168

Cryst. M.p. 215° (rapid heat.). Mod. sol. hot H_2O . Heat of comb. 843.1 Cal. k (first) = 1.65×10^{-4} at 25°; (second) = 1.2×10^{-6} at 100°. $KMnO_4 \rightarrow$ phthalic acid. $MnO_2 + H_2SO_4 \rightarrow$ benzoic acid.*Mono-Me ester*: $C_9H_{10}O_4$. MW, 182. M.p. 125–6°.*Mono-Et ester*: $C_{10}H_{12}O_4$. MW, 196. M.p. 121–2°.*Anhydride*: plates or prisms. M.p. 83–4°. Spar. sol. Et_2O .Baeyer, *Ann.*, 1892, 269, 194. **$\Delta^{3,5}$ -Dihydrophthalic Acid** (1 : 3-Cyclohexadiene-5 : 6-dicarboxylic acid) $C_8H_8O_4$

MW, 168

Cis-.Monoclinic prisms from H_2O . M.p. 173–5°. Sol. EtOH, Et_2O . Spar. sol. cold H_2O . $Ac_2O \rightarrow$ anhydride. Reduces $NH_3 \cdot AgNO_3$.*Anhydride*: needles from $CHCl_3$ - Et_2O . M.p. 99–100°.*Trans-*.*d-*.Needles from H_2O . M.p. 121°. Sol. EtOH, Et_2O , $CHCl_3$. $[\alpha]_D + 125.49^\circ$ in EtOH.*l-*.Needles from H_2O . M.p. 122°. Sol. Et_2O , $CHCl_3$. $[\alpha]_D - 126.24^\circ$ in EtOH.*dl-*.Prisms from H_2O . M.p. 210°. Sol. Et_2O . Mod. sol. hot H_2O . $k = 2.46 \times 10^{-4}$ at 25°. Reduces $NH_3 \cdot AgNO_3$.Baeyer, *Ann.*, 1892, 269, 189.Neville, *J. Chem. Soc.*, 1906, 89, 1746.Pasquinelli, *Chem. Abstracts*, 1944, 38, 5734.**Dihydropinol Hydrate.**See under *p*-Menthandiol-2 : 8.

Dihydropyran C_5H_8O

MW, 84

B.p. 86–7°. D_{15}^{20} 0.922. n_D^{20} 1.4402.Paul, *Compt. rend.*, 1933, 196, 1409; *Bull. soc. chim.*, 1933, 53, 1489.**Dihydropyrazole.**

See Pyrazoline.

Dihydropyrrole.

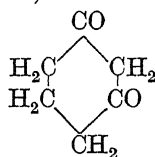
See Pyrroline.

Dihydro- α -quinolone.

See Hydrocarbostyryl.

Di-hydroquinone.

See 2 : 5 : 2' : 5'-Tetrahydroxydiphenyl.

Dihydroresorcinol (1 : 3-Diketohexamethylene, cyclohexandione-1:3, 1:3-diketocyclohexane, cyclohexenolone-1:3) $C_6H_8O_2$

MW, 112

Prisms from C_6H_6 or $AcOEt$. M.p. 105–6°. Sol. H_2O , $EtOH$, Me_2CO , $CHCl_3$. Spar. sol. CS_2 , Et_2O , cold C_6H_6 . Non-volatile in steam. Enolises, the hydroxy form reacting as a monobasic acid, $k = 0.55 \times 10^{-5}$ at 25°. Reduces $AgNO_3$ but not Fehling's.**Dioxime**: m.p. anhyd. 155–6°. Reduces Fehling's.**Monophenylhydrazone**: needles from $EtOH$. Aq. M.p. 176–7°.Merling, *Ann.*, 1894, 278, 28.Schilling, Vorländer, *Ann.*, 1899, 308, 190.Klingenfuss, *Chem. Zentr.*, 1937, II, 220.**Dihydrosantonin.**

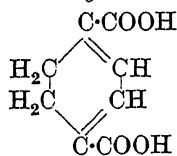
See Santonene.

Dihydrosilveterpineol.See *m*-Menthanol-8.**Dihydroskatole.**

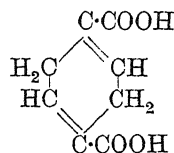
See 3-Methyldihydroindole.

Dihydrosobrerol.See under *p*-Menthandiol-2 : 8.**Dihydrostilbazole.**

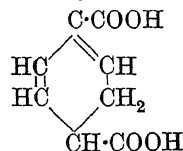
See Phenylethylpyridine.

 $\Delta^{1,3}$ -Dihydroterephthalic Acid (1 : 3-Cyclohexadiene-1 : 4-dicarboxylic acid) $C_8H_8O_4$

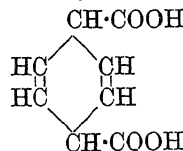
MW, 168

Spar. sol. H_2O .**Di-Me ester**: $C_{10}H_{12}O_4$. MW, 196. M.p. 85°.**Di-phenyl ester**: $C_{20}H_{16}O_4$. MW, 320. Needles from $MeOH$. M.p. 175°.Baeyer, *Ann.*, 1889, 251, 301. **$\Delta^{1,4}$ -Dihydroterephthalic Acid** (1 : 4-Cyclohexadiene-1 : 4-dicarboxylic acid) $C_8H_8O_4$

MW, 168

Needles from H_2O . Sublimes on heating without melting and with partial conversion to terephthalic acid. Spar. sol. H_2O . Heat of comb. 836.1 Cal. $K_3Fe(CN)_6 \rightarrow$ terephthalic acid.**Mono-Me ester**: $C_9H_{10}O_4$. MW, 182. Needles from $EtOH$. M.p. 225°.**Di-Me ester**: $C_{10}H_{12}O_4$. MW, 196. M.p. 130°. Sol. $CHCl_3$, Et_2O , $AcOH$. Sublimes.**Mono-Et ester**: $C_{10}H_{12}O_4$. MW, 196. Needles from $EtOH$. M.p. 178–9°.**Di-phenyl ester**: m.p. 191°.**Di-l-menthyl ester**: needles from $EtOH$. M.p. 68°. $[\alpha]_D^{20} = 104.6^\circ$.Levy, Curchod, *Ber.*, 1889, 22, 2112. **$\Delta^{1,5}$ -Dihydroterephthalic Acid** (1 : 3-Cyclohexadiene-2 : 5-dicarboxylic acid) $C_8H_8O_4$

MW, 168

Cryst. from H_2O . Decomp. on heating. Spar. sol. hot H_2O . Reduces $NH_3 \cdot AgNO_3$.Baeyer, *Ann.*, 1889, 251, 298. **$\Delta^{2,5}$ -Dihydroterephthalic Acid** (1 : 4-Cyclohexadiene-3 : 6-dicarboxylic acid) $C_8H_8O_4$

MW, 168

Cis-Melts and decomposes to terephthalic acid on rapid heating. Sol. hot H_2O . Reduces $AgNO_3$. Alk. $KMnO_4 \rightarrow$ terephthalic acid.**Trans-**Prisms from $AcOEt$. Melts and decomposes

to terephthalic acid on rapid heating. Sol. hot H_2O . Heat of comb. 845.4 Cal. Alk. $\text{KMnO}_4 \rightarrow$ terephthalic acid.

Di-Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. Prisms from ligroin. M.p. 77° .

Di-phenyl ester: $\text{C}_{20}\text{H}_{16}\text{O}_4$. MW, 320. M.p. 146° .

Baeyer, *Ann.*, 1889, 251, 293.

Dihydro- α -terpineol.

See *p*-Menthanol-8.

Dihydroterpinolene.

See $\Delta^{4(8)}$ -*p*-Menthene.

Dihydrotestosterone.

See Androstane-17 β -ol-3-one.

epi-Dihydrotestosterone.

See Androstane-17 α -ol-3-one.

Dihydrothiazole.

See Thiazoline.

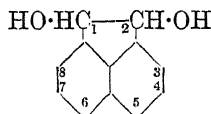
Dihydrotoluene.

See Methylcyclohexadiene.

Dihydrotropilidene.

See $\Delta^{1,3}$ -Cycloheptadiene.

1 : 2-Dihydroxyacenaphthene (Acenaphthylene glycol)



$\text{C}_{12}\text{H}_{10}\text{O}_2$

MW, 186

Cis.

Silky needles from H_2O or MeOH. M.p. $212-13^\circ$. *Cis*- or *trans*- with $\text{KMnO}_4 \rightarrow$ naphthalic acid. Rapidly oxidised by $\text{Pb}(\text{OAc})_4$.

Mono-acetyl: needles from EtOH. M.p. $122-3^\circ$.

Diacetyl: yellow cryst. from MeOH. M.p. 130° .

Di-l-menthoxyacetyl: cryst. from pet. ether. M.p. $40-2^\circ$. $[\alpha]_{\text{D}}^{20} - 114.8^\circ$ in C_6H_6 .

Trans.

dl.

Cryst. from H_2O . M.p. 159.5° . More sol. H_2O than *cis*- form.

d.

Needles from H_2O . M.p. $158-158.5^\circ$. $[\alpha]_{\text{D}}^{20} + 66^\circ$ in C_6H_6 , $+ 52^\circ$ in CHCl_3 , 0° in MeOH and EtOH, $- 25^\circ$ in Me_2CO , $- 76^\circ$ in PhNO_2 .

Di-l-menthoxyacetyl: needles. M.p. $114-5^\circ$. $[\alpha]_{\text{D}}^{20} - 327.3^\circ$ in C_6H_6 .

Monti, *Gazz. chim. ital.*, 1938, 68, 608.

Jack, Rule, *J. Chem. Soc.*, 1938, 191.

5 : 6-Dihydroxyacenaphthene.

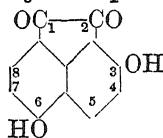
Cryst. from C_6H_6 . M.p. $196-9^\circ$. Sol. MeOH, C_6H_6 . Spar. sol. H_2O , ligroin. Readily oxidised.

Diacetyl: m.p. $194-5^\circ$.

I.G., D.R.P. 517,264, (*Chem. Zentr.*, 1931, II, 1758).

Criegee, *Ann.*, 1936, 522, 75.

3 : 6-Dihydroxyacenaphthenequinone



$\text{C}_{12}\text{H}_6\text{O}_4$

MW, 214

Di-Me ether: $\text{C}_{14}\text{H}_{10}\text{O}_4$. MW, 242. Yellow needles from AcOH. M.p. 227° . Quinoxaline deriv.: rods from AcOH. M.p. $196-7^\circ$.

Lesser, Gad, *Ber.*, 1927, 60, 244.

3 : 8-Dihydroxyacenaphthenequinone.

Di-Me ether: orange red powder from PhNO_2 . M.p. 279° . Monophenylhydrazone: orange red needles. M.p. 128° . Di-phenylhydrazone: red plates. M.p. $232-3^\circ$. Quinoxaline deriv.: yellow needles from xylene. M.p. 253° .

Lesser, Gad, *Ber.*, 1927, 60, 245.

Staudinger, Goldstein, Schlenker, *Helv. Chim. Acta*, 1921, 4, 356.

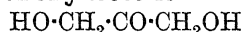
2 : 5-Dihydroxyacetanilide.

See under Aminohydroquinone.

2 : 4-Dihydroxy-5-acetobenzoic Acid.

See Resacetophenone-5-carboxylic Acid.

1 : 3-Dihydroxyacetone



$\text{C}_3\text{H}_6\text{O}_3$

MW, 90

Crystallises in form of dimeride $(\text{C}_3\text{H}_6\text{O}_3)_2$. M.p. about 80° . Sol. H_2O , hot EtOH, hot Et_2O , Me_2CO . Insol. ligroin. Reduces Fehling's. Red. \rightarrow glycerol. Forms bisulphite comp.

Diacetyl: needles from Et_2O -pet. ether. M.p. $46-7^\circ$. Sol. hot H_2O .

Dibenzoyl: needles from EtOH. M.p. 120° . *Di-p-nitrobenzoyl*: cryst. from toluene. M.p. 197.5° .

Di-Et acetal: cryst. from C_6H_6 . M.p. 90° . Sol. H_2O , EtOH, Et_2O , CHCl_3 .

Oxime: m.p. 84° . Sol. H_2O , EtOH. Spar. sol. Et_2O .

p-Nitrophenylhydrazone: cryst. from EtOH. M.p. 160° (156°).

2 : 4-Dinitrophenylhydrazone: m.p. $277-8^\circ$ decomp.

Benzoylhydrazone: cryst. from EtOH. M.p. 133° .

Bertrand, *Ann. chim.*, 1904, 3, 253.

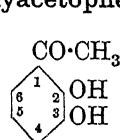
Butlin, *J. Soc. Chem. Ind.*, 1938, 57, 463T.

Otter, *Rec. trav. chim.*, 1937, 56, 474.

4 : ω -Dihydroxyacetophenone.

See *p*-Hydroxyphenacyl Alcohol.

2 : 3-Dihydroxyacetophenone (3-Aceto-catechol)



$\text{C}_8\text{H}_8\text{O}_3$

MW, 152

Dark yellow prisms from C_6H_6 -ligroin. M.p. 97–8°.

Diacetyl: leaflets from C_6H_6 . M.p. 109°.

Di-Me ether: $C_{10}H_{12}O_3$. MW, 180. B.p. 143–4°/14 mm. *Oxime*: m.p. 96–7°. *Semicarbazone*: prisms. M.p. 166–7°.

Krannichfeldt, *Ber.*, 1913, 46, 4017.

2 : 4-Dihydroxyacetophenone.

See Resacetophenone.

2 : 5-Dihydroxyacetophenone.

See Quinacetophenone.

2 : 6-Dihydroxyacetophenone (2-Aceto-resorcinol).

M.p. 155–6°.

Di-Me ether: m.p. 72–3°.

Me-Et ether: cryst. from H_2O . M.p. 86°.

Shamshurin, *Chem. Abstracts*, 1947, 41, 104.

Limaye, *Chem. Abstracts*, 1937, 31, 2182.

3 : 4-Dihydroxyacetophenone (Acetopyrocatechol, 4-acetocatechol).

Needles from H_2O . M.p. 116°.

3 : 4-Diacetyl: m.p. 91°.

3 : 4-Dibenzoyl: cryst. from EtOH. M.p. 118°.

Oxime: cryst. from AcOEt. M.p. 184° decomp.

3-Me ether: see Acetovanillone.

Di-Me ether: see Acetoveratrone.

Stephen, Weizmann, *J. Chem. Soc.*, 1914, 105, 1050.

Rosenmund, Lohfert, *Ber.*, 1928, 61, 2603.

3 : 5-Dihydroxyacetophenone (5-Acetosorcinol).

Cryst. from H_2O . M.p. 147–8°.

3 : 5-Diacetyl: needles from ligroin. M.p. 91–2°.

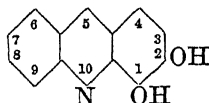
Semicarbazone: needles from EtOH. M.p. 205–6°.

p-Nitrophenylhydrazone: red needles from AcOH.Aq. M.p. 236–7°.

Di-Me ether: $C_{10}H_{12}O_3$. MW, 180. Needles from pet. ether. M.p. 42–3°. B.p. 151–2°/10 mm. *Semicarbazone*: needles from EtOH.Aq. M.p. 186–7°.

Mauthner, *J. prakt. Chem.*, 1927, 115, 275.

1 : 2-Dihydroxyacridine



$C_{13}H_9O_2N$

MW, 211

Di-Me ether: $C_{15}H_{13}O_2N$. MW, 239. M.p. 189°. *Picrate*: m.p. 220° decomp.

Graves, Hughes, Lions, *Brit. Chem. Abstracts*, 1939, II, 180.

1 : 4-Dihydroxyacridine.

Di-Me ether: pale yellow needles from EtOH.Aq. M.p. 130–1°.

Sherlin, Braz, Yakubovich, Vorob'eva, Rabinovich, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 895.

2 : 3-Dihydroxyacridine.

B, HCl, H_2O : yellow needles from EtOH-HCl. M.p. 235° decomp.

Di-Me ether: yellowish white needles + $1H_2O$ from EtOH.Aq. M.p. 107°.

Borsche, Runge, Trautner, *Ber.*, 1933, 66, 1318.

2 : 4-Dihydroxyacridine.

Dibenzoyl: needles from Me_2CO . M.p. 163°.

Eliasberg, Friedlaender, *Ber.*, 1892, 25, 1759.

Niementowski, *Ber.*, 1906, 39, 386.

2 : 8-Dihydroxyacridine.

Orange-ochre needles. Reddens at 275°. Does not melt below 300°. Sols. fluoresce.

Di-Me ether: m.p. 138–9°.

Di-Et ether: m.p. 142–3°.

Benda, Schmidt, U.S.P. 1,715,332, (*Chem. Abstracts*, 1929, 23, 3543).

Benda, *Ber.*, 1912, 45, 1794.

2 : 9-Dihydroxyacridine.

Di-Me ether hydrate: m.p. 64–6°.

Di-Et ether: needles from Me_2CO .Aq. M.p. 83°.

Lucius, Brüning, *Chem. Zentr.*, 1923, II, 1250.

3 : 7-Dihydroxyacridine.

Pale yellow needles from EtOH.Aq. M.p. 324°. Sol. EtOH, Me_2CO . Spar. sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 . Alc. sol. → green fluor.

Bogert, Hirschfelder, Laufer, *Chem. Zentr.*, 1930, II, 1703.

Linnell, Stuckey, *Quart. J. Pharm. Pharmacol.*, 1940, 13, 170.

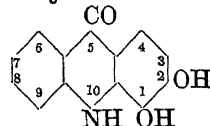
3 : 9-Dihydroxyacridine.

Light brown cryst. from EtOH. M.p. 190–2°. Darkens in air. Spar. sol. H_2O . Alc. sol. → blue fluor. Alk. sols. → green fluor.

9-Me:3-Et ether: yellow plates from H_2O . M.p. 144°.

Linnell, Stuckey, *Quart. J. Pharm. Pharmacol.*, 1940, 13, 167.

1 : 2-Dihydroxyacridone



$C_{13}H_9O_3N$

MW, 227

Di-Me ether: $C_{15}H_{13}O_3N$. MW, 255. M.p. 225°.

Graves, Hughes, Lions, *Brit. Chem. Abstracts*, 1939, II, 180.

1 : 4-Dihydroxyacridone.

Di-Me ether : yellow needles from EtOH.Aq. M.p. 222-3°.

Sherlin, Braz, Yakubovich, Vorob'eva, Rabinovich, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 895.

1 : 9-Dihydroxyacridone.

Di-Me ether : m.p. 274-5°.

Sherlin, Braz, Yakubovich, Vorob'eva, Rabinovich, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 895.

2 : 3-Dihydroxyacridone.

Di-Me ether : greenish yellow powder. Does not melt below 300°. Insol. most org. solvents.

Borsche, Runge, Trautner, *Ber.*, 1933, 66, 1317.

2 : 4-Dihydroxyacridone.

Yellow needles from Me₂CO-EtOH. M.p. 370°. Sol. Me₂CO, alkalis. Spar. sol. EtOH, AcOH, AcOEt, hot H₂O. Zn dust dist. → acridine.

Mono-Me ether : C₁₄H₁₁O₃N. MW, 241. (i) Dark brown cryst. M.p. 203°. (ii) Yellow leaflets. M.p. 252°.

Di-Me ether : green cryst. from EtOH. M.p. 286-7° decomp.

Monoacetyl deriv. : yellow cryst. from AcOEt. Softens at 195°. M.p. 200°.

Monobenzoyl deriv. : greenish yellow plates from EtOH. M.p. 295-7°.

Anil : yellow leaflets from EtOH-Me₂CO. M.p. 269-70°.

Baczyński, Niementowski, *Ber.*, 1905, 38, 3009.

2 : 8-Dihydroxyacridone.

Prac. colourless plates from EtOH or AcOH. Does not melt below 320°. Sol. conc. H₂SO₄ with blue fluor. Mod. sol. hot EtOH, AcOEt, Me₂CO. Spar. sol. PhNO₂. Insol. H₂O, C₆H₆, Et₂O.

Di-Me ether : needles or plates from AcOH. Does not melt below 320°.

Matsumura, *J. Am. Chem. Soc.*, 1929, 51, 818.

3 : 7-Dihydroxyacridone.

Yellow amorphous powder from EtOH.Aq. Does not melt below 350°. Alc. sol. → green fluor.

Linnell, Stuckey, *Quart. J. Pharm. Pharmacol.*, 1940, 13, 170.

3 : 9-Dihydroxyacridone.

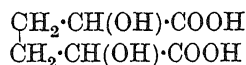
Pale yellow needles from EtOH.Aq. M.p. 275° (rapid heat), 265-70° decomp. Alc. sol. → blue fluor.

9-Me : 3-Et ether : orange yellow needles from EtOH.Aq. Alc. and CHCl₃ sols. → blue fluor.

Linnell, Stuckey, *Quart. J. Pharm. Pharmacol.*, 1940, 13, 167.

Dihydroxyacrolein.

See Reductone.

1 : 4-Dihydroxyadipic Acid

C₆H₁₀O₆

MW, 178

d.

Needles from Me₂CO-CHCl₃. M.p. 157° decomp. Sol. H₂O. Spar. sol. EtOH, Me₂CO. Insol. Et₂O. [α]_D²⁰ + 3.8° in H₂O.

Diacetyl : cryst. from Me₂CO-pet. ether. M.p. 159° decomp.

Diamide : C₆H₁₂O₄N₂. MW, 176. Cryst. from Py. M.p. 164°.

dl.

Plates from Me₂CO-CHCl₃. M.p. 146°. Sol. H₂O, EtOH. Spar. sol. Me₂CO. Insol. Et₂O, CHCl₃, C₆H₆.

Diamide : m.p. 177° decomp.

Dianilide : plates from EtOH. M.p. 186°.

Meso.

Plates from EtOH. M.p. 174°. Sol. H₂O, hot EtOH. Insol. Et₂O.

Di-Me ester : C₈H₁₄O₆. MW, 206. Needles from C₆H₆-pet. ether. M.p. 89°. *Di-Me ether* : cryst. from pet. ether. M.p. 53°.

Diamide : plates from H₂O. M.p. 242° decomp.

Dianilide : plates from EtOH. M.p. 216°.

Le Sueur, *J. Chem. Soc.*, 1908, 93, 719.

Freudenberg, Bruce, Gauf, *Ann.*, 1934, 510, 221.

Schmidt, Kraft, *Ber.*, 1941, 74, 33.

5 : 6-Dihydroxy-2-aldehydobenzoic Acid.

See Nor-opianic Acid.

3 : 5-Dihydroxy-4-aldehydbenzyl Alcohol.

See Barbatol.

3 : 5-Dihydroxy-4-aldehydo-o-toluic Acid.

See Hæmatommic Acid.

3 : 5-Dihydroxy-6-aldehydo-o-toluic Acid.

See Isohæmatommic Acid.

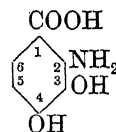
Dihydroxy-allylbenzene.

See Allylcatechol.

Dihydroxyaminoanthraquinone.

See Aminoalizarin, Aminopurpuroxanthin, Aminoquinizarin, Aminoanthrarufin, Aminochrysazin, Aminohystazarin, Aminoisoanthraflavic Acid.

3 : 4-Dihydroxy-2-aminobenzoic Acid (2-Aminoprotocatechuic acid, 3 : 4-dihydroxyanthranilic acid)



C₇H₇O₄N

MW, 169

3 : 4-Di-Me ether : *see* 2-Aminoveratric Acid.

3-Me-4-Et ether : C₁₀H₁₃O₄N. MW, 211.

Needles from MeOH. M.p. 183°. *Me ester*: prisms from EtOH. M.p. 42°.

Kühn, *Ber.*, 1895, 28, 810.

3 : 5-Dihydroxy-2-aminobenzoic Acid (2-Amino- α -resorcylic acid, 3 : 5-dihydroxyanthranilic acid).

3 : 5-*Di-Me ether*: $C_9H_{11}O_4N$. MW, 197. Needles from EtOH. M.p. 189–90°. *Et ester*: m.p. 45°. B.p. 175–7°/0.5 mm.

I.G., F.P. 655,356, (*Chem. Zentr.*, 1929, II, 2833).

4 : 5-Dihydroxy-2-aminobenzoic Acid (6-Aminoprotocatechuic acid, 4 : 5-dihydroxyanthranilic acid).

4 : 5-*Di-Me ether*: see 6-Aminoveratric Acid.

5 : 6-Dihydroxy-2-aminobenzoic Acid (5 : 6-Dihydroxyanthranilic acid).

5 : 6-*Di-Me ether*: $C_9H_{11}O_4N$. MW, 197. Pale yellow leaflets from EtOH. M.p. 98–9°. *Me ester*: m.p. 49–50°. *N-Acetyl*: m.p. 179–80°.

Radionow, Kanewska, Kupinska, *Ber.*, 1929, 62, 2566.

2 : 5-Dihydroxy-3-aminobenzoic Acid (3-Aminogentisic acid).

Leaflets or needles from H_2O . Decomp. at 204°. Spar. sol. EtOH, AcOH.

2 : 5-*Di-Me ether*: $C_9H_{11}O_4N$. MW, 197. Needles from H_2O . Darkens at 170°. Decomp. at 210–5°. *B, HCl*: needles. Darkens at 170°. Decomp. at 215°.

Rubenstein, *J. Chem. Soc.*, 1925, 127, 2002.

Hemmelmayer, *Monatsh.*, 1914, 35, 5.

4 : 5-Dihydroxy-3-aminobenzoic Acid (5-Aminoprotocatechuic acid).

5-*Me ether*: 5-aminovanillic acid. $C_8H_9O_4N$. MW, 183. *B, HCl*: scales. Decomp. above 200°. 4-*Benzoyl-Me ester*: cryst. from EtOH. M.p. 188–90°. 4 : 5-*Diacetyl*: cryst. from EtOH. M.p. 215°.

4 : 5 *Di-Me ether*: see 5-Aminoveratric Acid.

Simonsen, Rau, *J. Chem. Soc.*, 1918, 113, 24.

Vogl, *Monatsh.*, 1899, 20, 391.

4 : 6-Dihydroxy-3-aminobenzoic Acid (5-Amino- β -resorcylic acid).

Leaflets from H_2O . M.p. 193°.

B, HCl: cryst. + $2H_2O$. M.p. 212–3° decomp.

B_2, H_2SO_4 : needles. M.p. 226° decomp.

Di-Me ether: *Et ester*, cryst. from Et_2O . M.p. 84°.

Hemmelmayer, *Monatsh.*, 1904, 25, 41.

Späth, Klager, Schlösser, *Ber.*, 1931, 64, 2210.

5 : 6-Dihydroxy-3-aminobenzoic Acid.

5-*Me ether*: $C_8H_9O_4N$. MW, 183. M.p. 250°.

5 : 6-*Di-Me ether*: $C_9H_{11}O_4N$. MW, 197. Leaflets + $1H_2O$ from H_2O . M.p. 150°. *B, HCl*: needles from H_2O . Decomp. at 203°.

Murakami, *Ann.*, 1932, 496, 150.

3 : 5-Dihydroxy-4-aminobenzoic Acid (4-Amino- α -resorcylic acid).

3 : 5-*Di-Me ether*: $C_9H_{11}O_4N$. MW, 197. Tablets from EtOH. M.p. 182° decomp. *Et ester*: needles from Et_2O . M.p. 49–50°. $FeCl_3$ \rightarrow violet-red col.

Meyer, *Monatsh.*, 1887, 8, 432.

2 : 6-Dihydroxy-4-aminopyridine.

See Glutazine.

Dihydroxyamylbenzoic Acid.

See Olivetol-carboxylic Acid.

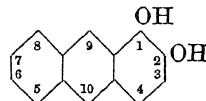
Dihydroxyaniline.

See Aminohydroquinone and Aminoresorcinol.

2 : 5-Dihydroxyanisaldehyde.

See under 2 : 4 : 5-Trihydroxybenzaldehyde.

1 : 2-Dihydroxyanthracene (1 : 2-Anthradial)



$C_{14}H_{10}O_2$

MW, 210

Leaflets. M.p. 160–2°. Sol. EtOH, Et_2O , AcOH, caustic alkalis. Sols. show weak green fluor. Alk. sols. turn blue then black on exposure to air.

Diacetyl: needles from EtOH–AcOH. M.p. 157–157.5°.

Hall, Perkin, *J. Chem. Soc.*, 1923, 123, 2034.

1 : 5-Dihydroxyanthracene (*Rufol*).

Yellow needles. M.p. about 265° decomp. Sol. EtOH, Et_2O , AcOH, C_6H_6 . Sols. show blue fluor. Pale green sols. in caustic alkalis.

Di-Me ether: $C_{16}H_{14}O_2$. MW, 238. Leaflets from MeOH. M.p. 224°.

Di-Et ether: $C_{18}H_{18}O_2$. MW, 266. Needles from EtOH. M.p. 179°.

Diacetyl: leaflets from AcOEt. M.p. 198°.

Lampe, *Ber.*, 1909, 42, 1414.

1 : 8-Dihydroxyanthracene (*Chrysazol*).

Yellow needles from EtOH. Aq. M.p. 225° decomp. Sol. EtOH, Et_2O , AcOEt, C_6H_6 . Sols. show blue fluor. Sol. caustic alkalis to green sols.

Di-Me ether: leaflets from EtOH. M.p. 198°.

Di-Et ether: leaflets from EtOH. M.p. 139°.

Diacetyl: leaflets from AcOEt. M.p. 184°.

Lampe, *Ber.*, 1909, 42, 1415.

1 : 9-Dihydroxyanthracene.

Diacetyl: m.p. 210–11°.

Zahn, Koch, *Ber.*, 1938, 71, 172.

2 : 3-Dihydroxyanthracene.

Yellowish leaflets. Decomp. about 282°. Sol. EtOH, Et₂O, AcOH. Sols. show violet fluor. Spar. sol. ligroin. Greenish yellow sols. in alkalis.

Di-Me ether: needles from EtOH. M.p. 204°. Sol. EtOH, Et₂O, AcOH, C₆H₆.

Diacetyl: m.p. 175°.

Lagodzinski, *Ann.*, 1905, 342, 106.

Green, *J. Chem. Soc.*, 1927, 556.

2 : 6-Dihydroxyanthracene (Flavol).

Pale yellow cryst. from EtOH. Darkens at 270°. M.p. 295–300° decomp. Sol. EtOH, Et₂O, AcOH. Sols. show blue fluor. Yellow sols. in alkalis with green fluor.

Di-Me ether: leaflets from AcOH. M.p. 255–6°.

Di-Et ether: cryst. M.p. 230–1°.

Diacetyl: leaflets from AcOH. M.p. 260–1°.

Hall, Perkin, *J. Chem. Soc.*, 1923, 123, 2033.

2 : 7-Dihydroxyanthracene.

Cryst. from C₆H₆. Darkens at 250°. M.p. 280–5° decomp. EtOH and AcOH sols. show violet fluor.

Di-Me ether: leaflets from AcOH. M.p. 216–7°.

Di-Et ether: m.p. 192–3°.

Diacetyl: leaflets. M.p. 282°.

Hall, Perkin, *J. Chem. Soc.*, 1923, 123, 2031.

9 : 10-Dihydroxyanthracene.

See Anthrahydroquinone.

Dihydroxyanthrahydroquinone.

See Tetrahydroxyanthracene.

Dihydroxyanthranilic Acid.

See Dihydroxy-2-aminobenzoic Acid.

1 : 2-Dihydroxyanthraquinone.

See Alizarin.

1 : 3-Dihydroxyanthraquinone.

See Purpuroxanthin.

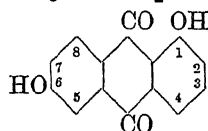
1 : 4-Dihydroxyanthraquinone.

See Quinizarin.

1 : 5-Dihydroxyanthraquinone.

See Anthrarufin.

1 : 6-Dihydroxyanthraquinone



C₁₄H₈O₄

MW, 240

Orange yellow needles from AcOH. M.p. 276° (271–2°). Sol. Me₂CO, PhNO₂. Mod. sol. hot EtOH, hot C₆H₆. Yellowish red sols. in alkalis, and in conc. H₂SO₄.

Di-Me ether: C₁₆H₁₂O₄. MW, 268. Yellow leaflets. M.p. 185°.

Diacetyl: yellow needles from AcOH. M.p. 205–6° (230–4°).

Dibenzoyl: needles from AcOH. M.p. 209–11°.

Frobenius, Hepp, *Ber.*, 1907, 40, 1048.

1 : 7-Dihydroxyanthraquinone.

Yellow needles. M.p. 292–3°. Sol. EtOH, AcOH. Mod. sol. Et₂O, CHCl₃, C₆H₆. Yellow sols. in alkalis. Brownish yellow sol. in H₂SO₄.

Di-Me ether: yellow needles from C₆H₆. M.p. 191°.

Diacetyl: pale yellow needles from AcOH. M.p. 198–9°.

Wedekind, D.R.P. 202,398, (*Chem. Zentr.*, 1908, II, 1476).

1 : 8-Dihydroxyanthraquinone.

See Chrysazin.

2 : 3-Dihydroxyanthraquinone.

See Hystazarin.

2 : 6-Dihydroxyanthraquinone

See Anthraflavic Acid.

2 : 7-Dihydroxyanthraquinone.

See Isoanthraflavic Acid.

1 : 3-Dihydroxyanthraquinone-2-carb-oxyllic Acid.

See Munjistin.

1 : 4-Dihydroxyanthraquinonecarboxylic Acid.

See Quinizarin-carboxylic Acid.

4 : 5-Dihydroxyanthraquinone-2-carb-oxyllic Acid.

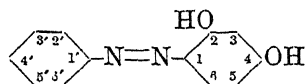
See Rhein.

3 : 4-Dihydroxyanthrone.

See Deoxyalizarin.

4 : 4'-Dihydroxyarsenobenzene.

See *p*-Arsenophenol.

2 : 4-Dihydroxyazobenzene (Benzeneazoresorcinol)

C₁₂H₁₀O₂N₂

MW, 214

Dark red needles. M.p. 170°.

4-Me ether: reddish-yellow leaflets from EtOH. M.p. 115–6°.

Di-Me ether: red cryst. from EtOH. M.p. 92°.

4-Et ether: brownish red needles from EtOH. M.p. 87°.

Di-Et ether: yellowish red needles from EtOH. M.p. 70°.

Diacetyl: orange-yellow needles from EtOH. M.p. 104°.

Kostanecki, *Ber.*, 1888, 21, 3119.

2 : 5-Dihydroxyazobenzene (Benzeneazohydroquinone).

Red needles from AcOH.Aq. M.p. 145–8°. Sol. Et₂O, Me₂CO, C₆H₆. Spar. sol. EtOH.

5-Benzoyl: orange red needles from MeOH or Me₂CO.Aq. M.p. 110–112°.

Witt, Johnson, *Ber.*, 1893, 26, 1909.

3 : 4-Dihydroxyazobenzene (*Benzeneazocatechol*).

Deep red needles or prisms with blue reflex from EtOH. M.p. 165° decomp. Sol. EtOH, alkalis.

3-Me ether: red prisms from ligroin. M.p. 70-1°.

Di-Me ether: red needles from ligroin. M.p. 53-4° (44-5°).

Witt, Mayer, *Ber.*, 1893, 26, 1073.

2 : 2'-Dihydroxyazobenzene (*o-Azophenol*).

Yellow leaflets from C₆H₆ or EtOH. M.p. 172°. Sol. Et₂O, conc. alkalis. Spar. sol. EtOH. Insol. H₂O.

Di-Me ether: *o*-azoanisole. C₁₄H₁₄O₂N₂. MW, 242. Orange leaflets. M.p. 153° (141°). Sol. EtOH, Et₂O, C₆H₆. Spar. volatile in steam.

Di-Et ether: *o*-azophenetole. C₁₆H₁₈O₂N₂. MW, 270. Reddish prisms. M.p. 131°. B.p. 240° decomp. Sol. EtOH, Et₂O. Non-volatile in steam.

Di-phenyl ether: red needles from EtOH. M.p. 168-9°.

Diacetyl: orange red cryst. M.p. 150°.

Willstätter, Benz, *Ber.*, 1906, 39, 3501.

Bogoslovsky, *Chem. Abstracts*, 1947, 41, 105.

2 : 4' -Dihydroxyazobenzene (*op' - Azo-phenol*).

2-Me ether: C₁₃H₁₂O₂N₂. MW, 228. Brownish yellow cryst. from AcOH.Aq. M.p. 146-7°. Sol. EtOH, Et₂O, C₆H₆, AcOH, CHCl₃, ligroin.

2-Et ether: C₁₄H₁₄O₂N₂. MW, 242. Red-brown leaflets from C₆H₆. M.p. 131°. Sol. EtOH, Et₂O, hot C₆H₆. Spar. sol. ligroin.

Di-Et ether: *op'*-azophenetole. Yellowish brown leaflets from EtOH. M.p. 77-8°. Sol. Et₂O, C₆H₆, ligroin.

Jacobson, Meyer, *Ann.*, 1895, 287, 213.

3 : 3'-Dihydroxyazobenzene (*m-Azophenol*).

Yellow leaflets with metallic lustre. M.p. 207°. Sol. hot EtOH, alkalis.

Di-Me ether: *m*-azoanisole. C₁₄H₁₄O₂N₂. MW, 242. M.p. 73-4°.

Di-Et ether: *m*-azophenetole. C₁₆H₁₈O₂N₂. MW, 270. Yellow cryst. M.p. 91°. Sol. EtOH.

Diacetyl: yellow needles from EtOH. M.p. 144°.

Dibenzoyl: yellowish brown leaflets from EtOH.Aq. M.p. 180°.

Ruggli, Hinovker, *Helv. Chim. Acta*, 1934, 17, 411.

3 : 4' -Dihydroxyazobenzene (*mp' - Azo-phenol*).

3-Et ether: C₁₄H₁₄O₂N₂. MW, 242. Brown leaflets from C₆H₆. M.p. 107°. Sol. EtOH, C₆H₆. Spar. sol. ligroin, pet. ether.

Dict. of Org. Comp.—II.

Di-Et ether: *mp'*-azophenetole. Brown cryst. from ligroin. M.p. 71°. Sol. EtOH, ligroin.

Jacobson, Meyer, *Ann.*, 1895, 287, 214.

4 : 4'-Dihydroxyazobenzene (*p-Azophenol*). Exists in two apparently stereoisomeric forms.

α-Form.

Green powder when anhydrous. M.p. 216°. Sol. EtOH, Et₂O, C₆H₆. Cryst. from EtOH.Aq. with 1H₂O.

β-Form.

Deep red powder when anhydrous. M.p. 216°. Sol. EtOH, Et₂O, C₆H₆. Cryst. from EtOH.Aq. with 1H₂O.

Mono-Me ether: C₁₃H₁₂O₂N₂. MW, 228. Red leaflets from AcOH. M.p. 142°. Sol. AcOH, C₆H₆. Spar. sol. CHCl₃.

Di-Me ether: *p*-azoanisole. Yellow leaflets and prisms from MeOH. M.p. 160.5-162.5° (165°). Sol. C₆H₆, hot EtOH, hot MeOH.

Mono-Et ether: C₁₄H₁₄O₂N₂. MW, 242. Brown needles + 1H₂O from EtOH.Aq. M.p. anhyd. 125-6°.

Di-Et ether: *p*-azophenetole. Yellow leaflets from EtOH. M.p. 157-9° (160°).

Diacetyl: yellow prisms and needles from AcOH. M.p. 198-9°.

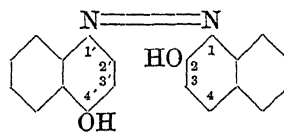
Dibenzoyl: reddish yellow leaflets from C₆H₆. Has 2 m.ps, (1) 210.5-211.5° (liquid crystals): (2) 249-51°.

Willstätter, Benz, *Ber.*, 1906, 39, 3495.

Bigiavi, Carrara, *Gazz. chim. ital.*, 1923, 53, 285.

Cook, Jones, *J. Chem. Soc.*, 1939, 1310.

2 : 4' -Dihydroxy - 1 : 1' -azonaphthalene (*αβ-Azonaphthol*, *2-naphtholazo-4-naphthol*)



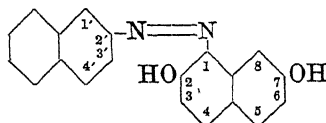
C₂₀H₁₄O₂N₂

MW, 314

Reddish violet cryst. M.p. 229°. Insol. H₂O, alkalis. Spar. sol. EtOH. Violet sol. in H₂SO₄.

Niementowski, *Chem. Zentr.*, 1902, 73, II, 938.

2 : 7-Dihydroxy-1 : 2'-azonaphthalene



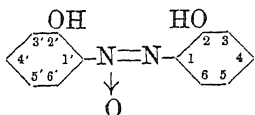
C₂₀H₁₄O₂N₂

MW, 314

Greenish needles with metallic lustre from EtOH. M.p. 202°.

Clausius, *Ber.*, 1890, 23, 524.

2 : 2'-Dihydroxyazoxybenzene (o-Azoxyphenol)



$C_{12}H_{10}O_3N_2$ MW, 230

Pale yellow cryst. from xylene. M.p. 154–5°.

Di-Me ether: o-azoxyanisole, 2 : 2'-dimethoxyazoxybenzene. $C_{14}H_{14}O_3N_2$. MW, 258. Orange cryst. from EtOH. M.p. 81°. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

Di-Et ether: o-azoxyphenetole, 2 : 2'-diethoxyazoxybenzene. $C_{16}H_{18}O_3N_2$. MW, 286. Colourless cryst. M.p. 102°. Sol. hot EtOH. Insol. H₂O. Non-volatile in steam.

Diacetyl: red leaflets from C₆H₆. M.p. 150°.

Dibenzoyl: yellow cryst. from EtOH. M.p. 108–9°.

Bigiavi, Guarducci, *Gazz. chim. ital.*, 1927, 57, 145.

Brand, *J. prakt. Chem.*, 1903, 67, 145.

Schmidt, Möhlau, *J. prakt. Chem.*, 1878, 18, 200.

3 : 3'-Dihydroxyazoxybenzene (m-Azoxyphenol).

Brownish yellow needles from H₂O or xylene. M.p. 183°. Sol. EtOH. Spar. sol. C₆H₆. H₂SO₄ → red sol.

Di-Me ether: m-azoxyanisole, 3 : 3'-dimethoxyazoxybenzene. Cryst. from EtOH. M.p. 51–2°. Turns red on exposure to light.

Di-Et ether: m-azoxyphenetole, 3 : 3'-diethoxyazoxybenzene. Pale yellow prisms from EtOH.Aq. M.p. 49–50° (47–6°).

Diacetyl: yellow leaflets from 50% EtOH. M.p. 102°.

Dibenzoyl: needles from AcOH. M.p. 175°.

Ruggli, Hinovker, *Helv. Chim. Acta*, 1934, 17, 410.

Rotarski, *Ber.*, 1908, 41, 865.

Fletcher, Lewis, *Chem. Abstracts*, 1933, 27, 2433.

4 : 4'-Dihydroxyazoxybenzene (p-Azoxyphenol).

Reddish yellow needles. M.p. 224° decomp.

Di-Me ether: p-azoxyanisole, 4 : 4'-dimethoxyazoxybenzene. Yellow needles. M.p. 118–9°. Exhibits anisotropy. Liq. at 118° is turbid but goes clear at 135°: shows reverse changes on cooling.

Di-Et ether: p-azoxyphenetole, 4 : 4'-diethoxyazoxybenzene. Needles from EtOH. M.p. 137–8°. Exhibits anisotropy. Turbid liq. goes clear at 168°.

Diacetyl: orange needles from EtOH. M.p. 163°.

Mono-benzoyl deriv.: needles from EtOH, m.p. 200–1°. Needles from C₆H₆, m.p. 212°.

Dibenzoyl: m.p. 187–90°.

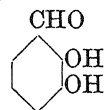
Bigiavi, Carrara, *Gazz. chim. ital.*, 1923, 53, 285.

Bigiavi, Guarducci, *Gazz. chim. ital.*, 1927, 57, 145.

Davies, Down, *J. Chem. Soc.*, 1929, 586.

Rising, *Ber.*, 1904, 37, 43.

2 : 3-Dihydroxybenzaldehyde



$C_7H_6O_3$ MW, 138

Yellow needles. M.p. 108°. B.p. 119–20°/16 mm. Sol. EtOH, AcOH, Me₂CO, hot C₆H₆. Spar. sol. H₂O. Spar. volatile in steam.

3-Me ether: 3-aldehydoguaiacol, o-vanillin. $C_8H_8O_3$. MW, 152. Yellow needles from H₂O. M.p. 44–5°. B.p. 128°/10 mm. *Oxime*: needles from H₂O. M.p. 123°. *Semicarbazone*: needles. M.p. 225° decomp. *Phenylhydrazone*: m.p. 130–1°. *p-Nitrophenylhydrazone*: reddish-brown needles from EtOH. M.p. 227–8°.

Di-Me ether: 3-aldehydoveratrol, o-veratric aldehyde, 2 : 3 - dimethoxybenzaldehyde. $C_9H_{10}O_3$. MW, 166. Needles from ligroin. M.p. 54°. B.p. 137°/12 mm. *Oxime*: needles from EtOH.Aq. M.p. 98–9°. *Semicarbazone*: needles. M.p. 231° decomp. *Phenylhydrazone*: m.p. 138°.

Anil: m.p. 135°.

Semicarbazone: m.p. 226° decomp.

Phenylhydrazone: yellow needles from EtOH. M.p. 167°.

Pauly, Schübel, Lockemann, *Ann.*, 1911, 383, 312.

2 : 4-Dihydroxybenzaldehyde.

See β-Resorcylic Aldehyde.

2 : 5-Dihydroxybenzaldehyde.

See Gentisic Aldehyde.

2 : 6-Dihydroxybenzaldehyde.

See γ-Resorcylic Aldehyde.

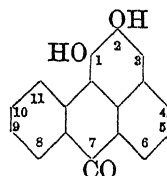
3 : 4-Dihydroxybenzaldehyde.

See Protocatechuic Aldehyde.

3 : 5-Dihydroxybenzaldehyde.

See α-Resorcylic Aldehyde.

1 : 2-Dihydroxybenzanthrone



$C_{17}H_{10}O_3$

MW, 262

M.p. 192°.

Dibenzoyl: m.p. 320° decomp.

Turski, Grynwasser, *Chem. Abstracts*, 1929, 23, 2435.

2 : 3-Dihydroxybenzanthrone.

Red cryst. from trichlorobenzene. M.p. 255°.
Di-Me ether: $C_{19}H_{14}O_3$. MW, 290. M.p. 156-8°.

I.G., D.R.P. 508,322, (*Chem. Zentr.*, 1931, I, 3400).

4 : 5-Dihydroxybenzanthrone.

Di-Me ether: orange yellow. M.p. 276-7°.

Oliverio, *Gazz. chim. ital.*, 1934, 64, 139.

5 : 6-Dihydroxybenzanthrone.

M.p. 258°.

Turski, Grynwasser, *Chem. Abstracts*, 1929, 23, 2435.

6 : 11-Dihydroxybenzanthrone.

M.p. 320°.

Maki, *Chem. Abstracts*, 1934, 28, 5435.

8 : 9-Dihydroxybenzanthrone.

M.p. 185°.

Diacetyl: m.p. 109°.

Turski, Grynwasser, *Chem. Abstracts*, 1929, 23, 2435.

10 : 11-Dihydroxybenzanthrone.

Orange red leaflets from EtOH. M.p. 309-10° decomp. Conc. alkalis \rightarrow blue col. $H_2SO_4 \rightarrow$ crimson col. $HNO_3 \rightarrow$ bluish violet col.

10-*Me ether*: $C_{18}H_{12}O_3$. MW, 276. Orange needles. M.p. 247-9°. *Acetyl*: pale yellow needles from EtOH-AcOH. M.p. 205-7°.

Di-Me ether: yellow needles from Me_2CO . M.p. 139-41°.

Diacetyl: pale yellow needles from Me_2CO . M.p. 202-4°.

Perkin, *J. Chem. Soc.*, 1920, 117, 701.

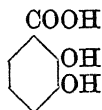
Miller, Perkin, *J. Chem. Soc.*, 1925, 127, 2688.

Dihydroxybenzene.

See Catechol, Hydroquinone and Resorcinol.

Dihydroxybenzidine.

See Dihydroxy-4 : 4'-diaminodiphenyl.

2 : 3-Dihydroxybenzoic Acid (Catechol-3-carboxylic acid)

$C_7H_6O_4$ MW, 154

Cryst. + $1H_2O$ from cold H_2O . M.p. anhyd. 204°. $k = 1.14 \times 10^{-3}$ at 25°. Heat above m.p. (or by gradual heating) \rightarrow catechol + CO_2 . $FeCl_3 \rightarrow$ blue col.

Et ester: $C_9H_{10}O_4$. MW, 182. M.p. 130.5°.

3-*Me ether*: guaiacol-3-carboxylic acid, 3-methoxysalicylic acid, o-vanillic acid. $C_8H_8O_4$. MW, 168. Cryst. + $1H_2O$. M.p. anhyd. 152°. Heat above m.p. \rightarrow guaiacol. *Me ester*: $C_9H_{10}O_4$. MW, 182. M.p. 73°. *Et ester*:

$C_{10}H_{12}O_4$. MW, 196. M.p. 26-7°. B.p. 164°/20 mm.

Di-Me ether: see 2 : 3-Dimethoxybenzoic Acid.

3-*Me 2-Et ether*: m.p. 51-2°. *Et ester*: b.p. 154-6°/11-12 mm.

Diacetyl: m.p. 148-50°.

Praxmarer, *Monatsh.*, 1906, 27, 1200.

Rodionov, *Chem. Abstracts*, 1941, 35, 5101.

2 : 4-Dihydroxybenzoic Acid.

See β -Resorcylic Acid.

2 : 5-Dihydroxybenzoic Acid.

See Gentisic Acid.

2 : 6-Dihydroxybenzoic Acid.

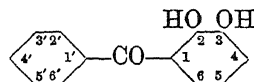
See γ -Resorcylic Acid.

3 : 4-Dihydroxybenzoic Acid.

See Protocatechuic Acid.

3 : 5-Dihydroxybenzoic Acid.

See α -Resorcylic Acid.

2 : 3-Dihydroxybenzophenone (3-Benzocatechol)

$C_{13}H_{10}O_3$ MW, 214

Yellow plates from 20% EtOH. M.p. 65°. Alc. $FeCl_3 \rightarrow$ dark green col.

Di-Me ether: viscous yellow oil. B.p. 210°/14 mm., 153°/0.3 mm. 2 : 4-Dinitrophenylhydrazones: orange cryst. from EtOH. M.p. 166-8° (152°).

Baker, Smith, *J. Chem. Soc.*, 1936, 348.

Richtzenhain, Nippus, *Ber.*, 1944, 77, 566.

2 : 4-Dihydroxybenzophenone (4-Benzoresorcinol).

Needles from H_2O . M.p. 144° (146°). Sol. EtOH, Et_2O , AcOH.

4-*Me ether*: $C_{14}H_{12}O_3$. MW, 228. Yellow needles from EtOH.Aq. M.p. 66°.

Di-Me ether: $C_{15}H_{14}O_3$. MW, 242. Prisms from EtOH.Aq. M.p. 87-8°.

Diacetyl: prisms. M.p. 78°.

Dischendorfer, *Monatsh.*, 1933, 62, 263.

Cox, *Rec. trav. chim.*, 1931, 50, 848.

Shah, Mehta, *J. Indian Chem. Soc.*, 1936, 13, 368.

2 : 5-Dihydroxybenzophenone (Benzo-hydroquinone).

Yellow needles from EtOH.Aq. M.p. 125°. Sol. EtOH, Et_2O , C_6H_6 .

5-*Me ether*: yellow plates from EtOH. M.p. 84-85.5°.

Di-Me ether: cryst. from MeOH. M.p. 51°. B.p. 225°/38 mm.

Phenylhydrazones: cryst. from EtOH. M.p. 144°.

Herzig, Hofmann, *Ber.*, 1908, 41, 144.

Bogert, Howells, *J. Am. Chem. Soc.*, 1930, 52, 842.

Dischendorfer, *Monatsh.*, 1935, 66, 208.

2 : 6-Dihydroxybenzophenone (2-*Benzo-resorcinol*).
M.p. 135°.

Limaye, Munje, *Chem. Abstracts*, 1938, 32, 2096.

3 : 4-Dihydroxybenzophenone (4-*Benzo-catechol*).

Prisms + 1H₂O from H₂O. M.p. anhyd. 134° (145°). Sol. EtOH, hot H₂O, NH₃, alkalis. Reduces NH₃·AgNO₃.

Me ether: benzoguaiacol. C₁₄H₁₂O₃. MW, 228. Pale yellow cryst. from EtOH. M.p. 131-2°.

Di-Me ether: benzoveratrol. C₁₅H₁₄O₃. MW, 242. Needles from EtOH. M.p. 103-4° (99°).

Dibenzoyl: m.p. 95°.

Roshdestwenski, *Chem. Zentr.*, 1915, 86, I, 985.

Bartolotti, *Gazz. chim. ital.*, 1897, 27, i, 286.

3 : 5-Dihydroxybenzophenone (5-*Benzo-resorcinol*).

Leaflets + 1H₂O from H₂O. M.p. 160-2°. Sol. EtOH, Et₂O, Me₂CO, hot H₂O. Spar. sol. CHCl₃, C₆H₆.

Fischer, Fischer, *Ber.*, 1913, 46, 1147.

2 : 2'-Dihydroxybenzophenone.

Leaflets or prisms from ligroin. M.p. 59-60°. Sol. EtOH, Et₂O, CHCl₃. Insol. H₂O.

Di-Me ether: C₁₅H₁₄O₃. MW, 242. M.p. 104°.

Di-Et ether: C₁₇H₁₈O₃. MW, 270. Needles from EtOH.Aq. M.p. 109°.

Diacetyl: yellowish plates from EtOH. M.p. 96° (83°).

Phenylhydrazone: m.p. 152°.

Graebe, Feer, *Ber.*, 1886, 19, 2609.

2 : 3'-Dihydroxybenzophenone.

Needles from H₂O. M.p. 126°.

Staedel, Haase, Moyat, *Ann.*, 1894, 283, 177.

2 : 4'-Dihydroxybenzophenone.

Plates from hot H₂O. M.p. 150-1° (147-8°). Sol. hot EtOH, C₆H₆. Spar. sol. hot H₂O.

Di-Me ether: m.p. 99-100°. Sol. hot EtOH, Et₂O, C₆H₆, AcOH.

Diacetyl: needles from hot H₂O. M.p. 84-5°.

Anil: yellow needles from EtOH. M.p. 214°.

Baeyer, *Ann.*, 1907, 354, 177.

Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, 54, 1449.

3 : 3'-Dihydroxybenzophenone.

Needles from H₂O. M.p. 170° (162-3°).

Diacetyl: leaflets from EtOH. M.p. 89-90°.

Dibenzoyl: leaflets from EtOH. M.p. 101-2°.

Gattermann, Rüdtt, *Ber.*, 1894, 27, 2296.

3 : 4'-Dihydroxybenzophenone.

Needles from H₂O. M.p. 205-6° (200°).

Di-Me ether: m.p. 58-9°.

Gattermann, Rüdtt, *Ber.*, 1894, 27, 2295.

See also Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, 54, 1449.

4 : 4'-Dihydroxybenzophenone.

Cryst. from H₂O. M.p. 210° (208-10°). Sol. MeOH, Et₂O, Me₂CO, hot H₂O. Insol. C₆H₆, CHCl₃, CS₂.

Me ether: C₁₄H₁₂O₃. MW, 228. Needles from H₂O. M.p. 151-2°.

Di-Me ether: needles from EtOH. M.p. 146°.

Et ether: C₁₅H₁₄O₃. MW, 242. M.p. 146-7°.

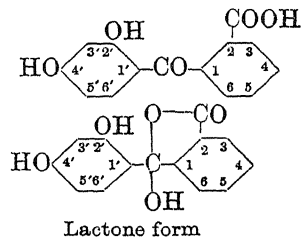
Di-Et ether: C₁₇H₁₈O₃. MW, 270. Leaflets from EtOH. M.p. 131°.

Diacetyl: needles from EtOH. M.p. 156° (152°).

Auwers, *Ber.*, 1903, 36, 3899.

Unger, *Ann.*, 1933, 504, 285.

2' : 4'-Dihydroxybenzophenone-2-carboxylic Acid (2-[2 : 4-*Dihydroxybenzoyl*]-benzoic acid)



C₁₄H₁₀O₅

MW, 258

Free acid exists in lactone form. Needles + 1H₂O from H₂O. M.p. 208-9°. Very sol. EtOH, Et₂O, Me₂CO, AcOH, AcOEt. Sol. MeOH, hot H₂O. Spar. sol. CHCl₃, CCl₄. Yellow sol. in dil. NaOH. H₂SO₄ → red col.

Me ester: C₁₅H₁₂O₅. MW, 272. Cryst. from MeOH. M.p. 191-2°. *4'-Me ether*: prisms from EtOH.Aq. M.p. 136°. *Di-Me ether*: needles from MeOH. M.p. 98-9°. *4'-Acetyl*: cryst. from MeOH. M.p. 110°.

Et ester: C₁₆H₁₄O₅. MW, 286. Cryst. from EtOH.Aq. M.p. 133-4°. *4'-Et ether*: needles from EtOH.Aq. M.p. 78°. *4'-Acetyl*: cryst. from EtOH. M.p. 62-6°.

Propyl ester: C₁₇H₁₆O₅. MW, 300. M.p. 84°.

4'-Me ether: C₁₅H₁₂O₅. MW, 272. Scales. M.p. 164-5°.

Di-Me ether: C₁₆H₁₄O₅. MW, 286. Leaflets from MeOH.Aq. M.p. 164-5°.

4'-Et ether: C₁₆H₁₄O₅. MW, 286. Needles from EtOH.Aq. M.p. 173°.

4'-Acetyl: needles from AcOH.Aq. M.p. 161°.

Triacetyl: cryst. from MeOH. M.p. 134-5°.

Phenylhydrazone: needles + 1 EtOH from EtOH. M.p. 260-1°.

Orndorff, Kline, *J. Am. Chem. Soc.*, 1924, 46, 2276.

**2' : 5'-Dihydroxybenzophenone-2-carb-
oxylic Acid** 213

**2' : 5' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid** (2-[2 : 5-Dihydroxybenzoyl]-benzoic
acid).

Brownish yellow cryst. from H₂O or AcOH.
M.p. 189-90° (231°). Sol. EtOH, Me₂CO.
H₂SO₄ → brown col. → red on heating.

Di-Me ether: prisms from chlorobenzene.
M.p. 162°.

Zahn, Ochwat, *Ann.*, 1928, 462, 94.

**3' : 4' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid** (2-[3 : 4-Dihydroxybenzoyl]-benzoic
acid).

Cryst. from AcOH.Aq. M.p. 207°.

Me ester: m.p. 178°.

Di-Me ether: 2-veratroylbenzoic acid. Leaflets
from EtOH. M.p. 233°. *Me ester*: needles.
M.p. 109-10°.

Waldmann, *J. prakt. Chem.*, 1938, 150,
99.

Oliverio, *Gazz. chim. ital.*, 1934, 64, 139.

**4 : 4' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid.**

4'-Me ether: microcryst. from AcOEt-pet.
ether. M.p. 225°.

Mitter, Dutt, *J. Indian Chem. Soc.*, 1936,
13, 228.

**4 : 5 - Dihydroxybenzophenone - 2 - carb-
oxylic Acid** (6-Benzoylprotocatechuic acid).

4-Me ether: 6-benzoylvanillic acid. Cryst.
M.p. 223-4°.

Di-Me ether: 6-benzoylveratric acid. Needles
from EtOH. M.p. 199-200°. *Me ester*: needles.
M.p. 110-11°.

Oliverio, *Gazz. chim. ital.*, 1934, 64, 139.

**5 : 4' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid.**

4'-Me ether: needles from AcOEt-pet. ether.
M.p. 203°.

Mitter, Dutt, *J. Indian Chem. Soc.*, 1936,
13, 228.

**5 : 6 - Dihydroxybenzophenone - 2 - carb-
oxylic Acid** (2-Benzoylprotocatechuic acid).

Di-Me ether: 2-benzoylveratric acid. Prisms
from AcOH.Aq. M.p. 192°. H₂SO₄ →
purple col.

Weizmann, Bergmann, *J. Chem. Soc.*,
1936, 569.

**6 : 2' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid.**

Yellow needles from EtOH.Aq. M.p. 199-
200°.

Diacetyl: cryst. from EtOH. M.p. 186°.

Mitter, Dutt, *J. Indian Chem. Soc.*, 1936,
13, 228.

2 : 4-Dihydroxybenzoylformic Acid

**6 : 4' - Dihydroxybenzophenone - 2 - carb-
oxylic Acid.**

4'-Me ether: yellow needles from EtOH.Aq.
M.p. 211-13°.

Mitter, Dutt, *J. Indian Chem. Soc.*, 1936,
13, 228.

**2' : 4' - Dihydroxybenzophenone - 4 - carb-
oxylic Acid** (4-[2 : 4-Dihydroxybenzoyl]-benzoic
acid).

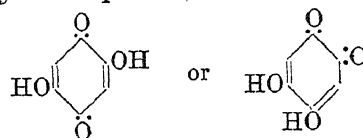
Yellow cryst. from EtOH. M.p. 293°. FeCl₃
→ reddish brown col.

Yamashita, *Chem. Zentr.*, 1933, II, 872.

4 : 5-Dihydroxy-o-benzoquinone.

See 2 : 5-Dihydroxy-p-benzoquinone.

2 : 5-Dihydroxy-p-benzoquinone (4 : 5-Di-
hydroxy-o-benzoquinone)



C₆H₄O₄

MW, 140

Dark yellow needles from AcOEt. Sublimes
at 215° part. decomp. Sol. EtOH, AcOH.
Prac. insol. Et₂O, cold H₂O. Reacts strongly
acidic. pK₁ 5.18, pK₂ 2.73. Aniline → 2 : 5-
dianilino-p-benzoquinone. Br + NaOH →
bromanilic acid. Reacts also as 4 : 5-dihydroxy-
o-benzoquinone: e.g., o-phenylenediamine →
2 : 3-dihydroxy-phenazine.

Di-Me ether: C₈H₈O₄. MW, 168. Decomp.
at 220°. Sol. hot EtOH.

Di-Et ether: C₁₀H₁₂O₄. MW, 196. M.p.
183°. Sol. hot EtOH.

Diacetyl: yellow plates or prisms from C₆H₆.
M.p. 150-2°.

Kehrmann, *Ber.*, 1890, 23, 905.

Jones, Shonle, *J. Am. Chem. Soc.*, 1945,
67, 1034.

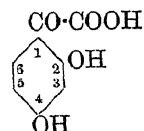
Dihydroxybenzoylbenzoic Acid.

See Dihydroxybenzophenone-carboxylic Acid.

2 : 4-Dihydroxybenzoylcyclohexane.

See 4-Hexahydrobenzoylresorcinol.

2 : 4-Dihydroxybenzoylformic Acid



C₈H₆O₅

MW, 182

Yellow needles from H₂O or Et₂O-ligroin.
M.p. 168°. FeCl₃ → brownish red col.

Di-Me ether: C₁₀H₁₀O₅. MW, 210. Cryst. +
1H₂O from H₂O or EtOH, m.p. 65-70°.
Needles from C₆H₆, m.p. 138-9°.

4-Et ether: C₁₀H₁₀O₅. MW, 210. Needles
from C₆H₆. M.p. 128-30°.

Di-Et ether: $C_{12}H_{14}O_5$. MW, 238. Cryst. from C_6H_6 . M.p. 130° decomp.

Karrer, Ferla, *Helv. Chim. Acta*, 1921, 4, 209.

2 : 5-Dihydroxybenzoylformic Acid.

Yellow or red needles. M.p. 141° . Readily sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ unstable green col.

Di-Me ether: needles from C_6H_6 . M.p. $75-6^\circ$. *Et ester*: yellow leaflets from ligroin. M.p. 38° . B.p. $200^\circ/11$ mm. *Amide*: needles from C_6H_6 . M.p. 129° . *Nitrile*: pale yellow needles from ligroin. M.p. $97-8^\circ$.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 393.

Mauthner, *Ber.*, 1909, 42, 194.

2 : 6-Dihydroxybenzoylformic Acid.

Di-Me ether: m.p. 98° . *Semicarbazone*: m.p. 210° decomp.

Limaye, Gangal, *Chem. Zentr.*, 1937, I, 2599.

3 : 4-Dihydroxybenzoylformic Acid.

Needles from $CHCl_3$ -ligroin. M.p. 92° . Yellow needles + $1H_2O$ from AcOH-petrol, anhyd. at 100° , m.p. 159° . $FeCl_3 \rightarrow$ green col.

3-Me ether: $C_9H_8O_5$. MW, 196. Prisms + C_6H_6 from C_6H_6 . M.p. $133-4^\circ$. Heat above m.p. \rightarrow vanillin.

Di-Me ether: veratroylformic acid. Tablets + H_2O , m.p. 100° . Needles from C_6H_6 , m.p. $138-9^\circ$. *Et ester*: m.p. 44° . B.p. $205^\circ(197^\circ)/10$ mm. *Isoamyl ester*: b.p. $220-5^\circ/10$ mm. *Nitrile*: needles from ligroin. M.p. $116-17^\circ$.

Di-Et ether Et ester: m.p. $40-1^\circ$. B.p. $201-2^\circ/12$ mm.

Francis, Nierenstein, *Ann.*, 1911, 382, 204.

Barger, Ewins, *J. Chem. Soc.*, 1909, 95, 1560.

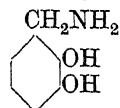
Snyder, Duck, Ide, *Organic Syntheses*, 1935, XV, 31.

Kindler, Metzendorf, Dschi-yin-Kwok, *Ber.*, 1943, 76, 308.

2 : 5-Dihydroxybenzyl Alcohol.

See Gentisyl Alcohol.

2 : 3-Dihydroxybenzylamine



$C_7H_9O_2N$

MW, 139

B, HCl: m.p. 186° .

B, HI: m.p. 149° .

Di-Me ether: 2 : 3-dimethoxybenzylamine. $C_9H_{13}O_2N$. MW, 167. B.p. $137^\circ/11$ mm. D_4^{20} 1.1243. *Hydrochloride*: m.p. 159° . *Picrate*: m.p. 205° . *N-Acetyl*: m.p. 94° . B.p. $210^\circ/10$ mm.

Douetteau, *Bull. soc. chim.*, 1911, 9, 935.

3 : 4-Dihydroxybenzylamine.

B, HCl: m.p. 172° .

B, HI: m.p. 205° .

Di-Me ether: see Veratrylamine.

Douetteau, *Bull. soc. chim.*, 1911, 9, 937.

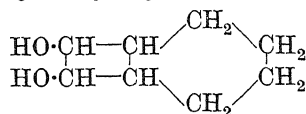
2 : 4-Dihydroxybenzylcyclohexane.

See 4-Hexahydrobenzylresorcinol.

Di-[hydroxybenzylidene]-acetone.

See Dihydroxydistyryl Ketone.

7 : 8-Dihydroxybicyclo-[4 : 2 : 0]-octane



$C_8H_{14}O_2$

MW, 142

Leaflets from C_6H_6 . M.p. 142° . Lead tetraacetate \rightarrow hexahydro-o-phthalaldehyde. $HNO_3 \rightarrow$ hexahydrophthalic acid.

Diacetyl: fragrant oil. B.p. $105^\circ/0.4$ mm. D_4^{20} 1.1025. n_D^{20} 1.4662.

Reppe, Schichting, Klager, Toepel, *Ann.*, 1948, 560, 1.

Cope, Herrick, *J. Am. Chem. Soc.*, 1950, 72, 983.

Dihydroxybutane.

See Butylene Glycol and Tetramethylene Glycol.

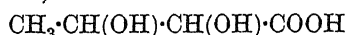
Dihydroxybutylbenzene.

See Phenylbutylene Glycol.

3 : 4-Dihydroxy-1-butylene.

See Erythrol.

1 : 2-Dihydroxybutyric Acid (2-Methylglyceric acid)



$C_4H_8O_4$

MW, 120

l.

l.

M.p. $74-5^\circ$. Sol. EtOH, Me_2CO . Spar. sol. Et_2O . $[\alpha]_D^{16} - 13.5^\circ$.

dl.

Exists in two forms :

(1) Erythro-. Cryst. from H_2O . M.p. 81.5° . Sol. EtOH, AcOH, hot AcOEt.

Phenylhydrazine salt: cryst. from EtOH. M.p. 105° .

Me ester: $C_5H_{10}O_4$. MW, 134. B.p. $109^\circ/10$ mm.

Et ester: $C_6H_{12}O_4$. MW, 148. B.p. $113^\circ/10$ mm.

n-Propyl ester: $C_7H_{14}O_4$. MW, 162. B.p. $117^\circ/10$ mm.

n-Butyl ester: $C_8H_{16}O_4$. MW, 176. B.p. $127^\circ/10$ mm.

n-Amyl ester: $C_9H_{18}O_4$. MW, 190. B.p. $139^\circ/10$ mm.

p-Phenylphenacyl ester: m.p. 130° .

Phenylhydrazide: cryst. from AcOEt. M.p. 123.5° .

Diacetyl: cryst. + H₂O from H₂O. M.p. 50°. Oily liq. when anhydrous. B.p. 127°/4 mm. *Chloride*: b.p. 79°/3 mm.

(2) Threo-. Prisms from H₂O. M.p. 73-74.5°. Sol. EtOH, hot AcOEt.

II.
Prisms. M.p. 45°. Sol. H₂O, EtOH. Spar. sol. Et₂O.

Glattfield, Woodruff, *J. Am. Chem. Soc.*, 1927, 49, 2310.

Glattfield, Straitiff, *J. Am. Chem. Soc.*, 1938, 60, 1385.

Glattfield, Chittum, *J. Am. Chem. Soc.*, 1933, 55, 3663.

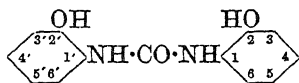
2 : 4-Dihydroxybutyrophenone.

See Resobutyrophenone.

1 : 2-Dihydroxycaproic Acid.

See 2-Propylglyceric Acid.

2 : 2'-Dihydroxycarbanilide



C₁₃H₁₂O₃N₂ MW, 244

Needles. M.p. 125°.

Di-Me ether: C₁₅H₁₆O₃N₂. MW, 272. M.p. 185-6°.

Struve, Radenhausen, *J. prakt. Chem.*, 1895, 52, 241.

3 : 3'-Dihydroxycarbanilide.

Needles from EtOH.Aq. M.p. 222° (215°).

Mistry, Guha, *J. Indian. Chem. Soc.*, 1930, 7, 795.

4 : 4'-Dihydroxycarbanilide.

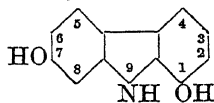
Needles from hot H₂O. M.p. 288° decomp.

Di-Me ether: m.p. 232-3°.

Di-Et ether: C₁₇H₂₀O₃N₂. MW, 300. M.p. 226°.

Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 795.

1 : 7-Dihydroxycarbazole



C₁₂H₉O₂N MW, 199

Needles from xylene or dichlorobenzene. M.p. 246-7°.

I.G., F.P. 754,224, (*Chem. Zentr.*, 1934, I, 2656).

1 : 8-Dihydroxycarbazole.

M.p. 211-12°.

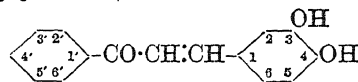
I.G., D.R.P. 511,021, (*Chem. Abstracts*, 1931, 25, 1262).

2 : 3-Dihydroxycarbazole.

Di-Me ether: C₁₄H₁₃O₃N. MW, 227. Cryst. from toluene. M.p. 125°.

Hughes, Lions, Maunsell, Wright, *Chem. Abstracts*, 1939, 33, 613.

3 : 4-Dihydroxychalkone (Phenyl 3 : 4-dihydroxystyryl ketone)



C₁₅H₁₂O₃ MW, 240

M.p. 204-5° decomp.

Di-Me ether: C₁₇H₁₆O₃. MW, 268. Yellow needles from EtOH.Aq. M.p. 88°.

Diacetyl: m.p. 124.5-125°.

Dickinson, Heilbron, Irving, *J. Chem. Soc.*, 1927, 1896.

Geissman, Clinton, *J. Am. Chem. Soc.*, 1946, 68, 697.

2 : 2'-Dihydroxychalkone (2-Hydroxyphenyl 2-hydroxystyryl ketone).

M.p. 160-1° decomp.

2-Me ether: C₁₆H₁₄O₃. MW, 254. Yellow needles from EtOH. M.p. 112°. *Acetyl*: pale yellow needles from EtOH. M.p. 64°.

2-Et ether: C₁₇H₁₆O₃. MW, 268. Yellow needles from EtOH. M.p. 61°. *Acetyl*: yellow leaflets from EtOH.Aq. M.p. 68°.

Diacetyl: m.p. 85.5-86°.

Dibenzoyl: m.p. 114°.

Tambor, Gubler, *Helv. Chim. Acta*, 1919, 2, 108.

Ikawa, Stahman, Link, *J. Am. Chem. Soc.*, 1944, 66, 902.

Geissman, Clinton, *J. Am. Chem. Soc.*, 1946, 68, 697.

2 : 4'-Dihydroxychalkone (4-Hydroxyphenyl 2-hydroxystyryl ketone).

Pale yellow. M.p. 145°.

4'-Me ether: yellow plates from EtOH.Aq. M.p. 148° decomp. *Acetyl*: pale yellow leaflets from EtOH.Aq. M.p. 129-30°.

Dibenzoyl: pale yellow. M.p. 120°.

Zwayer, Kostanecki, *Ber.*, 1908, 41, 1337.

Russell, Todd, *J. Chem. Soc.*, 1937, 421.

3 : 2'-Dihydroxychalkone (2-Hydroxyphenyl 3-hydroxystyryl ketone).

3-Me ether: yellow leaflets from EtOH. M.p. 94-5°.

Gutzeit, Kostanecki, *Ber.*, 1905, 38, 933.

3 : 4'-Dihydroxychalkone (4-Hydroxyphenyl 3-hydroxystyryl ketone).

Di-Me ether: pale yellow. M.p. 96-7°.

Hudson, *J. Chem. Soc.*, 1946, 754.

4 : 2'-Dihydroxychalkone (2-Hydroxyphenyl 4-hydroxystyryl ketone).

Pale yellow needles from EtOH.Aq. M.p. 145°.

4-*Me ether*: pale orange plates from EtOH. M.p. 93-4°. *Acetyl*: prisms. M.p. 84°.

Dibenzoyl: pale yellow prisms from EtOH.Aq. M.p. 120°.

Russell, Todd, *J. Chem. Soc.*, 1937, 423.

4 : 3'-Dihydroxychalkone (3-*Hydroxyphenyl 4-hydroxystyryl ketone*).

Di-Me ether: m.p. 52°.

Dodds, Goldberg, Lawson, Robinson, *Proc. Roy. Soc.*, 1939, B127, 140.

4 : 4'-Dihydroxychalkone (4-*Hydroxyphenyl 4-hydroxystyryl ketone*).

Yellow felted needles from H₂O. M.p. 197°. H₂SO₄ → red col.

4-*Me ether*: yellow needles from EtOH. M.p. 188-90°. *Acetyl*: yellow needles from EtOH. M.p. 101°. *Benzoyl*: yellow needles from EtOH. M.p. 154°.

4'-*Me ether*: yellow needles from EtOH.Aq. M.p. 180°. *Acetyl*: needles from EtOH. M.p. 144°. *Benzoyl*: needles from EtOH. M.p. 141°.

Di-Me ether: needles. M.p. 102-3°. *Semicarbazone*: m.p. 177-8°.

Acetyl deriv.: yellow needles from EtOH. M.p. 126°.

Benzoyl deriv.: yellow needles from C₆H₆-EtOH. M.p. 183°.

Tognazzi, *Gazz. chim. ital.*, 1924, 54, 697. Vorländer, *Ber.*, 1925, 58, 128.

2' : 4'-Dihydroxychalkone (2 : 4-*Dihydroxyphenyl styryl ketone*).

Yellow needles from EtOH-toluene. M.p. 151° (175°).

4'-*Me ether*: yellow needles from EtOH. M.p. 105°. *Acetyl*: yellow needles from EtOH. M.p. 83-4°.

Di-Me ether: yellow needles from EtOH. M.p. 78°.

4'-*Et ether*: yellow needles. M.p. 104°. *Acetyl*: yellow needles. M.p. 74-5°.

Di-Et ether: C₁₉H₂₀O₃. MW, 296. Needles from EtOH. M.p. 92-3°.

Saiyad, Nadkarni, Wheeler, *J. Chem. Soc.*, 1937, 1737.

Shinoda, Sato, *Chem. Zentr.*, 1928, II, 1885.

Emilewicz, Kostanecki, *Ber.*, 1899, 32, 311.

2' : 5'-Dihydroxychalkone (2 : 5-*Dihydroxyphenyl styryl ketone*).

5'-*Me ether*: red cryst. from petrol. M.p. 49°.

Di-Me ether: yellow cryst. from petrol. M.p. 43°.

5'-*Et ether*: needles from EtOH. M.p. 83°.

Di-Et ether: C₁₉H₂₀O₃. MW, 296. Yellow prisms from EtOH. M.p. 50-1°.

Simonis, Lear, *Ber.*, 1926, 59, 2912, 2915.

2' : 6'-Dihydroxychalkone (2 : 6-*Dihydroxyphenyl styryl ketone*).

Di-Me ether: m.p. 80°.

Di-Et ether: plates from EtOH. M.p. 90-5°.

Simonis, Lear, *Ber.*, 1926, 59, 2912, 2915.

3' : 4'-Dihydroxychalkone (3 : 4-*Dihydroxyphenyl styryl ketone*).

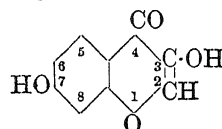
Di-Me ether: yellow leaflets from MeOH or pet. ether. M.p. 85°.

Monti, *Gazz. chim. ital.*, 1930, 60, 43.

3 : 12-Dihydroxycholanolic Acid.

See Deoxycholic Acid.

3 : 7-Dihydroxychromone



C₉H₆O₄ MW, 178

Pale brown leaflets from MeOH.Aq. M.p. 271°. Mod. sol. H₂O, EtOH. Spar. sol. Et₂O.

7-*Me ether*: C₁₀H₈O₄. MW, 192. Micro-needles from 30% MeOH. M.p. 171-2°.

Di-Me ether: C₁₁H₁₀O₄. MW, 206. Leaflets from MeOH. M.p. 169-70°.

Di-Et ether: C₁₃H₁₄O₄. MW, 234. Needles. M.p. 125°.

Diacetyl: needles from 50% AcOH. M.p. 148-9°.

Dibenzoyl: m.p. 205-6°.

Pfeiffer, Oberlin, *Ber.*, 1924, 57, 208.

5 : 7-Dihydroxychromone.

Plates from EtOH. M.p. 273°.

7-*Me ether*: needles from EtOH. M.p. 117-8°. *Acetyl*: needles from EtOH.Aq. M.p. 141°.

Di-Me ether: needles + 1H₂O from H₂O. M.p. anhyd. 131-2°.

Kostanecki, de Wildt, *Ber.*, 1902, 35, 863.

7 : 8-Dihydroxychromone.

Needles + 2H₂O from H₂O. M.p. anhyd. 262°.

Di-Me ether: needles + 1H₂O from EtOH.Aq. M.p. anhyd. 124°.

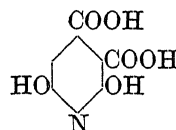
Diacetyl: leaflets from EtOH.Aq. M.p. 110°.

David, Kostanecki, *Ber.*, 1903, 36, 128.

1 : 2-Dihydroxychrysene.

See Chrysohydroquinone.

2 : 6-Dihydroxycinchomeric Acid (2 : 6-*Dihydroxypyridine-3 : 4-dicarboxylic acid*)



C₇H₅O₆N MW, 199

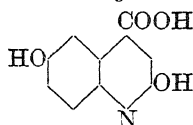
Di-Et ester: C₁₁H₁₃O₆N. MW, 255. Plates from EtOH. M.p. 161-2°. Sol. C₆H₆. Insol.

H₂O. Boiling HCl or dil. alkalis → citrazinic acid. FeCl₃ → reddish violet col.

Ruhemann, Stapleton, *J. Chem. Soc.*, 1900, 77, 243, 250.

Rogerson, Thorpe, *J. Chem. Soc.*, 1906, 89, 640.

2 : 6-Dihydroxycinchonic Acid (2 : 6-Dihydroxyquinoline-4-carboxylic acid)



C₁₀H₇O₄N

MW, 205

Anhyd. at 150°. Turns brown at 300°. M.p. 326°. Zn dust dist. → quinoline. Heat above 400° → 2 : 6-dihydroxyquinoline.

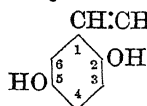
Sahashi, *Biochem. Z.*, 1927, 189, 208; 1926, 168, 69; 1925, 159, 221.

Makino, Fujihara, *Bull. Chem. Soc. Japan*, 1944, 19, 95.

2 : 4-Dihydroxycinnamic Acid.

See Umbellie Acid.

2 : 5-Dihydroxycinnamic Acid



C₉H₈O₄

MW, 180

M.p. 207° decomp. Sol. EtOH. Reduces NH₃.AgNO₃. FeCl₃ → olive green col.

2-Me ether : C₁₀H₁₀O₄. MW, 194. Yellow cryst. from H₂O. M.p. 179-80°.

Di-Me ether : 2 : 5-dimethoxycinnamic acid. C₁₁H₁₂O₄. MW, 208. Yellowish needles from H₂O. M.p. 147°. Sol. EtOH, Et₂O, hot H₂O. Sols. fluoresce.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 391.

3 : 4-Dihydroxycinnamic Acid.

See Caffeic Acid.

3 : 5-Dihydroxycinnamic Acid.

Needles from H₂O. M.p. 245-6°. Sol. EtOH. Insol. C₆H₆.

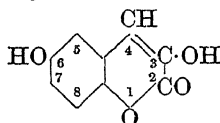
Di-Me ether : 3 : 5-dimethoxycinnamic acid. C₁₁H₁₂O₄. MW, 208. Needles from H₂O. M.p. 175-6°. Sol. EtOH, C₆H₆.

Mauthner, *J. prakt. Chem.*, 1925, 110, 126.

4 : α-Dihydroxycinnamic Acid.

See 4-Hydroxyphenylpyruvic Acid.

3 : 6-Dihydroxycoumarin



C₉H₆O₄

MW, 178

Leaflets + H₂O from H₂O. Anhyd. needles from boiling H₂O. Anhyd. at 100°. M.p. above 220°. FeCl₃ → green col.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 384.

4 : 7-Dihydroxycoumarin.

Needles from hot H₂O. M.p. 265° decomp. Sol. EtOH. Mod. sol. Me₂CO. Spar. sol. AcOH. Insol. Et₂O, C₆H₆, CHCl₃, ligroin. FeCl₃ → weak brown col.

4-Me ether : C₁₀H₈O₄. MW, 192. Needles from EtOH.Aq. M.p. 256°.

Di-Me ether : C₁₁H₁₀O₄. MW, 206. Needles from H₂O. M.p. 155-6° (162°).

Monoacetyl deriv. : cryst. from H₂O. M.p. 223°.

Diacetyl : prisms. M.p. 145-5°.

Sonn, *Ber.*, 1917, 50, 1299.

Bauer, Schoder, *Arch. Pharm.*, 1921, 259, 53.

Heilbron, Hill, *J. Chem. Soc.*, 1927, 1708.

5 : 7-Dihydroxycoumarin.

Prisms from AcOH.Aq. M.p. 285-6°. FeCl₃ → green → red col.

5 : 7-Di-Me ether : see Citropten.

Diacetyl : prisms from EtOH. M.p. 140°.

Heyes, Robertson, *J. Chem. Soc.*, 1936, 1832.

6 : 7-Dihydroxycoumarin.

See Aesculetin.

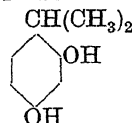
7 : 8-Dihydroxycoumarin.

See Daphnetin.

Dihydroxycrotonic Lactone.

See Tetronic Acid.

2 : 4-Dihydroxycumene (2 : 4-Dihydroxyisopropylbenzene, 4-isopropylresorcinol)



C₉H₁₂O₂

MW, 152

Cryst. from AcOH.Aq. M.p. 105°.

Meyer, Bernhauer, *Monatsh.*, 1929, 53, 54, 737.

2 : 5-Dihydroxycumene (2 : 5-Dihydroxy-1-isopropylbenzene, 2-isopropylhydroquinone).

Needles. M.p. 130-1°.

Di-Me ether : C₁₁H₁₆O₂. MW, 180. B.p. 114-16°/15 mm. D₄¹⁵ 1.0129. n_D¹⁵ 1.5105.

Bayrac, *Bull. soc. chim.*, 1895, 13, 984.

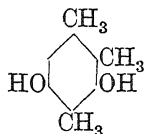
3 : 4-Dihydroxycumene (3 : 4-Dihydroxy-1-isopropylbenzene, 4-isopropylcatechol).

Leaflets from ligroin. M.p. 78°. B.p. 270-2°, 167-9°/26 mm.

Di-Me ether : 4-isopropylveratrol. B.p. 234-6°. D₄⁰ 1.0203.

Delange, *Compt. rend.*, 1904, 138, 1702.

3 : 5-Dihydroxy-ψ-cumene (2 : 4 : 5-Trimethylresorcinol, 3 : 5-dihydroxy-1 : 2 : 4-trimethylbenzene)



$C_9H_{12}O_2$

MW, 152

Cryst. M.p. 156°.

Di-Me ether: $C_{11}H_{16}O_2$. MW, 180. B.p. 141-4°.

Kraus, *Monatsh.*, 1891, 12, 203.

3 : 6-Dihydroxy-ψ-cumene.

See ψ-Cumohydroquinone.

Dihydroxycyclohexane.

See Hexahydrocatechol and Quinitol.

Dihydroxycyclopentane.

See Cyclopentandiol.

2 : 5-Dihydroxy-p-cymene.

See Thymohydroquinone.

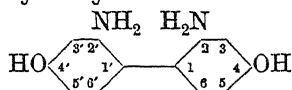
3 : 4-Dihydroxydiallyl.

See Divinylethylene Glycol.

Dihydroxydiaminoanthraquinone.

See Diaminoanthraflavic Acid, Diaminoanthrarufin, Diaminochrysazin, Diamino-hystazarin and Diaminoquinizarin.

4 : 4'-Dihydroxy-2 : 2'-diaminodiphenyl



$C_{12}H_{12}O_2N_2$

MW, 216

4 : 4'-*Di-Me ether*: *see* *m*-Dianisidine.

5 : 5'-Dihydroxy-2 : 2'-diaminodiphenyl.

Prisms from MeOH.Aq. containing H_2SO_4 . M.p. 225° decomp. Prac. insol. Et_2O , C_6H_6 . Rapidly turns brown in air.

Borsche, *Ber.*, 1917, 50, 830.

2 : 2'-Dihydroxy-3 : 3'-diaminodiphenyl.

Needles. Darkens about 190°. M.p. 227° corr. decomp.

Tetra-acetyl deriv.: cryst. from MeOH. M.p. 242° corr.

Diels, Biebergeil, *Ber.*, 1902, 35, 308.

4 : 4'-Dihydroxy-3 : 3'-diaminodiphenyl.

Needles from EtOH.Aq. Softens at 300°. M.p. 314-5°.

4 : 4'-*Di-Me ether*: m.p. 195°. B_2HCl : needles from HCl. M.p. 262°. *Diacetyl deriv.*: cryst. from AcOH. M.p. 330°.

N : N'-*Diacetyl*: needles. M.p. 210°.

Tetra-acetyl deriv.: needles. M.p. 225°.

Hodgson, Holt, *J. Chem. Soc.*, 1937, 38.

Bratz, Niementowski, *Ber.*, 1919, 52, 193.

6 : 6'-Dihydroxy-3 : 3'-diaminodiphenyl.

Needles. M.p. 246° corr. Turns brown at about 200°. Spar. sol. hot EtOH.

Borsche Scholten, *Ber.*, 1917, 50, 605.

2 : 2'-Dihydroxy-4 : 4'-diaminodiphenyl (2 : 2'-Dihydroxybenzidine).

Plates from Me_2CO . M.p. 140°.

Tetra-acetyl deriv.: leaflets from EtOH.Aq. M.p. 128°.

Sen, Sadasivam, *J. Indian. Chem. Soc.*, 1932, 9, 403.

Elbs, Kirsch, *J. prakt. Chem.*, 1903, 67, 271.

3 : 3'-Dihydroxy-4 : 4'-diaminodiphenyl (3 : 3'-Dihydroxybenzidine).

Cryst. from Py.Aq. M.p. 292°. Turns brown at 230°. (Plates from Me_2CO . M.p. 160°.)

B_2HCl : plates. M.p. 144°.

3 : 3'-*Di-Me ether*: *see* Dianisidine.

3 : 3'-*Di-Et ether*: *see* Diphenetidide.

Tetrabenzoyl deriv.: microcryst. from $CHCl_3$. M.p. 180°.

Sen, Sadasivam, *J. Indian. Chem. Soc.*, 1932, 9, 403.

Burkhardt, Wood, *J. Chem. Soc.*, 1929, 151.

I.G., D.R.P. 488,611, (*Chem. Zentr.*, 1930, I, 1698).

α : β-Dihydroxydibenzyl.

See Hydrobenzoin.

2 : 2'-Dihydroxydiethylamine (*Diethanolamine*)



$C_4H_{11}O_2N$

MW, 105

Prisms. M.p. 28°. B.p. 270°/748 mm., 217-18°/150 mm., 154-5°/10 mm. Very sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 . D_4^{20} 1.0966. n_D^{20} 1.4776. Non-volatile in steam. Reacts strongly alkaline.

B, HNO_3 : m.p. 69°.

B_2, H_2PtCl_6 : needles. M.p. 160-1° decomp.

Picrate: leaflets from H_2O . M.p. 109-10°.

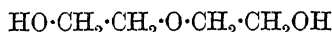
Knorr, *Ber.*, 1897, 30, 915.

Leibush, Shorina, *Chem. Abstracts*, 1947, 41, 5446.

4 : 4'-Dihydroxy-α : β-diethyldiphenyl-ethane.

See Dihydrodiethylstilboestrol.

2 : 2'-Dihydroxydiethyl Ether (*Diethylene glycol, ethylene diglycol*)



$C_4H_{10}O_3$

MW, 106

B.p. 245°, 133°/14 mm., 119-20°/7 mm. Sol. H_2O , EtOH, Et_2O . D_4^{15} 1.1197. n_D^{15} 1.4488, n_D^{20} 1.4472.

Diacetyl: b.p. 110-35°/16 mm. D_4^{20} 1.123. n_D^{20} 1.4348.

Monobenzoyl: b.p. 153-4°/2 mm. (127-30°/5 mm.). n_D^{20} 1.5200.

Dibenzoyl: b.p. 230°/1-2 mm. D_4^{21} 1.1751. n_D^{20} 1.5448.

Me ether: $C_5H_{12}O_3$. MW, 120. *p*-Nitrophenylurethane: m.p. 73.4-73.7°.

Di-Me ether: $C_6H_{14}O_3$. MW, 134. B.p. 160.5-161°/756.6 mm. D_{15}^{25} 0.9514. n_D^{20} 1.4097.

Et ether: carbitol, cellosolve. $C_6H_{14}O_3$. MW, 134. B.p. 194-5°. D_{20}^{20} 1.0397. n_D^{20} 1.4300. *Carbonate*: b.p. 232-235°/55 mm. *Benzoyl*: b.p. 160-1°/14.5 mm., 141-3°/2 mm. *p*-Nitrobenzoyl: b.p. 207-9°/4 mm. *p*-Nitrophenylurethane: m.p. 65.8-66.3°.

Di-Et ether: $C_8H_{18}O_3$. MW, 162. B.p. 187°/735 mm. D_{15}^{25} 0.9149.

Dipropyl ether: $C_{10}H_{22}O_3$. MW, 190. B.p. 219°/737 mm. D_{15}^{25} 0.8877.

Butyl ether: $C_8H_{18}O_3$. MW, 162. B.p. 228.5-230°. D_{20}^{20} 0.9650. n_D^{20} 1.4321. *Benzoyl*: b.p. 179.3-181.3°/4 mm. *p*-Nitrophenylurethane: m.p. 54.5-55.3°.

Dibutyl ether: $C_{12}H_{26}O_3$. MW, 218. B.p. 250-2°/741 mm. D_{15}^{25} 0.8847.

tert.-Butyl ether: b.p. 72°/2 mm. D_4^{20} 0.9374.

tert.-Amyl ether: b.p. 50-55°/3 mm.

Ethyl-butyl ether: b.p. 218-9°.

Ethyl-amyl ether: b.p. 121-4°/18 mm.

Ethyl-vinyl ether: b.p. 90-7°/20 mm.

Ethyl-allyl ether: b.p. 200-3°.

Diphenyl ether: $C_{16}H_{18}O_3$. MW, 258. M.p. 66°.

Di- β -naphthyl ether: m.p. 122°.

Rinkenbach, *Ind. Eng. Chem.*, 1927, 19, 474.

Matignon, Moureu, Dodé, *Bull. soc. chim.*, 1934, 1, 1308.

Liston, Dehn, *J. Am. Chem. Soc.*, 1938, 60, 1264.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1925, 47, 164.

4 : 4'-Dihydroxy- α : β -diethylstilbene.

See Diethylstilboestrol.

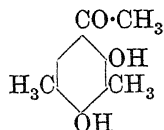
Dihydroxydiethyl sulphide.

See Thiodiglycol.

5 : 7-Dihydroxy-6 : 4'-dimethoxyflavone.

See Pectolarigenin.

2 : 4-Dihydroxy-3 : 5-dimethylacetophenone (*Clavatul*)



$C_{10}H_{12}O_3$ MW, 180

Isolated from cultures of *Aspergillus clavatus*. Plates from MeOH.Aq. M.p. 183°.

Acetyl: prisms. M.p. 95-6°.

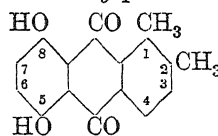
Bergel *et al.*, *J. Chem. Soc.*, 1944, 417.

Hassall, Todd, *J. Chem. Soc.*, 1947, 611.

Dihydroxydimethylacetylene.

See 2-Butyne-1 : 4-diol.

5 : 8-Dihydroxy-1 : 2-dimethylantraquinone (5 : 6-Dimethylquinizarin)



$C_{16}H_{12}O_4$ MW, 268

Diphenyl ether: $C_{28}H_{20}O_4$. MW, 420. Yellow needles from AcOH. M.p. 214°.

Harrop, Norris, Weizmann, *J. Chem. Soc.*, 1909, 95, 1315.

5 : 8-Dihydroxy-1 : 3-dimethylantraquinone (5 : 7-Dimethylquinizarin).

Diphenyl ether: yellow needles from AcOH. M.p. 186°.

Harrop, Norris, Weizmann, *J. Chem. Soc.*, 1909, 95, 1315.

5 : 8-Dihydroxy-1 : 4-dimethylantraquinone (5 : 8-Dimethylquinizarin).

Red needles from C_6H_6 . M.p. 252-3°. Sol. H_2SO_4 with yellowish red fluor. and red col.

Diphenyl ether: yellow needles. M.p. 154°.

Diacetyl: yellow needles from AcOH. M.p. 181-2°.

Meyer, Stark, *Ber.*, 1931, 64, 2010.

2 : 6-Dihydroxy-1 : 5-dimethylantraquinone (1 : 5-Dimethylantraflavic acid).

Yellow needles from AcOH or $PhNO_2$. Decomp. about 330°.

Di-Me ether: $C_{18}H_{16}O_4$. MW, 296. Yellow needles from AcOH. M.p. about 305° decomp.

Diacetyl: pale yellow needles from AcOH. M.p. 253°.

Fieser, Lothrop, *J. Am. Chem. Soc.*, 1936, 58, 752.

3 : 7-Dihydroxy-1 : 5-dimethylantraquinone (4 : 8-Dimethylantraflavic acid).

Sublimes in yellow leaflets or needles. M.p. above 360°. Spar. sol. EtOH, AcOH. Insol. C_6H_6 . Yellow sols. in H_2SO_4 and alkalis.

Acetyl deriv.: needles from EtOH.Aq. M.p. 223°.

Kostanecki, Niementowski, *Ber.*, 1885, 18, 2140.

3 : 5-Dihydroxy-1 : 7-dimethylantraquinone.

Yellow needles from EtOH. M.p. 213°. Sublimes in needles. Sol. AcOH. Spar. sol. C_6H_6 . $H_2SO_4 \rightarrow$ brownish yellow sol.

Acetyl deriv.: needles from EtOH.Aq. M.p. 188°.

Kostanecki, Niementowski, *Ber.*, 1885, 18, 2141; *Ann.*, 1887, 240, 278.

1 : 4-Dihydroxy-2 : 3-dimethylantraquinone (2 : 3-Dimethylquinizarin).

Red needles from chlorobenzene or by sub-

5 : 6-Dihydroxy-2 : 3-dimethylantraquinone 220

limation. M.p. 253°. Alc. alkalis → bluish violet sols.

Marschalk, Koenig, Ouroussoff, *Bull. soc. chim.*, 1936, 3, 1545.

5 : 6 - Dihydroxy - 2 : 3 - dimethylantraquinone (6 : 7-Dimethylalizarin).

Orange yellow needles from AcOH. M.p. 276°. Alkalis → purple red sols.

Bradbury, Weizmann, *J. Chem. Soc.*, 1914, 105, 2750.

5 : 8 - Dihydroxy - 2 : 3 - dimethylantraquinone (6 : 7-Dimethylquinizarin).

Orange needles from xylene. M.p. 222°. Sol. H_2SO_4 → bluish red col.

I.G., D.R.P. 571,522, (*Chem. Zentr.*, 1933, II, 611).

1 : 5 - Dihydroxy - 2 : 6 - dimethylantraquinone (2 : 6-Dimethylantrarin).

Brown needles from AcOH. M.p. 240-1°. H_2SO_4 → purple red sol.

Acetyl deriv.: yellow cryst. M.p. 284-5°.

Jowett, Petter, *J. Chem. Soc.*, 1903, 83, 1333.

Marschalk, Koenig, Ouroussoff, *Bull. soc. chim.*, 1936, 3, 1545.

1 : 7 - Dihydroxy - 2 : 6 - dimethylantraquinone.

Yellow leaflets from AcOEt. M.p. above 300°. Red col. in alkalis and H_2SO_4 .

7-Me ether: $C_{17}H_{14}O_4$. MW, 282. Yellow needles from AcOEt. M.p. 214-5°. Acetyl: pale yellow needles from EtOH. M.p. 195-6°.

Diacetyl: yellow needles. M.p. 215°.

Jowett, Potter, *J. Chem. Soc.*, 1903, 83, 1331.

3 : 7 - Dihydroxy - 2 : 6 - dimethylantraquinone (3 : 7-Dimethylantraflavic acid).

Orange yellow needles from EtOH. M.p. 232°. H_2SO_4 → purple-red sol. NH_3 -Aq. → red sol.

Jowett, Potter, *J. Chem. Soc.*, 1903, 83, 1334.

4 : 8 - Dihydroxy - 2 : 6 - dimethylantraquinone (3 : 7-Dimethylantrarin).

Yellow needles from C_6H_6 . M.p. 300°. Sublimes in orange red needles. H_2SO_4 → red fluor. sol.

Diacetyl: yellow plates. M.p. 236-7°.

Kostanecki, Niementowski, *Ber.*, 1885, 18, 255, 2139; *Ann.*, 1887, 240, 276.

1 : 8 - Dihydroxy - 2 : 7 - dimethylantraquinone (2 : 7-Dimethylchrysazin).

Yellow needles. M.p. 216-7°. H_2SO_4 → bluish red sol. Red sols. in alkalis.

Mono-acetyl: yellow needles. M.p. 222-3°.

Marschalk, Koenig, Ouroussoff, *Bull. soc. chim.*, 1936, 3, 1545.

1 : 1'-Dihydroxy-2 : 2'-dinaphthyl

4 : 6 - Dihydroxy - 2 : 5 - dimethylbenzaldehyde.

See β -Orcylaldehyde.

2 : 3 - Dihydroxy - 2 : 3 - dimethylbutane.

See Pinacol.

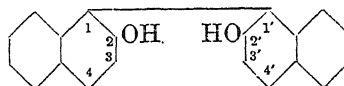
1 : 3 - Dihydroxy - 2 - dimethylbutyric Acid.

See Pantoic Acid.

sym. - Dihydroxydimethylurea.

See Dimethylolurea.

2 : 2' - Dihydroxy - 1 : 1' - dinaphthyl (β -Dinaphthol)



$C_{20}H_{14}O_2$ MW, 286

Cryst. from EtOH or toluene. M.p. 218°. Sol. Et_2O , alkalis. Mod. sol. EtOH. Spar. sol. $CHCl_3$. Insol. H_2O . Does not undergo Bucherer reaction and does not couple with diazo comps. Zn dust dist. → 1 : 1'-dinaphthyl. $POCl_3$, $ZnCl_2$ and Zn, etc. → perylene + dinaphthylene oxide.

Di-Me ether: $C_{22}H_{18}O_2$. MW, 314. M.p. 190°.

Di-Et ether: $C_{24}H_{22}O_2$. MW, 342. M.p. 90°.

Di-isopropyl ether: $C_{26}H_{26}O_2$. MW, 370. M.p. 150°.

Diacetyl: m.p. 109°.

Dipropionyl: m.p. 105°.

Di-*n*-butyl: m.p. 207°.

Di-picrate: m.p. 175-6°.

Pummerer, Prell, Rieche, *Ber.*, 1926, 59, 2160.

Korczyński, Tucholski, *Chem. Abstracts*, 1932, 26, 4044.

Travkin, *Chem. Abstracts*, 1934, 28, 3728.

4 : 4' - Dihydroxy - 1 : 1' - dinaphthyl (α -Dinaphthol).

Plates. M.p. 300° (266-8°). Sol. Et_2O , alkalis. Mod. sol. EtOH. Spar. sol. $CHCl_3$, C_6H_6 . Insol. H_2O . Sublimes. Decomp. on dist. Couples with diazo comps. $AlCl_3$ → 3 : 10-dihydroxyperylene.

Di-Me ether: plates from $PhNO_2$. M.p. 254-5°.

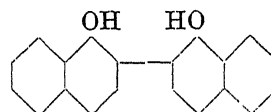
Di-Et ether: m.p. 211°.

Diacetyl: m.p. 217°.

Corbellini, Debenedetti, *Gazz. chim. ital.*, 1929, 59, 391.

See also Clemo, Cockburn, Spence, *J. Chem. Soc.*, 1931, 1265, (*Bibl.*).

1 : 1' - Dihydroxy - 2 : 2' - dinaphthyl (γ -Dinaphthol)



$C_{20}H_{14}O_2$ MW, 286

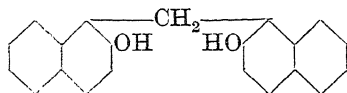
Prisms. M.p. 220°.

Di-Me ether: cryst. from ligroin. M.p. 122°.

Diacetyl: m.p. 169°.

Clemo, Cockburn, Spence, *J. Chem. Soc.*, 1931, 1272.

2 : 2'-Dihydroxy-1 : 1'-dinaphthylmethane (*Methylenedi-2-naphthol, methylenebis-β-naphthol*)



$C_{21}H_{16}O_2$

MW, 300

Needles from AcOH. M.p. 200° (94°). Sol. MeOH, EtOH, Et₂O, CHCl₃, Me₂CO, hot C₆H₆. Prac. insol. CS₂, ligroin, hot H₂O. Heat of comb. C_p 2477.4 Cal., C_v 2475.7 Cal.

Mono-Na deriv.: cryst. from Et₂O. M.p. 132°.

Di-Me ether: C₂₃H₂₀O₂. MW, 328. Plates from EtOH. M.p. 144-7°.

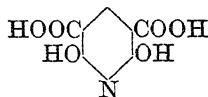
Diacetyl: needles from EtOH. M.p. 214°.

Picrate: reddish brown cryst. M.p. 178-9°.

Fries, Hübner, *Ber.*, 1906, 39, 440.

Hosaeus, *Ber.*, 1892, 25, 3214.

2 : 6-Dihydroxydinicotinic Acid (2 : 6-Dihydroxypyridine-3 : 5-dicarboxylic acid)



$C_7H_5O_6N$

MW, 199

Di-Et ester: C₁₁H₁₃O₆N. MW, 255. Needles from EtOH or dil. HCl. M.p. 201°. *Diacetyl*: cryst. from C₆H₆. M.p. 69-70°.

Amide: C₇H₆O₅N₂. MW, 198. Needles from H₂O. M.p. 213° decomp.

Diamide: C₇H₇O₄N₃. MW, 197. Needles from H₂O. Decomp. above 300°.

Dinitrile: C₇H₃O₂N₃. MW, 161. Yellow plates or needles from H₂O. M.p. above 280° decomp.

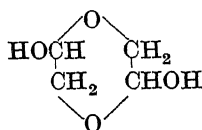
Dianilide: yellow cryst. from AcOH. Decomp. about 298°.

Et ether: C₉H₉O₆N. MW, 227. Needles from Me₂CO. M.p. 181-2° decomp. 3-*Et ester*: needles from Et₂O-Me₂CO. M.p. 159-60° decomp. *Di-Et ester*: needles from EtOH. M.p. 80-1°.

Gattermann, Skita, *Ber.*, 1916, 49, 498.

Urushibara, *Chem. Zentr.*, 1930, I, 2388.

2 : 5-Dihydroxy-1 : 4-dioxan (*Glycollaldehyde dimer*)



$C_4H_8O_4$

MW, 120

Cryst. from Et₂O. M.p. 84-5° (rapid heat.), 75-6°.

Diacetyl: m.p. 161-2° (157-8°).

Fenton, Jackson, *J. Chem. Soc.*, 1899, 575.

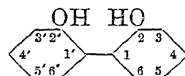
Summerbell, Rochen, *J. Am. Chem. Soc.*, 1941, 63, 3241.

Späth, Raschik, *Monatsh.*, 1946, 76, 65.

Dihydroxydiphenic Acid.

See Dihydroxydiphenyldicarboxylic Acid.

2 : 2'-Dihydroxydiphenyl (*oo'-Diphenol*)



$C_{12}H_{10}O_2$

MW, 186

Prisms from toluene. M.p. 109°. Cryst. as hydrate from H₂O, m.p. 73-5°. B.p. 325-6° (315°). Sol. EtOH, Et₂O, AcOH, C₆H₆, alkalis. Spar. sol. pet. ether. FeCl₃ → reddish violet col. Zn dust dist. → diphenyl. ZnCl₂ fusion → diphenylene oxide.

Di-Me ether: *oo'*-dianisole. C₁₄H₁₄O₂. MW, 214. Prisms from EtOH. M.p. 155°. B.p. 307-8° (299.5-301°). Sol. hot EtOH, hot C₆H₆. Spar. sol. Et₂O, ligroin.

Di-Et ether: *oo'*-diphenetole. C₁₆H₁₈O₂. MW, 242. Leaflets from EtOH.Aq. M.p. 36-7°.

Diacetyl: m.p. 95°.

Kraemer, Weissgerber, *Ber.*, 1901, 34, 1665.

Borsche, Scholten, *Ber.*, 1917, 50, 607.

Rütgerswerke A-G., B.P. 529,936, (*Brit. Chem. Abstracts*, 1941, B II, 36).

2 : 4'-Dihydroxydiphenyl (*op'-Diphenol*).

Prisms. M.p. 162-3°. B.p. 206-10°/11 mm. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. Zn dust dist. → diphenyl.

Diacetyl: leaflets from EtOH. M.p. 94°.

Di-Me ether: *op'*-dianisole. M.p. 70°.

Fichter, Brunner, *Bull. soc. chim.*, 1916, 19, 286.

Finzi, Mangini, *Gazz. chim. ital.*, 1933, 62, 1193.

3 : 3'-Dihydroxydiphenyl (*mm'-Diphenol*).

Needles from H₂O. M.p. 123-4°. B.p. 247°/18 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Mod. sol. hot H₂O. Sol. alkalis. FeCl₃ → bluish violet col. Zn dust dist. → diphenyl.

Di-Me ether: *mm'*-dianisole. Needles from EtOH.Aq. M.p. 36°. B.p. 328°. Sol. ord. org. solvents. Insol. H₂O.

Diacetyl: m.p. 82-5°.

Borsche, *Ber.*, 1917, 50, 828.

Schultz, Kohlhaus, *Ber.*, 1906, 39, 3343.

Adams, Kornblum, *J. Am. Chem. Soc.*, 1941, 63, 188.

Kornblum, *Organic Syntheses*, 1941, XXI, 30.

4 : 4'-Dihydroxydiphenyl (*pp'*-Diphenol).
Needles or plates from EtOH. M.p. 274-5°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆. No col. with FeCl₃. Zn dust dist. → diphenyl.

Di-Me ether: *pp'*-dianisole. Leaflets. M.p. 173° (171-2°). Spar. sol. Et₂O. Insol. H₂O, ligroin. Sublimes.

Di-Et ether: *pp'*-diphenetole. Needles. M.p. 176°. Sol. AcOH.

Diacetyl: needles from Me₂CO. M.p. 160-1°.

Dibenzenesulphonyl: m.p. 148°.

Di-o-nitrobenzenesulphonyl: m.p. 191-2°.

Di-p-toluenesulphonyl: m.p. 189-90°.

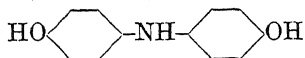
Hirsch, *Ber.*, 1889, 22, 335.

2 : 5-Dihydroxydiphenyl.

Needles from 25% EtOH. M.p. 96-8°.

Borsche, *Ann.*, 1900, 312, 221.

4 : 4'-Dihydroxydiphenylamine



C₁₂H₁₁O₂N MW, 201

Cryst. from H₂O. M.p. 174.5°. Sol. AcOH, alkalis, dil. min. acids. Spar. sol. Et₂O, C₆H₆, ligroin.

Di-Me ether: C₁₄H₁₅O₂N. MW, 229. Leaflets from EtOH. M.p. 103°. Sol. hot EtOH, Et₂O, Me₂CO, C₆H₆. Insol. H₂O, dil. acids.

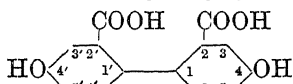
Di-Et ether: C₁₆H₁₉O₂N. MW, 257. M.p. 94°.

Schneider, *Ber.*, 1899, 32, 689.

3 : 6-Dihydroxy-2 : 5-diphenyl-*p*-benzoquinone.

See Polyporic Acid.

4 : 4'-Dihydroxydiphenyl-2 : 2'-dicarb- oxylic Acid (4 : 4'-Dihydroxydiphenic acid)



C₁₄H₁₀O₆ MW, 274

Pale yellow prisms + 1H₂O from H₂O. M.p. anhyd. 278-80° decomp. Sol. MeOH, EtOH, Et₂O. Mod. sol. C₆H₆, CHCl₃. Red sols. in alkalis.

Diacetyl: needles from H₂O. M.p. 222-3° decomp.

Adkins, Steinbring, Pickering, *J. Am. Chem. Soc.*, 1924, 46, 1922.

Schmidt, Schall, *Ber.*, 1905, 38, 3772.

5 : 5'-Dihydroxydiphenyl-2 : 2'-dicarb- oxylic Acid (5 : 5'-Dihydroxydiphenic acid).

Di-Me ether: C₁₆H₁₄O₆. MW, 302. Needles from MeOH. M.p. 229°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2485.

Adams, Kornblum, *J. Am. Chem. Soc.*, 1941, 63, 197.

6 : 6'-Dihydroxydiphenyl-2 : 2'-dicarb- oxylic Acid (6 : 6'-Dihydroxydiphenic acid).

dl.

Di-Me ester: C₁₆H₁₄O₆. MW, 302. Cryst. from MeOH. M.p. 137° corr.

Di-Me ether: m.p. 295-7°. *Brucine salt*: m.p. 198-9° corr. [α]_D²⁰ + 11.7°. *Quinine salt*: m.p. 178-9° corr. [α]_D²⁰ + 111°. *Diamide*: cryst. from EtOH.Aq. M.p. 273-4°. *Bis-dimethylamide*: needles from AcOEt-pet. ether. M.p. 175-6°. *Dihydrazide*: m.p. 254-5°.

Dilactone: C₁₄H₆O₄. MW, 238. Needles from AcOH. M.p. above 350°.

d.

Di-Me ether: cryst. from pet. ether-Me₂CO. M.p. 291-2°. [α]_D²⁰ + 108.5°. *Di-Me ester*: m.p. 98-9°. [α]_D²⁰ + 132°. *Diamide*: cryst. from MeOH. M.p. 230-1°. [α]_D²⁰ + 53.6°.

l.

Di-Me ether: cryst. from pet. ether-Me₂CO. M.p. 291-3°. [α]_D²⁰ - 114°. *Di-Me ester*: m.p. 101-2°. [α]_D²² - 160°. *Diamide*: cryst. from MeOH. M.p. 230-1°. [α]_D²⁰ - 54.8°. *Bis-methylamide*: needles from MeOH.Aq. M.p. 268-70°. [α]_D²⁰ - 89°. *Bis-dimethylamide*: needles from AcOEt-pet. ether. M.p. 133°. [α]_D²⁰ - 93.5°. *Dihydrazide*: needles. M.p. 263-5°. [α]_D²⁰ - 83.5°.

Huntress, Seickel, *J. Am. Chem. Soc.*, 1939, 61, 1362.

Stanley, McMahon, Adams, *J. Am. Chem. Soc.*, 1933, 55, 706.

Chi Yi Hsing, Adams, *J. Am. Chem. Soc.*, 1936, 58, 588.

3 : 2'-Dihydroxydiphenyl-2 : 6-dicarb- oxylic Acid.

Di-Me ether: cryst. from AcOH.Aq. M.p. 249°.

Huntress, Seickel, *J. Am. Chem. Soc.*, 1939, 61, 1364.

4 : 4'-Dihydroxydiphenyl-3 : 3'-dicarb- oxylic Acid.

M.p. 302-5°. Sol. Et₂O, AcOH. Spar. sol. C₆H₆, ligroin.

Bülow, Reden, *Ber.*, 1898, 31, 2577.

6 : 6'-Dihydroxydiphenyl-3 : 3'-dicarb- oxylic Acid.

Does not melt below 300°.

Di-Me ester: C₁₆H₁₄O₆. MW, 302. M.p. 264.5°. *Diacetyl*: m.p. 173°.

Di-Me ether: m.p. 302°. *Di-Me ester*: m.p. 172°.

Sugii, *Chem. Abstracts*, 1930, 24, 3505.

3 : 3'-Dihydroxydiphenyl-4 : 4'-dicarb- oxylic Acid.

Powder from EtOH.Aq. M.p. 318° decomp. FeCl₃ → violet col.

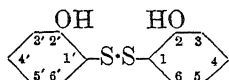
Di-Me ester: needles from C₆H₆ or AcOH.

M.p. 213-5°. *Diacetyl*: leaflets from EtOH.Aq. M.p. 140-2°.

Di-Me ether: needles from EtOH. M.p. 270-1° decomp. *Di-Me ester*: leaflets from EtOH. M.p. 170-1°. *Dichloride*: needles from C₆H₆. M.p. 170°. *Diamide*: needles + 1EtOH from EtOH.Aq. M.p. anhyd. 260-1°.

Mudrovčič, *Monatsh.*, 1913, 34, 1424.

2 : 2'-Dihydroxydiphenyl disulphide



C₁₂H₁₀O₂S₂

MW, 250

B.p. above 200° decomp. Sol. alkalis. Insol. H₂O. NaHg → monothiocatechol (*o*-mercaptophenol).

Di-Me ether: C₁₄H₁₄O₂S₂. MW, 278. Needles from EtOH. M.p. 119°. Decomp. on dist. Green sol. in H₂SO₄. CrO₃ in AcOH → anisole-*o*-sulphonic acid.

Di-Et ether: C₁₆H₁₈O₂S₂. MW, 306. Needles from EtOH. M.p. 89-90°.

Haitinger, *Monatsh.*, 1883, 4, 166.

3 : 3'-Dihydroxydiphenyl disulphide.

Needles from pet. ether. M.p. 94-5°. Sol. EtOH, Et₂O, C₆H₆, hot H₂O.

Zincke, Ebel, *Ber.*, 1914, 47, 928.

4 : 4'-Dihydroxydiphenyl disulphide.

Needles from H₂O. M.p. 150-1°. Sol. EtOH, Et₂O, caustic alkalis.

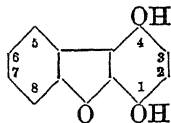
Di-Me ether: needles from EtOH. M.p. 44-5°.

Di-Et ether: needles from EtOH. M.p. 48-9°.

Diacetyl: leaflets from EtOH. M.p. 88-9°.

Leuckart, *J. prakt. Chem.*, 1890, 41, 196.

1 : 4-Dihydroxydiphenylene oxide



C₁₂H₈O₃

MW, 200

Cryst. from H₂O. M.p. 217-8° decomp.

1-*Me ether*: C₁₃H₁₀O₃. MW, 214. Needles from 10% EtOH. M.p. 155°.

Di-Me ether: C₁₄H₁₂O₃. MW, 228. Prisms from pet. ether. M.p. 78-5°.

Gilman, Van Ess, *J. Am. Chem. Soc.*, 1939, 61, 1369.

1 : 6-Dihydroxydiphenylene oxide.

M.p. 194-5°.

I.G., F.P. 816,719, (*Chem. Zentr.*, 1937, II, 3081).

1 : 8-Dihydroxydiphenylene oxide.

M.p. 190°. Pale green col. with FeCl₃.

Gilman, Young, *J. Am. Chem. Soc.*, 1935, 57, 1122.

2 : 6-Dihydroxydiphenylene oxide.

2-*Me ether*: m.p. 151-2°.

I.G., F.P. 816,719, (*Chem. Zentr.*, 1937, II, 3081).

2 : 7-Dihydroxydiphenylene oxide.

Prisms + $\frac{1}{2}$ H₂O from H₂O. M.p. 241°. FeCl₃ → green col.

Hata, Tatamatsu, Kubota, *Bull. Chem. Soc. Japan*, 1935, 10, 425.

3 : 4-Dihydroxydiphenylene oxide.

3-*Me ether*: needles from pet. ether. M.p. 111°.

Di-Me ether: cryst. from pet. ether. M.p. 79°.

Gilman, Van Ess, *J. Am. Chem. Soc.*, 1939, 61, 1368.

3 : 5-Dihydroxydiphenylene oxide.

M.p. 241-2°.

I.G., F.P. 816,719, (*Chem. Zentr.*, 1937, II, 3081).

3 : 6-Dihydroxydiphenylene oxide.

M.p. 243-4°.

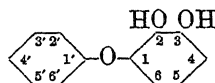
I.G., F.P. 816,719, (*Chem. Zentr.*, 1937, II, 3081).

4 : 5-Dihydroxydiphenylene oxide.

Plates from H₂O. M.p. 215°.

Simada, Hata, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1939, 35, 365.

2 : 3-Dihydroxydiphenyl Ether



C₁₂H₁₀O₃

MW, 202

Di-Me ether: C₁₄H₁₄O₃. MW, 230. M.p. 48-5°. B.p. 152°/2 mm.

Kranzfelder, Verbanc, Sowa, *J. Am. Chem. Soc.*, 1937, 59, 1488.

3 : 4-Dihydroxydiphenyl Ether.

Di-Me ether: b.p. 174°/4 mm.

3-*Phenyl ether*: C₁₈H₁₄O₃. MW, 278. M.p. 56°. B.p. 207-12°/2 mm.

4-*Me : 3-Phenyl ether*: C₁₉H₁₆O₃. MW, 292. B.p. 235-42°/14 mm.

Kranzfelder, Verbanc, Sowa, *J. Am. Chem. Soc.*, 1937, 59, 1488.

2 : 2'-Dihydroxydiphenyl Ether.

Di-Me ether: m.p. 79-80°. B.p. 330-1°.

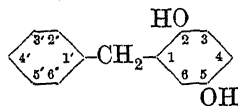
Briner, Bron, *Helv. Chim. Acta*, 1932, 15, 1236.

2 : 3'-Dihydroxydiphenyl Ether.

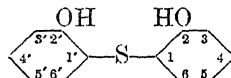
Cryst. M.p. 70°. B.p. 177-83°/4 mm.

Di-Me ether: prisms. M.p. 54° (33-4°). B.p. 326-9°, 157-60°/3 mm.Keimatsu, Yamaguchi, *Chem. Zentr.*, 1937, I, 2152.Doran, *J. Am. Chem. Soc.*, 1929, 51, 3450.**2 : 4'-Dihydroxydiphenyl Ether.***Di-Me ether*: m.p. 77°. B.p. 203°/20 mm.Sartoretto, Sowa, *J. Am. Chem. Soc.*, 1937, 59, 603.**3 : 3'-Dihydroxydiphenyl Ether.**

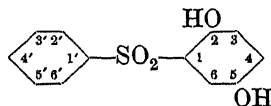
B.p. 258°/16 mm.

Di-Me ether: b.p. 332-4°, 210-12°/18 mm.*3-Me : 3'-Et ether*: $C_{15}H_{16}O_3$. MW, 244. B.p. 338-41°.*Di-Et ether*: $C_{16}H_{18}O_3$. MW, 258. B.p. 341-4°.*Di-phenyl ether*: $C_{24}H_{18}O_3$. MW, 354. B.p. 210-12°/18 mm.Tomita, *Chem. Zentr.*, 1933, II, 3132.Doran, *J. Am. Chem. Soc.*, 1929, 51, 3448.**3 : 4'-Dihydroxydiphenyl Ether.***Di-Me ether*: b.p. 336-8°.Doran, *J. Am. Chem. Soc.*, 1929, 51, 3449.**4 : 4'-Dihydroxydiphenyl Ether.**Scales from H_2O . Cryst. from toluene. M.p. 164-5°. Sol. EtOH, Et_2O , hot C_6H_6 . Oestrogenic and bactericidal.*Di-Me ether*: tablets from EtOH. M.p. 103°. B.p. 175-82°/14 mm.*Phenyl ether*: cryst. from EtOH.Aq. M.p. 87° (100°, 82°).*Me-phenyl ether*: cryst. from EtOH. M.p. 82°.*Di-phenyl ether*: leaflets from EtOH. M.p. 111°.Tomita, *Chem. Zentr.*, 1933, II, 3132.von Heyden, D.R.P. 609,080, (*Chem. Zentr.*, 1935, I, 3010).Osterlin, *Monatsh.*, 1930, 57, 36.**2 : 5-Dihydroxydiphenylmethane (2-Benzylhydroquinone)** $C_{13}H_{12}O_2$

MW, 200

Leaflets from hot H_2O . M.p. 105°. B.p. 230°/13 mm. Sol. EtOH, Et_2O . Reduces NH_3 .Ag NO_3 and warm Fehling's.Stollé, Möring, *Ber.*, 1904, 37, 3486.**2 : 4'-Dihydroxydiphenylmethane.**Needles from EtOH.Aq. M.p. 117-18°. Sol. EtOH, Et_2O . Spar. sol. H_2O .*Di-Me ether*: $C_{15}H_{16}O_2$. MW, 228. M.p. 26°.*Di-Et ether*: $C_{17}H_{20}O_2$. MW, 256. Needles from EtOH.Aq. M.p. 60°.*Diacetyl*: needles from AcOH. M.p. 70°.*Dibenzoyl*: m.p. 108°.Wagner, *J. prakt. Chem.*, 1902, 65, 313.**3 : 3'-Dihydroxydiphenylmethane.**Needles from AcOH.Aq. M.p. 103°. Sol. EtOH, Et_2O , AcOH, hot H_2O . Spar. sol. C_6H_6 .*Diacetyl*: leaflets from ligroin. M.p. 57-58-5°.Auwers, Rietz, *Ann.*, 1907, 356, 157.**4 : 4'-Dihydroxydiphenylmethane.**Leaflets or needles from hot H_2O . M.p. 158°.Sol. EtOH, Et_2O , alkalis. Mod. sol. $CHCl_3$. Insol. CS_2 . Non-volatile in steam. KOH fusion→ phenol + *p*-hydroxybenzoic acid.*Di-Me ether*: leaflets from EtOH. M.p. 52°.*Di-Et ether*: m.p. 38-9°.*Diacetyl*: prisms from EtOH. M.p. 69-70°.*Dibenzoyl*: needles from EtOH. M.p. 156°.Staedel, Haase, Moyat, *Ann.*, 1894, 283, 163.**2 : 2'-Dihydroxydiphenyl sulphide** $C_{12}H_{10}O_2S$

MW, 218

Needles from C_6H_6 . M.p. 142°. Sol. EtOH, Et_2O , AcOH, hot H_2O , hot C_6H_6 . Insol. ligroin. $FeCl_3$ on aq. sol. → green col.*Di-Me ether*: $C_{14}H_{14}O_2S$. MW, 246. Leaflets from EtOH. M.p. 73°. B.p. 252-3°/10 mm. Sol. EtOH, Et_2O , C_6H_6 .*Diacetyl*: needles from EtOH. M.p. 95-6°.Mauthner, *Ber.*, 1906, 39, 1350.**3 : 3'-Dihydroxydiphenyl sulphide.**Plates. M.p. 130°. $FeCl_3$ → blue col.Tassinari, *Gazz. chim. ital.*, 1893, 23, i, 194.**4 : 4'-Dihydroxydiphenyl sulphide.**Leaflets from EtOH. M.p. 151°. Sol. EtOH, Et_2O . Mod. sol. hot H_2O .*Di-Me ether*: leaflets from C_6H_6 . M.p. 46°. B.p. 215°/12 mm. Sol. EtOH, Et_2O , AcOH, C_6H_6 .*Di-Et ether*: $C_{16}H_{18}O_2S$. MW, 274. M.p. 55°.*Diacetyl*: m.p. 92-4°.Tassinari, *Gazz. chim. ital.*, 1887, 17, 83.**2 : 5-Dihydroxydiphenyl sulphone** $C_{12}H_{10}O_4S$

MW, 250

Prisms from EtOH.Aq. or H₂O. M.p. 196°. Spar. sol. Et₂O.

Hinsberg, *Ber.*, 1903, 36, 112.

2 : 2'-Dihydroxydiphenyl sulphone.

Needles from C₆H₆. M.p. 164-5° (179°). Sol. EtOH, Et₂O, AcOH. Spar. sol. C₆H₆. FeCl₃ on aq. sol. → red col. Blue sol. in conc. H₂SO₄.

Di-Me ether : C₁₄H₁₄O₄S. MW, 278. Needles from C₆H₆. M.p. 157-8°. Sol. EtOH, AcOH. Spar. sol. C₆H₆. Blue sol. in conc. H₂SO₄.

Diacetyl : needles from EtOH. M.p. 147-8° decomp.

Mauthner, *Ber.*, 1906, 39, 1351.

3 : 3'-Dihydroxydiphenyl sulphone.

M.p. 190-1°. Sol. EtOH, Et₂O. Spar. sol. AcOH.

Tassinari, *Gazz. chim. ital.*, 1893, 23, i, 195.

4 : 4'-Dihydroxydiphenyl sulphone.

Needles from H₂O. M.p. 240-1°. Sol. EtOH, Et₂O, hot H₂O, alkalis. D¹⁵ 1.3663.

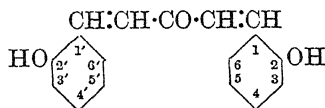
Di-Me ether : m.p. 130°. Sol. hot EtOH. Sublimes.

Di-Et ether : C₁₆H₁₈O₄S. MW, 306. Plates from EtOH. M.p. 163°.

Diacetyl : needles from EtOH. M.p. 163-5°.

Annaheim, *Ann.*, 1874, 172, 36.

2 : 2'-Dihydroxydistyryl Ketone (*Disalicylideneacetone*, *di-[o-hydroxybenzylidene]-acetone*, *lygosin*)



C₁₇H₁₄O₃

MW, 266

Yellowish needles from EtOH.Aq. M.p. 168° decomp. Sol. EtOH, Et₂O, CHCl₃, AcOH. Insol. H₂O. Hot dil. NaOH → salicylaldehyde + acetone. Heat above m.p. → dibenz-spiropyran. Sensitive acid-alkali indicator, orange in alkalis, opalescent in acids. Can be used for titrating ammonia.

Di-Me ether : C₁₉H₁₈O₃. MW, 294. Yellow leaflets from EtOH. M.p. 125°. Sol. hot EtOH.

Di-Et ether : C₂₁H₂₂O₃. MW, 322. Yellow leaflets from EtOH. M.p. 89°. Sol. hot EtOH.

Diacetyl : yellow needles from EtOH. M.p. 128°.

Dibenzoyl : m.p. 135°.

sym.-*Trinitrobenzene add. comp.* : 1 ketone to 2 t.n.b., m.p. 127° : 2 ketone to 1 t.n.b., m.p. 115°.

Decker, Felsner, *Ber.*, 1908, 41, 3001.

4 : 4'-Dihydroxydistyryl Ketone (*Di-[p-hydroxybenzylidene]-acetone*).

Exists in stable and labile modifications.

(1) *Stable*. Orange yellow leaflets or needles

Dict. of Org. Comp.—II.

from EtOH.Aq. M.p. 237-8°. Sol. EtOH, AcOH, Me₂CO. Spar. sol. Et₂O, CHCl₃, C₆H₆. Orange red sols. in alkalis. *Diacetyl* : yellowish needles from EtOH. M.p. 165-6°.

(2) *Labile*. Green leaflets. Heat at 145° → stable form. Sol. EtOH, AcOH. Insol. Et₂O, CHCl₃, C₆H₆. Orange sols. in alkalis from which min. acids precipitate the stable form.

Di-Me ether : see Dianisylideneacetone.

Zincke, Mühlhausen, *Ber.*, 1903, 36, 130.

Vorländer, Koch, *Ber.*, 1929, 62, 534.

McGookin, Sinclair, *J. Chem. Soc.*, 1928, 1175.

Dihydroxyethane-tricarboxylic Acid.

See Desoxalic Acid.

Dihydroxyethoxypropane.

See under Glycerol.

α : β-Dihydroxyethylbenzene.

See Styrene Glycol.

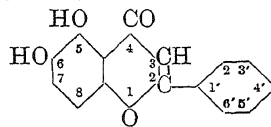
Dihydroxyethyl phenyl Ketone.

See β : γ-Dihydroxypropionophenone.

7 : 4'-Dihydroxyflavanone.

See Liquiritigenin.

5 : 6-Dihydroxyflavone



C₁₅H₁₀O₄

MW, 254

Yellow prismatic needles from EtOH. M.p. 189-91°. Alc. FeCl₃ → intense olive green col. Conc. H₂SO₄ → yellow col. with no fluor.

5-Me ether : C₁₆H₁₂O₄. MW, 268. Prisms from MeOH. M.p. 185°. *Acetyl* : m.p. 136-7°.

6-Me ether : yellow prismatic needles from EtOH. M.p. 128-9°. *Acetyl* : prisms from EtOH. M.p. 149°.

Di-Me ether : C₁₇H₁₄O₄. MW, 282. Plates from EtOH. M.p. 199°.

Diacetyl : prisms from EtOH. Needles from AcOEt. M.p. 165-6°.

Baker, *J. Chem. Soc.*, 1939, 960.

Horii, *J. Pharm. Soc. Japan*, 1939, 59, 209.

Nakazawa, *ibid.*, 194., 194.

Iyer, Venkataraman, *Proc. Indian Acad. Sci.*, 1946, 23, 278.

5 : 7-Dihydroxyflavone.

See Chrysin.

5 : 8-Dihydroxyflavone (*Primetin*).

Obtained from *Primula modesta*. Yellow prisms from EtOH. M.p. 230-1°. Alc. FeCl₃ → green col. Red sols. in alkalis. Yellow sol. in conc. H₂SO₄.

8-Me ether : C₁₆H₁₂O₄. MW, 268. Yellow needles from EtOH. M.p. 210°. Insol. alkalis. FeCl₃ → brownish violet col. *Acetyl* : needles from EtOH. M.p. 176°.

Di-Me ether: needles from AcOEt. M.p. 146°.

Diacetyl: needles from EtOH. M.p. 189°.

Horii, *J. Pharm. Soc. Japan*, 1939, 59, 209.

Nagai, Hatori, *Chem. Zentr.*, 1930, II, 409.

Baker, *J. Chem. Soc.*, 1939, 956.

6 : 7-Dihydroxyflavone.

Prisms +1H₂O from EtOH.Aq. M.p. 254°. Green sol. in conc. H₂SO₄.

Di-Me ether: C₁₇H₁₄O₄. MW, 282. Needles from EtOH.Aq. M.p. 189°.

Diacetyl: needles from EtOH. M.p. 201°.

Reigrodski, Tambor, *Ber.*, 1910, 43, 1966.

Hattori, *Chem. Abstracts*, 1932, 26, 4816.

7 : 8-Dihydroxyflavone.

Needles from EtOH. M.p. 246°. Sol. EtOH, C₆H₆. Insol. H₂O. Orange yellow sol. in conc. NaOH.Aq.

7-Me ether: yellow prisms. M.p. 227°. *Acetyl*: yellow needles. M.p. 227°.

Di-Me ether: needles from EtOH. M.p. 151°.

Diacetyl: needles from EtOH.Aq. M.p. 198°.

Venkataraman, *J. Chem. Soc.*, 1929, 2221.

Baker, *J. Chem. Soc.*, 1939, 958.

Seka, Prosche, *Monatsh.*, 1936, 69, 290.

5 : 4'-Dihydroxyflavone.

Yellow needles from EtOH. M.p. 237-40°. Alc. FeCl₃ → dark reddish brown col.

4'-Me ether: pale yellow needles from EtOH. M.p. 155-6°. *Acetyl*: needles from EtOH. M.p. 171-2°.

Diacetyl: needles from EtOH. M.p. 179-80°.

Syed, Wheeler, *J. Chem. Soc.*, 1936, 1714.

6 : 2'-Dihydroxyflavone.

Yellowish needles from EtOH. M.p. 304-5°.

Di-Et ether: C₁₉H₁₈O₄. MW, 310. Needles from C₆H₆-ligroin. M.p. 106°.

Diacetyl: prisms from EtOH.Aq. M.p. 148-9°.

Kostanecki, Seifart, *Ber.*, 1900, 33, 2512.

6 : 3'-Dihydroxyflavone.

Needles from EtOH. M.p. 300°.

Di-Et ether: leaflets from EtOH. M.p. 135-6°.

Diacetyl: needles from EtOH. M.p. 169-70°.

Blumstein, Kostanecki, *Ber.*, 1900, 33, 1480.

6 : 4'-Dihydroxyflavone.

Needles from EtOH. Decomp. at 320° without melting. Spar. sol. EtOH.

Di-Et ether: needles from EtOH.Aq. M.p. 143°. Yellow sol. in H₂SO₄ with green fluor.

Diacetyl: needles from AcOH-EtOH. M.p. 207°.

Kostanecki, Oderfeld, *Ber.*, 1899, 32, 1929.

7 : 2'-Dihydroxyflavone.

Needles from EtOH. M.p. 320°.

Di-Me ether: C₁₇H₁₄O₄. MW, 282. M.p. 176-7°.

Di-Et ether: C₁₉H₁₈O₄. MW, 310. Prisms from EtOH. M.p. 125°. Sol. in H₂SO₄ shows blue fluor.

Diacetyl: m.p. 105°.

Kostanecki, Salis, *Ber.*, 1899, 32, 1033.

7 : 3'-Dihydroxyflavone.

Needles. M.p. 277-8°. Sol. EtOH. Colourless sol. in H₂SO₄ with blue fluor.

Di-Me ether: m.p. 153°.

7-Et ether: plates from Py-EtOH. M.p. 263-4°. *Acetyl*: needles from EtOH.Aq. M.p. 126-7°.

Di-Et ether: needles. M.p. 153-4°. Sol. in H₂SO₄ shows bluish green fluor.

Diacetyl: needles from EtOH. M.p. 152-3°.

Harpe, Kostanecki, *Ber.*, 1900, 33, 325.

7 : 4'-Dihydroxyflavone.

M.p. 315°. Sol. in H₂SO₄ shows blue fluor.

Di-Me ether: pale yellow needles from EtOH.Aq. M.p. 143-4°.

Diacetyl: needles from EtOH. M.p. 182-3°.

Kostanecki, Osius, *Ber.*, 1899, 32, 325.

Tambor, *Ber.*, 1916, 49, 1709.

2' : 4'-Dihydroxyflavone.

M.p. 268-70°.

Di-Me ether: C₁₇H₁₄O₄. MW, 282. M.p. 221°.

Hattori, *Chem. Abstracts*, 1932, 26, 4816.

3' : 4'-Dihydroxyflavone.

Pale yellow cryst. from EtOH. M.p. 243°.

Di-Me ether: needles from EtOH. M.p. 154-5°.

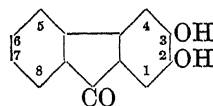
Diacetyl: needles from EtOH. M.p. 171°.

Bernstein, Fraschina, Kostanecki, *Ber.*, 1905, 38, 2180.

Dihydroxyflavonol.

See Trihydroxyflavone.

2 : 3-Dihydroxyfluorenone



C₁₃H₈O₃

MW, 212

Di-Me ether: C₁₅H₁₀O₃. MW, 240. Yellow leaflets from EtOH. M.p. 164°. H₂SO₄ → bluish green sol.

Reichert, *Arch. Pharm.*, 1932, 270, 551.

2 : 7-Dihydroxyfluorenone.

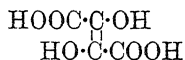
Red needles from EtOH. M.p. 338° decomp. Insol. H₂O, C₆H₆. Sublimes. Blue sols in alkalis.

Oxime: yellowish orange needles from EtOH. Aq. M.p. 300° decomp.

Dibenzoyl: yellow needles from C₆H₆. M.p. 231°.

Courtot, *Ann. chim.*, 1930, 14, 44.

Dihydroxyfumaric Acid



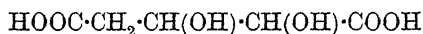
C₄H₄O₆ MW, 148

Prisms + 2H₂O from hot H₂O. $k = 8.2 \times 10^{-2}$ at 25°. Dehydrated in H⁺ at 80-5° → amorphous powder.

Fenton, *J. Chem. Soc.*, 1898, 73, 78.

Bösesken, de Voogd, *Rec. trav. chim.*, 1923, 42, 745.

1 : 2-Dihydroxyglutaric Acid



C₅H₈O₆ MW, 164

Inactive.

Plates from EtOH. Needles from H₂O. M.p. 164° decomp. Very sol. H₂O. Spar. sol. EtOH.

Active.

Two forms. (i) Plates or needles. M.p. 156°. Dextrorotatory in aq. sol. (ii) Non-cryst. On standing, acid → dextrorotatory lactone, C₅H₆O₅, m.p. 120°.

Kiliani, *Ber.*, 1885, 18, 2517.

Kiliani, Löffler, *Ber.*, 1905, 38, 3625.

1 : 3-Dihydroxyglutaric Acid



C₅H₈O₆ MW, 164

Meso.

Prisms from Me₂CO. M.p. 162°. Very sol. H₂O, EtOH. Spar. sol. AcOEt. Prac. insol. Et₂O, C₆H₆, CHCl₃.

Dianilide: plates from EtOH. M.p. 223°.

Di-p-toluidide: plates from EtOH. M.p. 232°.

dl.

Plates or prisms from H₂O. M.p. 125° → lactonic acid.

Dianilide: prisms from EtOH. M.p. 156°.

Di-p-toluidide: needles from EtOH. M.p. 179°.

d.

Cryst. M.p. 135°. $[\alpha]_D^{20} + 3.9^\circ$ in H₂O.

l.

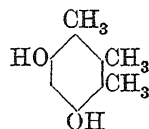
Cryst. from Et₂O. M.p. 135°. $[\alpha]_D^{20} - 2.6^\circ$ in H₂O.

Ingold, *J. Chem. Soc.*, 1921, 119, 322.

Nef, *Ann.*, 1910, 376, 22.

Kiliani, Matthes, *Ber.*, 1907, 40, 1242.

4 : 6-Dihydroxyhemimellitene (4 : 5 : 6-Tri-methylresorcinol, 4 : 6-dihydroxy-1 : 2 : 3-trimethylbenzene)



C₉H₁₂O₂

MW, 152

Needles or leaflets. M.p. 163-4°. Sol. Et₂O, EtOH, Me₂CO. Less sol. CHCl₃, C₆H₆, CS₂. Insol. pet. ether. FeCl₃ → blue col.

Simon, *Ann.*, 1903, 329, 308.

Dihydroxyheneicosane.

See Heneicosandiol.

2 : 3-Dihydroxyheptadecenylbenzene.

See Glutarhengol.

Dihydroxy-heptadecylbenzene.

See Hydrolaccol and Hydrothitsiol.

Dihydroxyheptane.

See Heptandiol.

2 : 5-Dihydroxy-hexadecylbenzene.

See Hexadecylhydroquinone.

3 : 4-Dihydroxy-1 : 5-hexadiene.

See Divinylethylene Glycol.

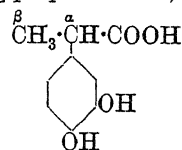
Dihydroxyhexahydrodrotoluene.

See Methylcyclohexandiol.

Dihydroxyhexane.

See Hexandiol.

3 : 4-Dihydroxyhydratropic Acid (α -[3 : 4-Dihydroxyphenyl]-propionic acid)



C₉H₁₀O₄

MW, 182

M.p. 97°. Very sol. H₂O, EtOH, Et₂O. FeCl₃ → green to brown col. Strong reducing agent.

Di-Me ether: C₁₁H₁₄O₄. MW, 210. Cryst. + 1H₂O from H₂O. M.p. 60°, anhyd. 52°. Readily sol. EtOH, Et₂O.

Bougault, *Ann. chim.*, 1902, 25, 564.

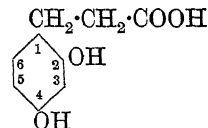
Dihydroxyhydrazobenzene.

See Hydrazophenol.

α : β -Dihydroxyhydrocinnamic Acid.

See 2-Phenylglyceric Acid.

2 : 4-Dihydroxyhydrocinnamic Acid (*Hydroumbellic acid*)



C₉H₁₀O₄

MW, 182

Cryst. from C₆H₆ or H₂O. M.p. 165°. FeCl₃ → green col. Reduces cold Tollen's reagent and warm Fehling's.

Di-Me ether: $C_{11}H_{14}O_4$. MW, 210. Cryst. from EtOH. M.p. 105° .

Bridge, Crocker, Cubin, Robertson, *J. Chem. Soc.*, 1937, 1533.

Chapman, Stephen, *J. Chem. Soc.*, 1925, 127, 889.

Langley, Adams, *J. Am. Chem. Soc.*, 1922, 44, 2325.

2 : 6-Dihydroxyhydrocinnamic Acid.

Prismatic needles from H_2O . M.p. 176° decomp.; resolidifies at 178° and melts again at $224-5^\circ$. Alc. sol. + $FeCl_3 \rightarrow$ red col.

Chapman, Stephen, *J. Chem. Soc.*, 1925, 127, 891.

3 : 4-Dihydroxyhydrocinnamic Acid ($\alpha\beta$ -Dihydrocaffeic acid, hydrocaffeic acid).

Occurs in spores of *Lycopodium clavatum*. Leaflets from H_2O . M.p. 139° . Sol. H_2O , EtOH, Et_2O . Reduces Fehling's and $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ green col.

3-Me ether: hydroferulic acid. $C_{10}H_{12}O_4$. MW, 196. Plates from H_2O . M.p. $89-90^\circ$.

4-Me ether: hydroisoferyl acid. Needles from H_2O . M.p. 146° .

Di-Me ether: 3 : 4-dimethoxyhydrocinnamic acid. $C_{11}H_{14}O_4$. MW, 210. Needles. M.p. anhyd. $98-9^\circ$. Sol. H_2O , EtOH, Et_2O . *Amide*: $C_{11}H_{15}O_3N$. MW, 209. Needles from C_6H_6 . M.p. $120-1^\circ$.

Lapworth, Wykes, *J. Chem. Soc.*, 1917, 111, 798.

Zetzsche, Huggler, *Helv. Chim. Acta*, 1927, 10, 472.

3 : 5-Dihydroxyhydrocinnamic Acid.

3-Me ether: plates from H_2O . M.p. 127° . Insol. C_6H_6 , pet. ether. *Amide*: needles from H_2O . M.p. 126° .

Di-Me ether: needles from C_6H_6 -pet. ether. M.p. $61-2^\circ$. *Amide*: needles from C_6H_6 -pet. ether. M.p. $80-1^\circ$.

Salway, *J. Chem. Soc.*, 1910, 97, 2417.

2 : 4-Dihydroxy-6-hydroxymethyl-3-aldehydobenzoic Acid.

See Barbatol-carboxylic Acid.

Dihydroxy-hydroxymethylanthraquinone.

See Aloe-emodin.

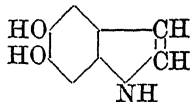
2 : 6-Dihydroxy-4-hydroxymethyl-benzaldehyde.

See Barbatol.

3 : 6-Dihydroxyindole.

See 6-Hydroxyindoxyl.

5 : 6-Dihydroxyindole



$C_8H_7O_2N$

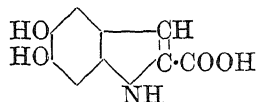
MW, 149

Di-Me ether: $C_{10}H_{11}O_2N$. MW, 177. Leaflets from EtOH-pet. ether. Rods from C_6H_6 . Needles from 30% EtOH. M.p. $154-5^\circ$. B.p. $198^\circ/8$ mm. Darkens rapidly. $FeCl_3 \rightarrow$ green col. *N-Acetyl*: yellowish brown leaflets from pet. ether. M.p. $150-2^\circ$.

Oxford, Raper, *J. Chem. Soc.*, 1927, 417.

Raper, *Biochem. J.*, 1927, 21, 89.

5 : 6-Dihydroxyindole-2-carboxylic Acid



$C_9H_7O_4N$

MW, 193

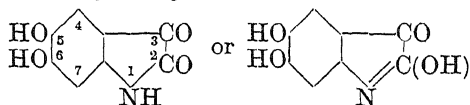
Di-Me ether: $C_{11}H_{11}O_4N$. MW, 221. Plates from C_6H_6 . M.p. $202-3^\circ$ decomp. $H_2SO_4 \rightarrow$ orange sol. *Ester*: yellow prisms from EtOH. M.p. 172° .

Oxford, Raper, *J. Chem. Soc.*, 1927, 420.

Raper, *Biochem. J.*, 1927, 21, 89.

Rubinstein, Perkin, *J. Chem. Soc.*, 1926, 360.

5 : 6-Dihydroxyisatin



$C_8H_5O_4N$

MW, 179

Di-Me ether: $C_{10}H_9O_4N$. MW, 207. Orange brown needles from C_6H_6 . M.p. about $180-95^\circ$.

5 : 6-Methylene ether: needles from H_2O . M.p. 284° decomp. $H_2SO_4 \rightarrow$ blue sol.

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2931.

Fetscher, Bogert, *J. Org. Chem.*, 1939, 4, 71.

6 : 7-Dihydroxyisatin.

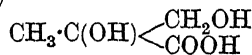
7-Me ether: $C_9H_7O_4N$. MW, 193. Dark red needles from AcOH. M.p. $246-7^\circ$ decomp. *Semicarbazone*: yellow tablets + $1H_2O$. M.p. above 270° .

Di-Me ether: orange needles from EtOH. M.p. $212-3^\circ$. *Semicarbazone*: yellow needles from EtOH. M.p. 254° .

Burton, Stoves, *J. Chem. Soc.*, 1937, 391.

Gulland, Robinson, Scott, Thornley, *J. Chem. Soc.*, 1929, 2933.

1 : 2-Dihydroxyisobutyric Acid (1-Methylglyceric acid)



$C_4H_8O_4$

MW, 120

Cryst. from AcOEt. M.p. 104° .

Me ester: $C_5H_{10}O_4$. MW, 134. B.p. $89^\circ/10$ mm. D_4^{25} 1.185. n_D^{25} 1.4438.

Et ester: $C_6H_{12}O_4$. MW, 148. B.p. $95^\circ/10$ mm. D_4^{25} 1.114. n_D^{25} 1.4370.

n-Propyl ester: $C_7H_{14}O_4$. MW, 162. B.p. $103^\circ/10$ mm. D_4^{25} 1.0789. n_D^{25} 1.4379.

n-Butyl ester: $C_8H_{16}O_4$. MW, 176. B.p. $113^\circ/10$ mm. D_4^{25} 1.0539. n_D^{25} 1.4393.

n-Amyl ester: $C_9H_{18}O_4$. MW, 190. B.p. $119^\circ/10$ mm. D_4^{25} 1.0288. n_D^{25} 1.4404.

Diacetyl: m.p. 59° . B.p. $135-45^\circ/2$ mm.

Chloride: b.p. $92-7^\circ/4$ mm.

Phenylhydrazone: cryst. from EtOH. M.p. 107° .

Glattfeld, Sherman, *J. Am. Chem. Soc.*, 1925, 47, 1445.

Glattfeld, Mochel, *J. Am. Chem. Soc.*, 1938, 60, 1012.

2 : 4-Dihydroxyisobutyrophenone.

See 4-Isobutyrylresorcinol.

2 : 4-Dihydroxyisocaprophenone.

See 4-Isocaprolylresorcinol.

7 : 4'-Dihydroxyisoflavone.

See Daidzein.

Dihydroxyisonicotinic Acid.

See Citrazinic Acid.

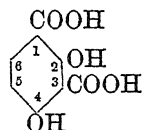
Dihydroxyisophthalaldehyde.

See Resorcindialdehyde.

4 : 5-Dihydroxyisophthalaldehydic Acid.

See Isonoropianic Acid.

2 : 4-Dihydroxyisophthalic Acid (*Resorcinol-2 : 4-dicarboxylic acid*)



$C_8H_6O_6$

MW, 198

Needles from H_2O or EtOH.Aq. M.p. 312° ($305-6^\circ$, $179-81^\circ$). Sol. EtOH, Et_2O . Spar. sol. cold H_2O . Aq. sol. + $FeCl_3 \rightarrow$ bluish red col.

Et ester: $C_{10}H_{10}O_6$. MW, 226. Needles from EtOH.Aq. M.p. $202-3^\circ$.

Di-Et ester: $C_{12}H_{14}O_6$. MW, 254. Needles from EtOH. M.p. 137° .

Errera, *Ber.*, 1899, 32, 2797.

Radha, Shah, *J. Indian Chem. Soc.*, 1942, 19, 495.

4 : 6-Dihydroxyisophthalic Acid (*Resorcinol-4 : 6-dicarboxylic acid*).

Cryst. from H_2O or EtOH.Aq. M.p. 326° (306°). Sol. EtOH, Et_2O . Mod. sol. hot H_2O . Does not reduce Fehling's or $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ violet col.

Di-Me ester: $C_{10}H_{10}O_6$. MW, 226. M.p. 147° .

Di-Et ester: $C_{12}H_{14}O_6$. MW, 254. Needles from EtOH. M.p. 141° (137°).

Di-Me ether: 4 : 6-dimethoxyisophthalic acid. $C_{10}H_{10}O_6$. MW, 226. M.p. 266° . *Di-Me ester*:

$C_{12}H_{14}O_6$. MW, 254. M.p. 150° . *Di-Et ester*: $C_{14}H_{18}O_6$. MW, 282. M.p. 83.5° .

Di-Et ether: $C_{12}H_{14}O_6$. MW, 254. Cryst. from EtOH. M.p. 250° decomp.

Hemmelmayr, *Monatsh.*, 1917, 38, 82.

Späth, Klager, Schlösser, *Ber.*, 1931, 64, 2206.

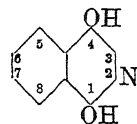
Marzin, *J. prakt. Chem.*, 1933, 138, 107.

Jois, Manjunath, Siddappa, *Chem. Zentr.*, 1933, II, 3119.

Dihydroxyisopropylbenzene.

See 2-Phenylpropylene Glycol and 2-Phenyltrimethylene Glycol.

1 : 4-Dihydroxyisoquinoline (*4-Hydroxyisocarbostryl*)



$C_9H_7O_2N$

MW, 161

Needles from AcOH. Reddens at 200° . Does not melt below 250° .

4-Me ether: $C_{10}H_9O_2N$. MW, 175. Needles from Me_2CO -pet. ether. M.p. 171° .

4-Acetyl: needles. M.p. $207-8^\circ$.

Gabriel, Colman, *Ber.*, 1902, 35, 2421.

3 : 4-Dihydroxyisoquinoline.

M.p. $189-90^\circ$.

Heller, *Ber.*, 1926, 59, 706.

5 : 8-Dihydroxyisoquinoline.

B, HCl: yellow leaflets from dil. HCl. Darkens about 260° .

Dibenzoyl: needles from EtOH. M.p. $162-3^\circ$.

Fieser, Martin, *J. Am. Chem. Soc.*, 1935, 57, 1843.

6 : 7-Dihydroxyisoquinoline.

Di-Me ether: $C_{11}H_{11}O_2N$. MW, 189. Cryst. from Et_2O . M.p. $93-4^\circ$. *B, HCl*: cryst. + $3H_2O$ from dil. HCl. M.p. anhyd. $208-10^\circ$ decomp. *Picrate*: yellow needles from EtOH. M.p. $218-20^\circ$.

Goldschmiedt, *Monatsh.*, 1887, 8, 521.

2 : 4-Dihydroxyisovalerophenone.

See 4-Isovalerylresorcinol.

2 : 4-Dihydroxy-6- β -ketoheptylbenzoic Acid.

See Olivetonc Acid.

Dihydro-xylene.

See Dimethylcyclohexadiene.

Dihydroxylepidine.

See Dihydroxy-4-methylquinoline.

Dihydroxymaleic Acid

$HO-C-COOH$

$HO-C-COOH$

$C_4H_4O_6$

MW, 148

Occurs in *Glaucium luteum*. Plates + 2H₂O from H₂O. Loses 2H₂O in vac. Anhyd. decomp. about 155° without melting. Sol. MeOH, EtOH. Spar. sol. Et₂O, AcOH, cold H₂O. Aq. sols. decomp. to glycollic aldehyde at room temp. $k = 7.2 \times 10^{-2}$ at 25°.

Fenton, *J. Chem. Soc.*, 1905, 87, 811.

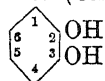
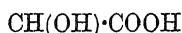
Neuberg, Schwenk, *Biochem. Z.*, 1915, 71, 112.

Nef, *Ann.*, 1907, 357, 291.

Dihydroxymalonic Acid.

See Mesoxalic Acid.

2 : 3-Dihydroxymandelic Acid



C₈H₈O₅ MW, 184

2 : 3-Di-Me ether : C₁₀H₁₂O₅. MW, 212. Cryst. from C₆H₆. M.p. 96°.

La Forge, *J. Am. Chem. Soc.*, 1931, 53, 3899.

2 : 4-Dihydroxymandelic Acid.

2 : 4-Di-Et ether : C₁₂H₁₆O₅. MW, 240. M.p. 115°.

Gregor, *Monatsh.*, 1895, 16, 624.

2 : 5-Dihydroxymandelic Acid.

Cryst. M.p. 143° decomp. Sol. H₂O, EtOH. Spar. sol. Et₂O. Insol. ligroin, C₆H₆. FeCl₃ → blue col.

2 : 5-Di-Me ether : cryst. from C₆H₆. M.p. 101°. Softens at 90°.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 394.

3 : 4-Dihydroxymandelic Acid.

White amorphous powder from EtOH-C₆H₆. Et ester : C₁₀H₁₂O₅. MW, 212. Cryst. from xylene. M.p. 152-3°. Sol. H₂O.

Nitrile : C₈H₇O₃N. MW, 165. Cryst. M.p. 100-105°.

3 : 4-Di-Me ether : plates from C₆H₆. M.p. 105°. Light → veratric aldehyde.

Barger, Ewins, *J. Chem. Soc.*, 1909, 95, 557.

Dihydroxymenthane.

See Menthandiol.

Dihydroxymesitylene.

See Mesoreinol.

Dihydroxymethoxybenzoic Acid.

See under Gallic Acid.

Dihydroxymethoxybenzophenone.

See Cotoin and Isocotoin.

Dihydroxymethoxycaproic Aldehyde.

See Diginose and Sarmentose.

7 : 8-Dihydroxy-6-methoxycoumarin.

See Fraxetin.

5 : 7-Dihydroxy-2'-methoxyflavanone.

See Citronetin.

5 : 7-Dihydroxy-6-methoxyflavone.

See Oroxylin-A.

5 : 4'-Dihydroxy-7-methoxyflavone.

See Genkwanin.

5 : 6-Dihydroxy-8-methoxyflavone.

See Izalpinin.

3 : 5-Dihydroxy-7-methoxy-2-methyl-flavanone.

See Alpinone.

Dihydroxymethoxymethylxanthone.

See Rubofusarin.

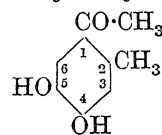
3 : 6-Dihydroxy-5-methoxytoluquinone.

See Spinulosin.

4 : 7-Dihydroxy-2-methoxyxanthone.

See Gentisin.

4 : 5-Dihydroxy-2-methylacetophenone (Methyl 4 : 5-dihydroxy-o-tolyl ketone)



C₉H₁₀O₃ MW, 166

Needles from C₆H₆ or xylene. M.p. 168-9° (164°). Alc. FeCl₃ → green col.

4-Me ether : C₁₀H₁₂O₃. MW, 180. Cryst. from C₆H₆-pet. ether. M.p. 123°. Sol. MeOH, C₆H₆. Spar. sol. H₂O. Alc. FeCl₃ → faint yellowish green col. Acetyl : needles from MeOH. M.p. 108°. Semicarbazone : prisms. Softens at 220°. Decomp. at 228-30°. Phenylhydrazine : prisms from MeOH. M.p. 164-5°.

Di-Me ether : C₁₁H₁₄O₂. MW, 194. Prisms from Et₂O or MeOH. M.p. 76-7°. Alk. KMnO₄ → 4 : 5-dimethoxyphthalic acid. Oxime : prisms from H₂O. M.p. 138°. Semicarbazone : cryst. from EtOH. M.p. 208° (186°). Phenylhydrazine : cryst. from dil. AcOH. M.p. 182° (168-70°).

Stephen, Weizmann, *J. Chem. Soc.*, 1914, 105, 1051.

Krannichfeldt, *Ber.*, 1913, 46, 4020.

4 : 6-Dihydroxy-2-methylacetophenone (Orcacetophenone, methyl 4 : 6-dihydroxy-o-tolyl ketone).

Needles from H₂O. M.p. 159°. Sol. EtOH, Et₂O, Me₂CO, AcOEt. Spar. sol. CHCl₃, C₆H₆. FeCl₃ → red col.

4-Me ether : acetovernone. Needles from EtOH.Aq. M.p. 79°. Volatile in steam. FeCl₃ → reddish brown col.

6-Me ether : isoacetovernone. Plates from H₂O. M.p. 150°. Non-volatile in steam. No col. with FeCl₃.

Di-Me ether : needles from EtOH.Aq. or pet. ether. M.p. 48°.

4-Glucoside : cryst. M.p. 189-90°. Tetraacetyl : m.p. 127-8°. FeCl₃ → blood-red col.

Hoesch, *Ber.*, 1915, 48, 1127.

Mauthner, *J. prakt. Chem.*, 1943, 161, 284.

2 : 4 - Dihydroxy - 3 - methylacetophenone
(3-Methylresacetophenone, methyl 2 : 4-dihydroxy-m-tolyl ketone).

M.p. 156-7°. Alc. $\text{FeCl}_3 \rightarrow$ violet col.
4-Me ether: m.p. 82-3°. Alc. $\text{FeCl}_3 \rightarrow$ greenish-blue col.

Rangaswami, Seshadri, *Chem. Abstracts*, 1939, 33, 2122.

2 : 6 - Dihydroxy - 3 - methylacetophenone
(Methyl 2 : 6-dihydroxy-m-tolyl ketone).

Yellow plates from C_6H_6 . M.p. 138°. Alc. $\text{FeCl}_3 \rightarrow$ dark green col.

Yanagita, *Ber.*, 1938, 71, 2271.

4 : 6 - Dihydroxy - 3 - methylacetophenone
(5-Methylresacetophenone, methyl 4 : 6-dihydroxy-m-tolyl ketone).

Pale yellow needles or plates from C_6H_6 or H_2O . M.p. 170°. Sol. EtOH, Me_2CO , hot H_2O . Spar. sol. C_6H_6 . Aq. and alc. sols. show green fluor. $\text{FeCl}_3 \rightarrow$ reddish violet col.

Yanagita, *Ber.*, 1938, 71, 2271.

2 : 6 - Dihydroxy - 4 - methylacetophenone
(Methyl 2 : 6-dihydroxy-p-tolyl ketone, γ -orcacetophenone).

Needles from EtOH.Aq. M.p. 146°. Sol. Et_2O , AcOH. Spar. sol. H_2O , C_6H_6 , CS_2 . $\text{FeCl}_3 \rightarrow$ black col.

Di-Me ether: prisms from EtOH.Aq. M.p. 89°.

Oxime: needles. M.p. 211-12°.

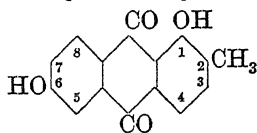
p-Nitrophenylhydrazone: red microcryst. plates. M.p. 245°.

Rasinski, *J. prakt. Chem.*, 1882, 26, 59.

3 : 4 - Dihydroxy - β - methylaminoaceto - phenone.

See Adrenalone.

1 : 6-Dihydroxy-2-methylantraquinone



$\text{C}_{15}\text{H}_{10}\text{O}_4$ MW, 254

Brown needles from AcOH. M.p. 281°. $\text{H}_2\text{SO}_4 \rightarrow$ red col.

Di-Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_4$. MW, 282. Yellow needles from C_6H_6 . M.p. 182°. Deep red sol. in H_2SO_4 .

Diacetyl: yellow needles from AcOH or EtOH. M.p. 212°.

Simonsen, Rau, *J. Chem. Soc.*, 1921, 119, 1347.

4 : 6-Dihydroxy-2-methylantraquinone.

Yellow needles from AcOH. M.p. 255-6°.

Mitter, Chatterji, *J. Indian Chem. Soc.*, 1931, 8, 783.

4 : 7-Dihydroxy-2-methylantraquinone.

Yellow needles from AcOH. M.p. 213-4°.

Mitter, Chatterji, *J. Indian Chem. Soc.*, 1931, 8, 783.

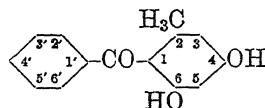
Dihydroxymethylantraquinone.

See also Chrysophanic Acid, Rubiadin, Methylalizarin, Methylanthrurufin, Methylchrysazin, Methylpurpuroxanthin, Methylquinizarin.

1 : 2-Di-[hydroxymethyl]-benzene.

See Phthalyl Alcohol.

4 : 6 - Dihydroxy - 2 - methylbenzophenone
(Benzorcin, phenyl 4 : 6-dihydroxy-o-tolyl ketone)



$\text{C}_{14}\text{H}_{12}\text{O}_3$ MW, 228

Plates from H_2O . M.p. 141°. Sol. EtOH, Et_2O , Me_2CO , AcOEt. Spar. sol. CHCl_3 , C_6H_6 , pet. ether. Alc. $\text{FeCl}_3 \rightarrow$ reddish-brown col.

Hoesch, *Ber.*, 1915, 48, 1131.

2' : 4'-Dihydroxy - 2 - methylbenzophenone
(4-o-Toluyresorcinol, 2 : 4-dihydroxyphenyl o-tolyl ketone).

Cryst. from AcOH.Aq. M.p. 126-7°. $\text{FeCl}_3 \rightarrow$ red col.

Diacetyl: from EtOH. M.p. 45°.

Limaye, Talwalkar, *Chem. Zentr.*, 1939, I, 4035.

2' : 6'-Dihydroxy - 2 - methylbenzophenone
(2-o-Toluyresorcinol, 2 : 6-dihydroxyphenyl o-tolyl ketone).

Cryst. from H_2O . M.p. 120°. $\text{FeCl}_3 \rightarrow$ black col.

Di-Me ether: $\text{C}_{16}\text{H}_{16}\text{O}_3$. MW, 256. M.p. 120°.

Dibenzoyl: m.p. 139-40°.

Limaye, Talwalkar, *Chem. Zentr.*, 1939, I, 4035.

3' : 4'-Dihydroxy - 2 - methylbenzophenone
(4-o-Toluycatechol, 3 : 4-dihydroxyphenyl o-tolyl ketone).

Needles. M.p. 105-6°. $\text{FeCl}_3 \rightarrow$ green col.

Di-Me ether: m.p. 72-3°.

Maniwa, *Chem. Zentr.*, 1925, I, 2375.

2 : 4 - Dihydroxy - 3 - methylbenzophenone
(Phenyl 2 : 4-dihydroxy-m-tolyl ketone).

Pale yellow plates from EtOH.Aq. M.p. 177°. Alc. $\text{FeCl}_3 \rightarrow$ dark red col.

4-Me ether: yellow plates or needles from EtOH. M.p. 125°. $\text{FeCl}_3 \rightarrow$ red col.

Jones, Robertson, *J. Chem. Soc.*, 1932, 1693.

6 : 4' - Dihydroxy - 3 - methylbenzophenone
(4-Hydroxyphenyl 6-hydroxy-m-tolyl ketone).

Yellow needles from C_6H_6 . M.p. 150-1°.

6-Me ether: $C_{15}H_{14}O_3$. MW, 242. Plates from C_6H_6 . M.p. 160°.

4'-Me ether: yellow plates from EtOH.Aq. M.p. 108-9°.

Di-Me ether: needles from ligroin. M.p. 69-70°.

Auwers, Rietz, *Ber.*, 1907, 40, 3520.

3 : 4'-Dihydroxy-4-methylbenzophenone (4-Hydroxyphenyl 3-hydroxy-p-tolyl ketone).

Di-Me ether: prisms from MeOH. M.p. 77-8°.

Simonsen, Rau, *J. Chem. Soc.*, 1921, 119, 1341.

2' : 4'-Dihydroxy-4-methylbenzophenone (4-p-Tolylresorcinol, 2 : 4-dihydroxyphenyl p-tolyl ketone).

Needles from AcOH.Aq. M.p. 138°. Alc. $FeCl_3 \rightarrow$ deep red col.

Di-Me ether: m.p. 92°.

Limaye, Shenolikar, *Chem. Zentr.*, 1938, I, 2359.

2' : 6'-Dihydroxy-4-methylbenzophenone (2-p-Tolylresorcinol, 2 : 6-dihydroxyphenyl p-tolyl ketone).

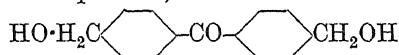
Cryst. from H_2O . M.p. 125°. Alc. $FeCl_3 \rightarrow$ blue-black col.

Di-Me ether: m.p. 134°.

Dibenzoyl: m.p. 130-1°.

Limaye, Shenolikar, *Chem. Zentr.*, 1938, I, 2359.

4 : 4'-Di-[hydroxymethyl]-benzophenone (4:4'-Dihydroxydimethylbenzophenone, 4:4'-dimethylolbenzophenone)



$C_{15}H_{14}O_3$ MW, 242

Prisms from cyclohexane. M.p. 51°.

Connerade, *Chem. Zentr.*, 1933, II, 2389.

1 : 2-Dihydroxy-1-methylbutyric Acid.

See Angliceric Acid.

6 : 7-Dihydroxy-4-methylcoumarin.

See 4-Methylaesculetin.

Dihydroxy-methylenedioxy-[-deoxybenzoin.

See ψ -Baptigenetin.

Di-[hydroxymethyl]-hydrazobenzene.

See Hydrazobenzyl Alcohol.

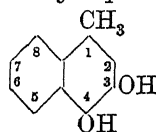
Dihydroxy-methylisophthalaldehyde.

See Orcindialdehyde.

ω : 2-Dihydroxy-1-methylnaphthalene.

See 1-Hydroxymethyl-2-naphthol.

3 : 4-Dihydroxy-1-methylnaphthalene (4-Methyl-1 : 2-naphthohydroquinone)



$C_{11}H_{10}O_2$

MW, 174

Diacetyl: needles from AcOH.Aq. M.p. 125°.

Fieser, Bradsher, *J. Am. Chem. Soc.*, 1939, 61, 420.

1 : 4-Dihydroxy-2-methylnaphthalene (2-Methyl-1 : 4-naphthohydroquinone).

Needles from AcOH. Two forms. (α) M.p. 170°. (β) M.p. 60°. Sol. of β -form in Na_2CO_3 , with HCl \rightarrow α -form. $FeCl_3$ or HNO_3 in AcOH \rightarrow 2-methyl-1 : 4-naphthoquinone.

Monoacetyl: m.p. 124.5-5.8°.

Diacetyl: prisms from EtOH. M.p. 113°.

Madinaveitia, Olay, *Chem. Abstracts*, 1933, 27, 2146.

Madinaveitia, de Buruaga, *Chem. Abstracts*, 1930, 24, 359.

Fries, Lohmann, *Ber.*, 1921, 54, 2919.

6 : 7-Dihydroxy-2-methylnaphthalene.

See Phyllomerol.

6 : 7-Dihydroxy-3-methyl-2-naphthoic Acid.

See Phyllomeronic Acid.

Dihydroxy-2-methyl-1 : 4-naphthoquinone.

See Droserone.

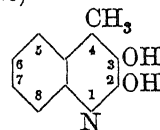
Dihydroxy-1-methylphenanthraquinone.

See Deuticulatol.

Dihydroxy-2-methylquinoline.

See Dihydroxyquinaldine.

2 : 3-Dihydroxy-4-methylquinoline (2 : 3-Dihydroxylepidine)



$C_{10}H_9O_2N$

MW, 175

Needles from EtOH. M.p. 245°. Alc. $FeCl_3 \rightarrow$ green col.

Camps, *Arch. Pharm.*, 1902, 240, 145.

2 : 7-Dihydroxy-4-methylquinoline (2 : 7-Dihydroxylepidine).

Needles + $1H_2O$ from EtOH.Aq. Brown at 280°. M.p. 290-300°. Sol. MeOH, EtOH. Spar. sol. H_2O , Et_2O , C_6H_6 . Dil. alk. sols. show blue fluor. Alc. $FeCl_3 \rightarrow$ yellowish red col.

7-Acetyl: needles from EtOH. M.p. 250-4°.

7-Benzoyl: needles from EtOH. M.p. 288°.

v. Pechmann, Schwarz, *Ber.*, 1899, 32, 3700.

Besthorn, Byvanek, *Ber.*, 1898, 31, 802.

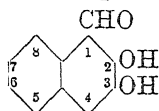
2 : 4-Dihydroxy-5-methylquinoline.

Cryst. powder. Does not melt below 300°. Zn dist. \rightarrow 5-methylquinoline.

Gabriel, Thieme, *Ber.*, 1919, 52, 1086.

2 : 10-Dihydroxymyristic Acid.

See Ipurolic Acid.

2 : 3-Dihydroxy-1-naphthaldehyde

$C_{11}H_8O_3$ MW, 188
Yellow prisms from EtOH.Aq. or C_6H_6 . M.p. 134°.

p-Bromophenylhydrazone: yellow scales from EtOH.Aq. M.p. 200° decomp.

Anil: yellow needles from EtOH. M.p. 199–200°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 181.

2 : 4-Dihydroxy-1-naphthaldehyde.

Needles from C_6H_6 -pet. ether. Purplish brown prisms from EtOH. M.p. 214°.

p-Bromophenylhydrazone: yellow needles from EtOH.Aq. M.p. 166°.

Anil: yellow needles. Reddens at 245°. M.p. 252°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 181.

2 : 5-Dihydroxy-1-naphthaldehyde.

Yellow needles. Darkens at 190°. Decomp. at 225–30°. Sol. EtOH, Et_2O . Spar. sol. H_2O , C_6H_6 , $CHCl_3$.

p-Bromophenylhydrazone: yellow needles + $1H_2O$ from EtOH. M.p. 206–7° decomp.

Anil: orange needles from EtOH. M.p. 209–10°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 181.

2 : 6-Dihydroxy-1-naphthaldehyde.

Dark yellow prisms from C_6H_6 . M.p. 189–90°. *p*-Bromophenylhydrazone: yellow scales from EtOH. M.p. 194–5° decomp.

Anil: orange needles. M.p. 250–60° (215–35°).

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 181.

2 : 7-Dihydroxy-1-naphthaldehyde.

Yellow needles from C_6H_6 . M.p. 160°.

p-Bromophenylhydrazone: greenish yellow scales from EtOH.Aq. M.p. 202–3° decomp.

Anil: yellow needles from EtOH. M.p. 214–5° (195–6°).

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 181.

I.G., F.P. 648,069, (*Chem. Abstracts*, 1929, 23, 2446).

2 : 8-Dihydroxy-1-naphthaldehyde.

Yellow scales from EtOH. M.p. 203–4° decomp. Sol. Et_2O . Spar. sol. H_2O , C_6H_6 .

p-Bromophenylhydrazone: yellow needles from EtOH.Aq. M.p. 206–7° decomp.

Anil: orange needles from EtOH. Darkens at 240°. Does not melt below 280°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

3 : 4-Dihydroxy-1-naphthaldehyde.

Pale yellow needles from Et_2O -pet. ether. M.p. 178–80°.

p-Bromophenylhydrazone: yellow needles from EtOH. M.p. 137–8°.

Anil: red needles with green reflex. M.p. 200–202°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

4 : 5-Dihydroxy-1-naphthaldehyde.

Yellow cryst. from EtOH.Aq. Darkens at 150–60°. M.p. 164–6° decomp. Sol. Et_2O , C_6H_6 , hot H_2O . Insol. pet. ether.

p-Bromophenylhydrazone: brownish yellow needles from EtOH.Aq. M.p. 180° decomp.

Anil: red needles. Darkens at 200°. Does not melt below 280°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

4 : 6-Dihydroxy-1-naphthaldehyde.

Yellow micro-needles from H_2O . Decomp. at 265–70°. Sol. Et_2O . Spar. sol. H_2O . Prac. insol. C_6H_6 .

p-Bromophenylhydrazone: greenish yellow scales from EtOH.Aq. M.p. 205–6° decomp.

Anil: red cryst. Decomp. at 230–40°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

4 : 7-Dihydroxy-1-naphthaldehyde.

Needles + $1H_2O$ from EtOH or H_2O . Darkens at 160°. Decomp. at 218°. Spar. sol. C_6H_6 , $CHCl_3$.

p-Bromophenylhydrazone: yellow needles + $1H_2O$ from EtOH.Aq. M.p. 185° decomp.

Anil: orange red scales with green reflex from EtOH. Darkens at 240°. Does not melt below 280°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

4 : 8-Dihydroxy-1-naphthaldehyde.

Yellow needles from H_2O . Darkens about 280°. Does not melt below 300°. Sol. Et_2O .

Di-Me ether: $C_{13}H_{12}O_3$. MW, 216. M.p. 131°.

p-Bromophenylhydrazone: golden yellow scales from EtOH.Aq. M.p. 206° decomp.

Anil: red needles. M.p. 200° (194–5°).

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 186.

I.G., F.P. 648,069, (*Chem. Abstracts*, 1929, 23, 2446).

1 : 4-Dihydroxy-2-naphthaldehyde.

Greenish yellow needles from H_2O or EtOH.Aq. Darkens at 160–70°. M.p. 188–90°.

4-Me ether: $C_{12}H_{10}O_3$. MW, 202. Yellow needles from EtOH.Aq. or pet. ether. M.p. 100°. Volatile in steam. Alc. $FeCl_3$ → green col.

p-Bromophenylhydrazone: green scales from EtOH.Aq. or AcOH.Aq. Decomp. at 214°.

Anil: red needles from EtOH. M.p. 184-5°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 180.

1 : 5-Dihydroxy-2-naphthaldehyde.

Yellow needles from H₂O or EtOH.Aq. M.p. 215°. Sol. AcOH. Alc. FeCl₃ → green col.

5-Me ether: yellow needles from EtOH.Aq. M.p. 128°.

Bezdzik, Friedlander, *Monatsh.*, 1909, 30, 286.

1 : 8-Dihydroxy-2-naphthaldehyde.

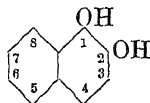
M.p. 134-5°. Sol. EtOH, Et₂O, C₆H₆, hot H₂O. Spar. sol. pet. ether.

p-Bromophenylhydrazone: yellow cryst. Darkens at 170°. Decomp. at 181°.

Anil: yellow needles. M.p. 229-30°.

Morgan, Vining, *J. Chem. Soc.*, 1921, 119, 183.

1 : 2-Dihydroxynaphthalene (αβ-Dihydroxynaphthalene, β-naphthohydroquinone)



C₁₀H₈O₂ MW, 160

Needles from CS₂, m.p. 103-4°. Leaflets + 1H₂O from H₂O, m.p. 58-60°. Yellow alk. sols. turn green in air. FeCl₃ → 1 : 2-naphthoquinone.

1-Me ether: C₁₁H₁₀O₂. MW, 174. Leaflets or plates from ligroin. M.p. 90-5°. Sol. EtOH, Et₂O, C₆H₆.

Di-Me ether: C₁₂H₁₂O₂. MW, 188. M.p. 31°. B.p. 278-80°. Picrate: m.p. 97°.

Diacetyl: m.p. 104-6°.

Paul, *Z. angew. Chem.*, 1897, 11, 24, 47.

1 : 3-Dihydroxynaphthalene (Naphthoresorcinol).

Leaflets from H₂O. M.p. 124°. Sol. H₂O, EtOH, Et₂O, AcOH. Spar. sol. C₆H₆, ligroin.

Diacetyl: prisms from AcOH.Aq. M.p. 56°. sym.-Trinitrobenzene add. comp.: brick red needles. M.p. 174-5°.

Friedländer, Rüdtt, *Ber.*, 1896, 29, 1609.

Kozlov, Odintsov, *J. Applied Chem. U.S.S.R.*, 1944, 17, 219.

Soliman, West, *J. Chem. Soc.*, 1944, 53.

Meyer, Bloch, *Organic Syntheses*, 1945, XXV, 73.

1 : 4-Dihydroxynaphthalene (α-Naphthohydroquinone).

Needles. M.p. 176°. Sol. EtOH, Et₂O, AcOH. Mod. sol. hot H₂O. Prac. insol. CS₂, ligroin, cold C₆H₆. CrO₃ → 1 : 4-naphthoquinone.

Me ether: needles. M.p. 131°.

Di-Me ether: needles from CS₂. M.p. 85°. Volatile in steam.

Et ether: C₁₂H₁₂O₂. MW, 188. Needles from H₂O. M.p. 104°.

Diacetyl: plates from EtOH. M.p. 128-30°.

Dibenzoyl: m.p. 169°.

Russig, *J. prakt. Chem.*, 1900, 62, 32.

1 : 5-Dihydroxynaphthalene.

M.p. 265°. Sol. Et₂O, Me₂CO. Mod. sol. EtOH, AcOH. Spar. sol. H₂O. Insol. C₆H₆, pet. ether. Alk. sols. turn brown in air. Reduces neutral AgNO₃.Aq. CrO₃ → 5-hydroxy-1 : 4-naphthoquinone.

Me ether: C₁₁H₁₀O₂. MW, 174. Leaflets from AcOH. M.p. 140°. Acetyl: m.p. 68°. Benzoyl: m.p. 102°.

Di-Me ether: C₁₂H₁₂O₂. MW, 188. M.p. 183-4°.

Di-Et ether: C₁₄H₁₆O₂. MW, 216. Leaflets from EtOH.Aq. M.p. 130°.

Diacetyl: m.p. 159-60°.

Dibenzoyl: needles from Py. M.p. 235°.

Bentley, Robinson, Weizmann, *J. Chem. Soc.*, 1907, 91, 106.

Erdmann, *Ann.*, 1888, 247, 356.

Fuchs, Stix, *Ber.*, 1922, 55, 663.

Fischer, Bauer, *J. prakt. Chem.*, 1916, 94, 13.

1 : 6-Dihydroxynaphthalene.

Prisms from C₆H₆. M.p. 137-8°. Sublimes. Sol. Me₂CO, Et₂O, C₆H₆. Spar. sol. cold EtOH. FeCl₃ → blue col. then brownish red ppt.

Di-Me ether: needles from pet. ether. M.p. 60-1°.

Di-Et ether: needles from ligroin. M.p. 83°.

Diacetyl: prisms from EtOH. M.p. 73°.

Dibenzoyl: prisms. M.p. 103-4°.

Claus, *J. prakt. Chem.*, 1889, 39, 316.

Fischer, Bauer, *J. prakt. Chem.*, 1916, 94, 1.

1 : 7-Dihydroxynaphthalene.

Needles from C₆H₆. M.p. 178°. Sol. EtOH, Et₂O, C₆H₆, hot H₂O. Alk. sols. rapidly darken in air. FeCl₃ → dark blue ppt.

Di-Et ether: m.p. 67°.

Diacetyl: plates from C₆H₆. M.p. 108°.

Dibenzoyl: m.p. 101-1-5°.

Emmert, *Ann.*, 1887, 241, 371.

Palfray, Leman, *Compt. rend.*, 1935, 200, 1328.

I.G., D.R.P. 535,080, (*Chem. Zentr.*, 1931, II, 3266).

1 : 8-Dihydroxynaphthalene (peri-Dihydroxynaphthalene).

Leaflets or needles from H₂O. M.p. 140°. Sol. Et₂O, C₆H₆. Spar. sol. ligroin, hot H₂O. CrO₃ → 5-hydroxy-1 : 4-naphthoquinone. FeCl₃ → white ppt. changing to green.

Di-Me ether: leaflets from pet. ether. M.p. 50°.

Diacetyl: m.p. 147–8°.

Erdmann, *Ann.*, 1888, 247, 356.

Heller, Kretzschmann, *Ber.*, 1921, 54, 1100.

2 : 3-Dihydroxynaphthalene.

Leaflets from H₂O. M.p. 160–1°. Sol. EtOH, Et₂O. Mod. sol. C₆H₆, ligroin, hot H₂O. FeCl₃ → dark blue col. and ppt.

Me ether: C₁₁H₁₀O₂. MW, 174. Needles. M.p. 108°. Sol. EtOH, Et₂O, C₆H₆. Mod. sol. hot H₂O.

Di-Me ether: C₁₂H₁₂O₂. MW, 188. Needles from ligroin. M.p. 116–5°. Sol. EtOH, C₆H₆. Spar. sol. ligroin. Spar. volatile in steam.

Et ether: m.p. 109–10°.

Di-Et ether: m.p. 96–7°.

Friedländer, Zakrzewski, *Ber.*, 1894, 27, 762.

2 : 6-Dihydroxynaphthalene.

Plates. M.p. 218°. Sol. EtOH, MeOH, Et₂O, Me₂CO, AcOH, hot H₂O. Spar. sol. C₆H₆. Insol. ligroin. Sublimes. Alk. sol. gradually darkens in air. FeCl₃ → yellowish ppt.

Di-Me ether: leaflets from C₆H₆. M.p. 150°. Spar. sol. Et₂O.

Di-Et ether: plates from EtOH. M.p. 162°.

Diacetyl: m.p. 175°.

Dibenzoyl: m.p. 215°.

Willstätter, Parnas, *Ber.*, 1907, 40, 1410.

2 : 7-Dihydroxynaphthalene.

Needles from H₂O. M.p. 190°. Sol. EtOH, Et₂O, hot H₂O. Mod. sol. CHCl₃, C₆H₆. Insol. ligroin. Sols rapidly darken in air.

Me ether: needles. M.p. 117°. Sublimes. Volatile in steam. *Acetyl*: m.p. 130°. *Benzoyl*: m.p. 140°.

Di-Me ether: m.p. 139°. Sol. EtOH, AcOH. Sublimes. Volatile in steam.

Di-Et ether: plates from EtOH. M.p. 104°.

Monobenzyl ether: needles from MeOH. M.p. 151–2°.

Monoacetyl: m.p. 171–2°.

Diacetyl: m.p. 136°.

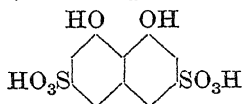
Monobenzoyl: m.p. 199°.

Dibenzoyl: m.p. 139°.

sym.-*Trinitrobenzene add. comp.*: brown prisms from C₆H₆. M.p. 162°.

Weber, *Ber.*, 1881, 14, 2206.

1 : 8-Dihydroxynaphthalene-3 : 6- disulphonic Acid (Chromotrope Acid)



C₁₀H₈O₈S₂

MW, 320

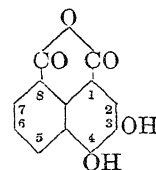
Needles + 2H₂O. Sol. H₂O. FeCl₃ → green col. Di-Na salt sol. H₂O, insol. brine; reacts acid. Tri-Na salt is neutral and tetra-Na salt alkaline. Alk. sols. show violet-blue fluor. Component for azo dyes.

M.L.B., D.R.P. 67,563, (*Ber.*, 1893, 26R, 519).

Cassella, D.R.P. 75,153, (*Ber.*, 1894, 27R, 820).

Bayer, D.R.P. 63,190, (*Ber.*, 1893, 26R, 733).

3 : 4-Dihydroxynaphthalic Anhydride



C₁₂H₆O₅

MW, 230

M.p. 330°.

Diacetyl: m.p. 217°.

Dibenzoyl: m.p. 222–3°.

Dziewoński, Olszewski, Kahl, *Brit. Chem. Abstracts*, 1932, A, 270.

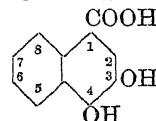
3 : 6-Dihydroxynaphthalic Anhydride.

M.p. 330°.

Di-Me ether: C₁₄H₁₀O₅. MW, 258. M.p. 280°.

Dziewoński, Majewicz, Schimmer, *Chem. Abstracts*, 1937, 31, 3906.

3 : 4-Dihydroxy-1-naphthoic Acid



C₁₁H₈O₄

MW, 204

Needles from H₂O. M.p. 195° decomp. (sinters at 180°). Sol. EtOH, Me₂CO, AcOEt. Spar. sol. CHCl₃, C₆H₆.

Heller, Ruhtenberg, *Ber.*, 1912, 45, 678.

4 : 8-Dihydroxy-1-naphthoic Acid.

Micro-cryst. powder from Et₂O–ligroin. M.p. 213° decomp.

Di-Me ether: C₁₃H₁₂O₄. MW, 232. Plates from EtOH. M.p. 222.5° decomp. *Me ester*: plates from MeOH. M.p. 173–3.5°.

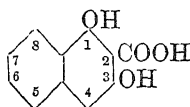
Hill, Short, Stromberg, *J. Chem. Soc.*, 1937, 940.

6 : 7-Dihydroxy-1-naphthoic Acid.

M.p. 295–7° decomp.

Rieche, D.R.P. 561,186, (*Chem. Zentr.*, 1933, I, 3630).

1 : 3-Dihydroxy-2-naphthoic Acid

 $C_{11}H_8O_4$

MW, 204

Yellowish needles from H_2O . Melts and decomposes about 145° . Sol. EtOH, Et_2O , hot H_2O .

Et ester: $C_{13}H_{12}O_4$. MW, 232. Pale yellow needles from EtOH.Aq. M.p. $83-4^\circ$. Sol. EtOH, Et_2O . Insol. H_2O . *Diacyl*: m.p. 64° .

Metzner, *Ann.*, 1897, 298, 386.

1 : 4-Dihydroxy-2-naphthoic Acid.

Needles from EtOH.Aq. Melts and decomposes about 186° (200°). Sol. EtOH, Et_2O . Mod. sol. H_2O . Insol. ligroin. Alc. sols shows blue fluor. $FeCl_3 \rightarrow$ green.

4-*Me ether*: $C_{12}H_{10}O_4$. MW, 218. Pale yellow. M.p. $196-8^\circ$ decomp.

4-*Et ether*: $C_{13}H_{12}O_4$. MW, 232. Prisms from AcOH. M.p. 170° .

4-*Acetyl*: plates from AcOH. M.p. 193° decomp.

Russig, *J. prakt. Chem.*, 1900, 62, 34.

Homeyer, Wallingford, *J. Am. Chem. Soc.*, 1942, 64, 798.

1 : 5-Dihydroxy-2-naphthoic Acid.

5-*Me ether*: cryst. from MeOH. M.p. $212-5-213^\circ$. *Me ester*: plates from C_6H_6 -pet. ether. M.p. $118-9^\circ$.

Di-*Me ether*: cryst. from EtOH. M.p. $151-2^\circ$. *Me ester*: plates from $CHCl_3$ -pet. ether. M.p. $80-1^\circ$.

Hill, Short, Stromberg, *J. Chem. Soc.*, 1937, 940.

1 : 7-Dihydroxy-2-naphthoic Acid.

Needles from EtOH. M.p. 217° decomp. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Friedländer, Zinberg, *Ber.*, 1896, 29, 39.

3 : 4-Dihydroxy-2-naphthoic Acid.

Yellowish plates from EtOH.Aq. M.p. 220° decomp. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. $CHCl_3$, C_6H_6 , H_2O . Reduces $AgNO_3$.

Me ester: $C_{12}H_{10}O_4$. MW, 218. Needles. M.p. 99° .

Et ester: $C_{13}H_{12}O_4$. MW, 232. Yellow prisms from Et_2O . M.p. 84° .

Diacyl: needles from AcOEt. M.p. $206-5-207^\circ$ decomp.

Mohlau, Kriebel, *Ber.*, 1895, 28, 3092.

Russig, *J. prakt. Chem.*, 1900, 62, 57.

3 : 5-Dihydroxy-2-naphthoic Acid.

Yellow needles from H_2O . M.p. 265° . Sol. EtOH, Et_2O , hot H_2O .

Et ester: needles from EtOH.Aq. M.p. $148-50^\circ$.

Diacyl: m.p. 188° .

Hosaeus, *Ber.*, 1893, 26, 672.

3 : 6-Dihydroxy-2-naphthoic Acid.

Yellowish needles. M.p. $254-6^\circ$. Sol. EtOH, Et_2O .

Schmid, *Ber.*, 1893, 26, 1117.

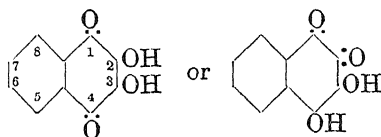
I.G., B.P. 296,010, (*Chem. Abstracts*, 1929, 23, 2190).

3 : 7-Dihydroxy-2-naphthoic Acid.

Yellow needles. M.p. $225-8^\circ$ decomp. Sol. EtOH. Spar. sol. H_2O .

Schmid, *Ber.*, 1893, 26, 1117.

2 : 3-Dihydroxy-1 : 4-naphthoquinone (2 : 3-Dihydroxy- α -naphthoquinone or 3 : 4-dihydroxy- β -naphthoquinone, isonaphthazarin)

 $C_{10}H_6O_4$

MW, 190

Orange red leaflets. M.p. 280° . Sol. Me_2CO . Spar. sol. EtOH, $CHCl_3$, Et_2O , C_6H_6 , hot H_2O . Sol. aq. alkalis and NH_3 to blue sols. Alk. sols. unstable. Ox. \rightarrow phthalic acid.

Me ether: $C_{11}H_8O_4$. MW, 204. M.p. 152° .

Di-*Me ether*: $C_{12}H_{10}O_4$. MW, 218. Yellow needles. M.p. 115° .

Monoacetyl: orange needles from AcOH. M.p. 172° .

Diacyl: needles from C_6H_6 . M.p. 191° .

Zincke, Ossenbeck, *Ann.*, 1899, 307, 11.

Macbeth, Price, Winzor, *J. Chem. Soc.*, 1935, 332.

Weygand, *Ber.*, 1943, 75, 625.

2 : 5-Dihydroxy-1 : 4-naphthoquinone.

M.p. 210° decomp.

Weygand, *Ber.*, 1943, 75, 625.

2 : 6-Dihydroxy-1 : 4-naphthoquinone.

Yellow needles from AcOH. Decomp. on heating. Sol. hot EtOH. Spar. sol. AcOH, Me_2CO , C_6H_6 . Sol. with red col. in NaOH.

Dimroth, Kerkovius, *Ann.*, 1913, 399, 39.

2 : 7-Dihydroxy-1 : 4-naphthoquinone.

Orange yellow needles. Decomp. at $205-10^\circ$ without melting. Sol. hot EtOH, Me_2CO . Aq. Sol. with red col. in NaOH.

Dimroth, Kerkovius, *Ann.*, 1913, 399, 42.

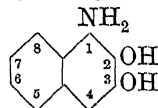
5 : 6-Dihydroxy-1 : 4-naphthoquinone.

See o-Naphthazarin.

5 : 8-Dihydroxy-1 : 4-naphthoquinone.

See Naphthazarin.

2 : 3-Dihydroxy-1-naphthylamine

 $C_{10}H_9O_2N$

MW, 175

Cryst. from H_2O . Decomp. about 230° .

Friedländer, Silberstern, *Monatsh.*, 1902, 23, 521.

2 : 4-Dihydroxy-1-naphthylamine.

Cryst. Becomes violet at 130° . M.p. 162° \rightarrow blue liq. Sols rapidly oxidise in air.

O : O : N-Triacetyl : plates from C_6H_6 . M.p. $155-6^\circ$.

Kehrmann, Hertz, *Ber.*, 1896, 29, 1419.

2 : 7-Dihydroxy-1-naphthylamine.

7-Me ether : $C_{11}H_{11}O_2N$. MW, 189. Plates from MeOH-pet. ether. M.p. 170° .

2 : 7-Di-Me ether : $C_{12}H_{13}O_2N$. MW, 203. Needles from C_6H_6 -ligroin. M.p. $82-3^\circ$. Acetyl : leaflets from EtOH. M.p. $179-80^\circ$. Benzoyl : needles. M.p. 182° . Picrate : yellow needles. M.p. 152° .

O : O : N-Triacetyl : m.p. 183° .

O : O : N-Tetra-acetyl : m.p. 135° .

Clausius, *Ber.*, 1890, 23, 521.

Nietski, Knapp, *Ber.*, 1897, 30, 1123.

3 : 4-Dihydroxy-1-naphthylamine.

N-Acetyl : needles from H_2O . M.p. 187° decomp.

O : O : N-Triacetyl : prisms from EtOH. M.p. 193° .

Kehrmann, *Ber.*, 1894, 27, 3340.

5 : 8-Dihydroxy-1-naphthylamine.

O : O : N-Triacetyl : needles from EtOH. M.p. 165° .

Graebe, *Ber.*, 1899, 32, 2878.

Graebe, Oeser, *Ann.*, 1904, 335, 149.

1 : 4-Dihydroxy-2-naphthylamine.

O : O : N-Triacetyl : needles. M.p. $259-60^\circ$.

Kehrmann, *Ber.*, 1894, 27, 3343.

1 : 5-Dihydroxy-2-naphthylamine.

Cryst. from C_6H_6 -pet. ether.

5-Me ether : plates from C_6H_6 . M.p. 158° decomp.

Fischer, Bauer, *J. prakt. Chem.*, 1917, 95, 262.

1 : 6-Dihydroxy-2-naphthylamine.

Free base is very unstable.

O : O : N-Triacetyl : needles from ligroin or EtOH.Aq. M.p. 150° .

Fischer, Bauer, *J. prakt. Chem.*, 1916, 94, 5.

3 : 4-Dihydroxy-2-naphthylamine.

M.p. 164° . Sol. EtOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 .

N-Acetyl : cryst. Decomp. about 170° .

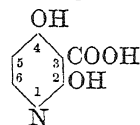
O : O : Diacetyl : needles from AcOH. Decomp. above 200° .

3 : N-Diacetyl : needles from Me_2CO . M.p. 195° decomp.

Zincke, Noack, *Ann.*, 1897, 295, 13.

Korn, *Ber.*, 1884, 17, 907.

2 : 4-Dihydroxynicotinic Acid (2 : 4-Dihydroxypyridine-3-carboxylic acid)



$C_6H_5O_4N$

MW, 155

Cryst. from H_2O . M.p. 182° decomp. Heat with conc. HCl \rightarrow 2 : 4-dihydroxypyridine.

Schroeter, Seidler, Sulzbacher, Kanitz, *Ber.*, 1932, 65, 439.

2 : 6-Dihydroxynicotinic Acid.

Needles. M.p. $197-8^\circ$ (rapid heat. in sealed tube).

Et ester : $C_8H_9O_4N$. MW, 183. Needles from Me_2CO . M.p. 183° (179° decomp.).

Amide : $C_8H_9O_3N_2$. MW, 154. M.p. 206° decomp.

Guthzeit, Laska, *J. prakt. Chem.*, 1898, 58, 423.

4 : 6-Dihydroxynicotinic Acid.

Needles from H_2O . M.p. about 310° .

Et ester : needles from H_2O . M.p. 213° decomp. Sol. EtOH. Spar. sol. H_2O , C_6H_6 .

Errera, *Ber.*, 1898, 31, 1686.

1 : 9-Dihydroxynonane.

See Nonandiol-1 : 9.

Dihydroxyoctadecane.

See Octadecanediol.

2 : 5-Dihydroxy-octadecylbenzene.

See Octadecylhydroquinone.

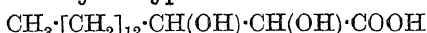
Dihydroxyoctane.

See Octandiol and Octamethylene Glycol.

Dihydroxyoctylbenzene.

See Octylresorcinol.

1 : 2-Dihydroxypalmitic Acid.



$C_{16}H_{32}O_4$

MW, 288

Two forms. (a-). Needles from Et_2O . Softens at $121-3^\circ$. M.p. $125-7^\circ$. (b-). Softens at $100-102^\circ$. M.p. $105-106.5^\circ$.

Simowski, *Chem. Zentr.*, 1916, II, 377.

2 : 11-Dihydroxypalmitic Acid



$C_{16}H_{32}O_4$

MW, 288

Non-carbohydrate fragment of rhamnoconvulvic acid. M.p. $83-4^\circ$. Sol. most ord. org. solvents. Insol. H_2O .

Me ester : $C_{17}H_{34}O_4$. MW, 302. Plates from Et_2O . M.p. $81-2^\circ$. $[\alpha]_D + 0.9^\circ$.

Et ester : $C_{18}H_{36}O_4$. MW, 316. Cryst. from Et_2O . M.p. $72-3^\circ$.

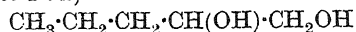
Votoček, Prelog, *Chem. Abstracts*, 1932, 26, 4030; 1929, 23, 2719.

8 : 9(?) -Dihydroxypalmitic Acid.

Cryst. powder from EtOH. M.p. 130° corr.

Chargaff, *Z. physiol. Chem.*, 1933, **218**, 223.**3 : 5-Dihydroxy-pentadecylbenzene.**

See Hydrobilobol.

1 : 2-Dihydroxypentane ($\alpha\beta$ -Amylene glycol, pentandiol-1 : 2) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104

d.-

B.p. 98–102°/13 mm. $[\alpha]_D^{20} + 0.95^\circ$.

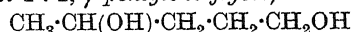
Di-phenylurethane : m.p. 97–8°.

dl.-

B.p. 210.5–11.5°/751 mm., 99–100°/3 mm.

 D_{20}^{20} 0.9802. n_D^{19} 1.4412.

Diacetyl : b.p. 219–20°/748 mm., 103–4°/2 mm.

 D_{20}^{20} 1.0148. n_D^{20} 1.4202.Levene, Walti, *J. Biol. Chem.*, 1931, **94**, 365.Kaufmann, Adams, *J. Am. Chem. Soc.*, 1923, **45**, 3040.**1 : 4-Dihydroxypentane** ($\alpha\delta$ -Amylene glycol, pentandiol-1 : 4, γ -pentylene glycol) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104

l.-

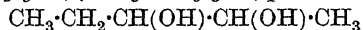
B.p. 95–6°/1.5 mm. $[\alpha]_D^{25} - 4.90^\circ$ in EtOH.

Di-phenylurethane : m.p. 131–3°.

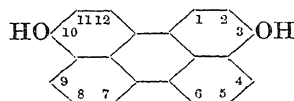
dl.-

B.p. 219–20°/713 mm., 124–6°/10 mm. Sol. H_2O , EtOH. Insol. ligroin. D_4^{20} 1.000. n_D^{19} 1.44388.Diacetyl : b.p. 107–10°/13 mm. D_{13}^{20} 1.029. n_D^{20} 1.4282.Di- α -naphthylurethane : m.p. 128–9.5°.Levene, Haller, Walti, *J. Biol. Chem.*, 1927, **72**, 593.Colman, Perkin, *J. Chem. Soc.*, 1888, **53**, 190.Semmler, *Ber.*, 1906, **39**, 2852.Hill, Adkins, *J. Am. Chem. Soc.*, 1938, **60**, 1033.**1 : 5-Dihydroxypentane.**

See Pentamethylene Glycol.

2 : 3-Dihydroxypentane (1-Methyl-2-ethyl-ethylene glycol, β -amylen glycol, pentandiol-2 : 3) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104B.p. 187.5°, 97°/17 mm. Sol. H_2O , EtOH. D_4^{20} 0.980.v. Pechmann, Dahl, *Ber.*, 1890, **23**, 2426.Milas, Sussman, *J. Am. Chem. Soc.*, 1937, **59**, 2345.**2 : 4-Dihydroxypentane** ($\beta\gamma$ -Amylene glycol, pentandiol-2 : 4) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104B.p. 197–8°, 97–8°/13 mm. Sol. H_2O , EtOH. D_4^{20} 0.9635. n_D^{20} 1.4349.Sprague, Adkins, *J. Am. Chem. Soc.*, 1934, **56**, 2669.Zelinsky, Ujedino, *J. prakt. Chem.*, 1911, **84**, 545.Ipatiew, *Ber.*, 1912, **45**, 3223.**1 : 2-Dihydroxypentane-carboxylic Acid.**

See Propylglyceric Acid.

3 : 10-Dihydroxyperylene $\text{C}_{20}\text{H}_{12}\text{O}_2$

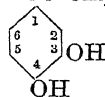
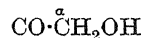
MW, 284

Yellow cryst. M.p. 227°.

Dibenzoyl : m.p. 295°.

Ioffe, Krichevtsov, *J. Gen. Chem. U.S.S.R.*, 1939, **9**, 1136, (*Chem. Abstracts*, 1939, **33**, 8603).**2 : 4-Dihydroxyphenacyl Alcohol.**

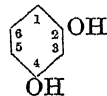
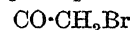
See Fisetol.

3 : 4-Dihydroxyphenacyl Alcohol (α : 3 : 4-Trihydroxyacetophenone) $\text{C}_8\text{H}_8\text{O}_4$

MW, 168

Cryst. from H_2O . M.p. 195°.3 : 4-Di-Me ether : veratroylcarbinol. $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. Cryst. M.p. 86–7°.Acetyl : plates from Et₂O. M.p. 91–2°. α : 3 : 4-Tri-Me ether : $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. Prisms from C_6H_6 -pet. ether. M.p. 62°. B.p. 190°/15 mm. Semicarbazone : cryst. from MeOH. M.p. 178°.

3 : 4-Diacetyl : plates from EtOH. M.p. 86–7°.

 α : 3 : 4-Triacetyl : plates from MeOH. M.p. 95°.Voswinkel, *Ber.*, 1909, **42**, 4651.Pratt, Robinson, *J. Chem. Soc.*, 1925, **127**, 170.**2 : 4-Dihydroxyphenacyl bromide** (ω -Bromo-2 : 4-dihydroxyacetophenone) $\text{C}_8\text{H}_7\text{O}_3\text{Br}$

MW, 231

Prisms from Et₂O-pet. ether. M.p. 127°.Di-Me ether : $\text{C}_{10}\text{H}_{11}\text{O}_3\text{Br}$. MW, 259. M.p. 102–4°.

Diacetyl: prisms from EtOH. M.p. 76°.

Sonn, *Ber.*, 1919, 52, 926.

Sonn, Falkenheim, *Ber.*, 1922, 55, 2979.

2 : 6-Dihydroxyphenacyl bromide (ω -*Bromo-2 : 6-dihydroxyacetophenone*).

Yellow plates from C₆H₆. M.p. 143° corr. FeCl₃ \rightarrow green col.

Diacetyl: m.p. 112°.

Shriner, Witte, *J. Am. Chem. Soc.*, 1939, 61, 2329.

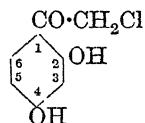
3 : 4-Dihydroxyphenacyl bromide (ω -*Bromo-3 : 4-dihydroxyacetophenone*).

Needles + 1H₂O from H₂O. M.p. 170°.

Di-Me ether: cryst. from Et₂O. M.p. 83°. B.p. 182°/12 mm.

Dzierzgowski, *Ber.*, 1893, 26R, 589.

2 : 4-Dihydroxyphenacyl chloride (ω -*Chloro-2 : 4-dihydroxyacetophenone*)



C₈H₇O₃Cl MW, 186.5

Prisms from Me₂CO.Aq. M.p. 131°. Sol. EtOH, Et₂O, AcOEt. Spar. sol. C₆H₆, CHCl₃, ligroin.

Di-Me ether: C₁₀H₁₁O₃Cl. MW, 214.5. Needles from C₆H₆. M.p. 119°.

Diacetyl: m.p. 73°.

Sonn, *Ber.*, 1917, 50, 1267.

3 : 4-Dihydroxyphenacyl chloride (ω -*Chloro-3 : 4-dihydroxyacetophenone*).

Prisms + 1H₂O from H₂O. M.p. anhyd. 173°. Sol. EtOH, hot H₂O. Sol. alkalis with yellow col. FeCl₃ \rightarrow green col. Reduces NH₃.AgNO₃.

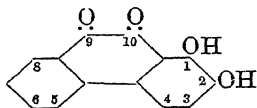
Diacetyl: m.p. 107.5–108°.

Slotta, Heller, *Ber.*, 1930, 63, 1028.

Rosenmund, Lohfert, *Ber.*, 1928, 61, 2603.

Hoberman, *J. Am. Chem. Soc.*, 1935, 57, 1382.

1 : 2-Dihydroxyphenanthraquinone



C₁₄H₈O₄ MW, 240

Dark red cryst. Decomp. on heating. Sol. EtOH, Me₂CO, AcOH. Spar. sol. H₂O. Sol. alkalis with green col. Red col. in conc. H₂SO₄.

Diacetyl: orange needles. M.p. 257° decomp.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 1939.

1 : 4-Dihydroxyphenanthraquinone.

Bluish violet needles from H₂O. Sol. EtOH, Et₂O, C₆H₆. Sol. alkalis with green col. Violet col. in conc. H₂SO₄.

Diacetyl: yellow prisms from C₆H₆-ligroin. M.p. 184°.

Brass, Stadler, *Ber.*, 1924, 57, 133.

2 : 3-Dihydroxyphenanthraquinone.

Reddish brown needles from EtOH.Aq. Spar. sol. H₂O. Sol. alkalis with reddish violet col. Reddish brown col. in conc. H₂SO₄.

Brass, Ferber, Stadler, *Ber.*, 1924, 57, 127.

2 : 4-Dihydroxyphenanthraquinone.

Brown needles from EtOH.Aq. Decomp. at 240° without melting. Sol. EtOH, AcOH, Me₂CO, hot H₂O. Spar. sol. C₆H₆. Sol. alkalis with olive green col. Olive yellow col. in conc. H₂SO₄.

Diacetyl: m.p. 197–8°.

Brass, Luther, Schoner, *Ber.*, 1930, 63, 2625.

2 : 6-Dihydroxyphenanthraquinone.

Reddish brown powder. Sol. EtOH, AcOH. Spar. sol. xylene. Sol. NaOH with red col. Yellowish green col. in conc. H₂SO₄.

Diacetyl: yellow plates from AcOH. M.p. 220–1°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2482.

2 : 7-Dihydroxyphenanthraquinone.

Brown needles. M.p. above 400° decomp. (293°). Sol. EtOH, AcOH, Me₂CO. Mod. sol. Et₂O. Spar. sol. C₆H₆. Sol. alkalis. Greenish brown col. in conc. H₂SO₄.

Diacetyl: plates from AcOH. M.p. 238° (235–6° decomp.).

Schmidt, Kämpf, *Ber.*, 1903, 36, 3741.

Ghatak, *Chem. Zentr.*, 1933, II, 2392.

3 : 4-Dihydroxyphenanthraquinone (Morpholquinone).

Red cryst. Deep blue col. in alkalis.

Diacetyl: yellow needles from AcOH. M.p. 196°.

Fieser, *Ber.*, 1931, 64, 701.

Schmidt, Söll, *Ber.*, 1908, 41, 3699.

Vongerichten, *Ber.*, 1899, 32, 1521.

3 : 6-Dihydroxyphenanthraquinone.

Orange red needles from PhNO₂. Spar. sol. H₂O, EtOH, AcOH. Sol. NaOH with red col. Red col. in conc. H₂SO₄.

Diacetyl: yellow needles. M.p. 217°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2482.

4 : 5-Dihydroxyphenanthraquinone.

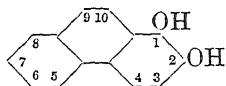
Needles from H₂O. Decomp. about 400° without melting. Reddish brown col. in conc. H₂SO₄.

Di-Me ether: $C_{16}H_{12}O_4$. MW, 268. Red cryst. from Et_2O . M.p. 190–1°.

Dibenzoyl: yellow needles from EtOH. M.p. about 170°.

Schmidt, Kämpf, *Ber.*, 1903, 36, 3750.

1 : 2-Dihydroxyphenanthrene



$C_{14}H_{10}O_2$ MW, 210

Needles from EtOH.Aq. M.p. 178°. Darkens on standing. Alc. alkalis \rightarrow yellow sols, in air \rightarrow alkali salt of 2-hydroxy-1 : 4-phenanthraquinone.

Di-Me ether: $C_{16}H_{14}O_2$. MW, 238. Needles from ligroin. M.p. 100–102°.

Diacetyl: cryst. from MeOH. M.p. 147°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 1901.

1 : 4-Dihydroxyphenanthrene.

Diacetyl: needles from ligroin. M.p. 140°. $CrO_3 \rightarrow$ 1 : 4-diacetoxyphenanthraquinone.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2470.

1 : 9-Dihydroxyphenanthrene.

Brown plates from C_6H_6 . M.p. 184–5°.

9-Me ether: needles from C_6H_5 -pet. ether. M.p. 131–2°. *Acetyl*: needles from EtOH. M.p. 155°.

Di-Me ether: plates from MeOH. M.p. 113–4°.

Diacetyl: needles from EtOH.Aq. M.p. 154–5°.

Burger, *J. Am. Chem. Soc.*, 1938, 60, 1534.

2 : 3-Dihydroxyphenanthrene.

Di-Me ether: leaflets from EtOH.Aq. M.p. 131° corr. *Picrate*: yellowish red cryst. from EtOH. M.p. 127–8°.

Pschorr, Buckow, *Ber.*, 1900, 33, 1831.

2 : 5-Dihydroxyphenanthrene.

Prisms from xylene. M.p. 180°.

Di-Me ether: needles from AcOH. M.p. 117°. *Picrate*: orange red needles from EtOH. M.p. 154–6°.

Diacetyl: plates from AcOH.Aq. M.p. 144°.

Rapson, Robinson, *J. Chem. Soc.*, 1935, 1542.

2 : 6-Dihydroxyphenanthrene.

Plates from EtOH.Aq. or xylene-toluene. M.p. 234°. Mod. sol. boiling H_2O .

Di-Me ether: needles from MeOH. M.p. 87°.

Diacetyl: plates from EtOH. M.p. 122–3°.

Dibenzoyl: m.p. 252–3°. Insol. EtOH.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2480.

2 : 7-Dihydroxyphenanthrene.

Needles from EtOH.Aq., AcOH.Aq. or xylene-toluene. M.p. 265°. Mod. sol. boiling H_2O .

Di-Me ether: plates from Py. Needles from MeOH. M.p. 169–70° (167–8°). *Picrate*: brick red needles from EtOH. M.p. 144°.

Diacetyl: plates from EtOH. M.p. 181–5°.

Rapson, Robinson, *J. Chem. Soc.*, 1935, 1542.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2480.

2 : 8-Dihydroxyphenanthrene.

Needles from EtOH.Aq. or xylene-toluene. M.p. 202°.

Diacetyl: needles from EtOH or C_6H_6 -ligroin. M.p. 125°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2480.

3 : 4-Dihydroxyphenanthrene.

See Morphol.

3 : 6-Dihydroxyphenanthrene.

Grey plates from EtOH.Aq. or xylene-toluene. M.p. 221°.

3-Me ether: cryst. from MeOH.Aq. M.p. 135–6°.

Di-Me ether: needles from MeOH.Aq. M.p. 104–5°. *Picrate*: red cryst. from EtOH. M.p. 154–5° decomp.

Diacetyl: plates from EtOH. M.p. 124–5°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2480.

3 : 8-Dihydroxyphenanthrene.

Pink needles from EtOH.Aq. or xylene-toluene. M.p. 247°. Mod. sol. boiling H_2O .

Di-Me ether: needles from MeOH. M.p. 117°.

Diacetyl: needles from EtOH. M.p. 184°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2480.

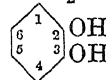
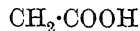
9 : 10-Dihydroxyphenanthrene.

See Phenanthrahydroquinone.

Dihydroxy-phenoxy-propane.

See under Glycerol.

2 : 3-Dihydroxyphenylacetic Acid



$C_8H_8O_4$ MW, 168

Needles + $\frac{1}{2}H_2O$ from $CHCl_3$. M.p. 75°, anhyd. 103–4°. $FeCl_3 \rightarrow$ green col.

3-Me ether: $C_9H_{10}O_4$. MW, 182. Plates from AcOEt-ligroin. M.p. 124°. $FeCl_3 \rightarrow$ green col. *Acetyl*: m.p. 146°.

Di-Me ether: see *o*-Homoveratric Acid.

Mosimann, Tambor, *Ber.*, 1916, 49, 1260.

2 : 4-Dihydroxyphenylacetic Acid.

Di-Me ether: needles from Et_2O . M.p. 113° corr.

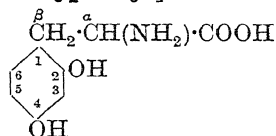
Pschorr, Knöffler, *Ann.*, 1911, 382, 56.

2 : 5-Dihydroxyphenylacetic Acid.

See Homogentisic Acid.

3 : 4-Dihydroxyphenylacetic Acid.

See Homoprotocatechuic Acid.

 β -[2 : 4-Dihydroxyphenyl]- α -alanine $\text{C}_9\text{H}_{11}\text{O}_4\text{N}$

MW, 197

Rectangular prisms from dil. H_2SO_3 . M.p. 223–4°. Aq. sol. reacts neutral. Spar. sol. EtOH, Et_2O , Me_2CO , CHCl_3 . $\text{FeCl}_3 \rightarrow$ violet col.

2 : 4-Di-Me ether : $\text{C}_{11}\text{H}_{15}\text{O}_4\text{N}$. MW, 225. Hexagonal plates from H_2O . M.p. 241°.

Deulofeu, *Ber.*, 1936, 69, 2458.Hirai, *Biochem. Z.*, 1926, 177, 449. **β -[2 : 5-Dihydroxyphenyl]- α -alanine.**

Cryst. from dil. H_2SO_3 . M.p. 203–4°. $\text{FeCl}_3 \rightarrow$ green col.

Hirai, *Biochem. Z.*, 1927, 189, 88. **β -[3 : 4-Dihydroxyphenyl]- α -alanine (*Dopa*). *dl*.**

Cryst. from H_2O or dil. NaHSO_3 . M.p. 271–2° decomp. Readily sol. H_2O . Oxidised by air in neutral or weakly alk. sols. \rightarrow dark coloured products. $\text{NaOH} \rightarrow$ red col. Reduces Fehling's on heating. $\text{FeCl}_3 \rightarrow$ green col. Millon's in cold \rightarrow orange red col. Phosphotungstic acid \rightarrow blue col.

B, HCl : plates from MeOH. M.p. 246° decomp.

B, HBr : plates from MeOH. M.p. 212° decomp.

Et ester: $\text{C}_{11}\text{H}_{15}\text{O}_4\text{N}$. MW, 225. Cryst. from EtOH. Aq. M.p. 129°.

3-Me ether : $\text{C}_{10}\text{H}_{13}\text{O}_4\text{N}$. MW, 211. Prisms + $2\text{H}_2\text{O}$ from H_2O . M.p. 255–6° decomp. N-Benzoyl: plates from H_2O or EtOH. M.p. 164°.

3 : 4-Di-Me ether : needles from EtOH. Aq. M.p. 252–3°. N-Benzoyl: m.p. 173–4°.

N-Acetyl: *Brucine salt*: needles + $2\text{H}_2\text{O}$ from EtOH. M.p. 176° with effervescence. $[\alpha]_{5461}^{20} - 46.3^\circ$.

O : O : N-Triacetyl: prisms from H_2O . M.p. 171–2°.

N-Benzoyl: cryst. + $1\text{H}_2\text{O}$ from H_2O . M.p. anhyd. 190–5°.

l.

Occurs in seedlings and pods of *Vicia faba*, the seeds of *Mucuna pruriens* and also in various species of the velvet bean. Prisms or needles from H_2O + SO_2 or plates from EtOH. Aq. M.p. 285.5° decomp. Spar. sol. C_6H_6 , CS_2 . Insol. EtOH, Et_2O , AcOH, pet. ether, CHCl_3 . Sol. dil. min. acids. $[\alpha]_{\text{D}}^{25} - 12.7^\circ$ in 4% HCl.

Dict. of Org. Comp.—II.

Rapidly turns green in air. Aq. sol. neutral to litmus and darkens in air. $\text{FeCl}_3 \rightarrow$ green col. Reduces AgNO_3 , acid KMnO_4 . Millon's \rightarrow orange red col. Phosphotungstic acid \rightarrow red-dish violet col.

B, HCl : prisms. M.p. 209° corr.

O : O : N-Tribenzoyl: needles from AcOH. M.p. about 170°.

Picrolonate: rosettes from H_2O . M.p. 241° decomp.

d.

Prisms from dil. H_2SO_3 . M.p. 282°. $[\alpha]_{\text{D}} + 11.9^\circ$.

N-Acetyl: *Brucine salt*: prisms from H_2O . M.p. 154° with effervescence.

Waser, Lewandowski, *Helv. Chim. Acta*, 1921, 4, 657.

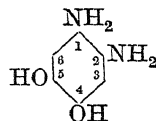
Damodaran, Rasaswamy, *Biochem. J.*, 1937, 31, 2149.

Harrington, Randall, *Biochem. J.*, 1931, 25, 1028.

Deulofeu, Mendivelzna, *Z. physiol. Chem.*, 1933, 219, 233.

2 : 4-Dihydroxyphenyl 3 : 4-dihydroxystyryl Ketone.

See Butein.

4 : 5-Dihydroxy-*o*-phenylenediamine (4 : 5-Diaminocatechol) $\text{C}_6\text{H}_8\text{O}_2\text{N}_2$

MW, 140

Di-Me ether: 4 : 5-diaminoveratrol. $\text{C}_8\text{H}_{12}\text{O}_2\text{N}_2$. MW, 168. Prisms. M.p. 131–2°. Sols. turn black in air.

Diacetyl: m.p. 204–5°.

Picrate: m.p. 192°.

Heinisch, *Monatsh.*, 1894, 15, 233.

Moureu, *Compt. rend.*, 1897, 125, 32.

2 : 4-Dihydroxy-*m*-phenylenediamine (2 : 4-Diaminoresorcinol).

Rapidly darkens in air. Salts with $\text{FeCl}_3 \rightarrow$ violet-blue \rightarrow brown col.

2 : 4-Di-Me ether : $B, 2\text{HCl}$: cryst. M.p. about 210° decomp. 1 : 3-N-Diacetyl: m.p. 192°.

Baker, Kirby, Montgomery, *J. Chem. Soc.*, 1932, 2878.

de la Harpe, Reverdin, *Ber.*, 1888, 21, 1405.

2 : 5-Dihydroxy-*m*-phenylenediamine (2 : 6-Diaminohydroquinone).

Rapidly oxidises in air.

1 : 3-N-Diacetyl: needles from EtOH. Aq. M.p. about 240° decomp.

1 : 2 : 3 : 5-*Tetra-acetyl*: needles or leaflets from EtOH.Aq. M.p. 216°.

Nietzki, Preusser, *Ber.*, 1886, 19, 2247.

4 : 6-Dihydroxy-*m*-phenylenediamine (4 : 6-*Diaminoresorcinol*).

1 : 3-*N-Diacetyl*: cryst. from AcOH. M.p. 335° decomp.

1 : 3 : 4-*Triacetyl*: needles. M.p. 225°.

1 : 3 : 4 : 6-*Tetra-acetyl*: needles from AcOH. M.p. 180°.

1 : 3-*Diacetyl*-4 : 6-*dibenzoyl*: cryst. from EtOH. M.p. 214°.

Kostanecki, *Ber.*, 1888, 21, 3115.

Kehrmann, Betsch, *Ber.*, 1897, 30, 2096, 2102.

2 : 5-Dihydroxy-*p*-phenylenediamine (2 : 5-*Diaminohydroquinone*).

Cryst.

1 : 4-*N-Diacetyl*: cryst. powder. Part. sublimes at 285–90°. Chars about 310°.

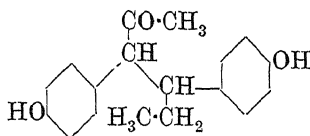
1 : 2 : 4 : 5-*Tetra-acetyl*: needles from EtOH.Aq. M.p. 190°.

Kehrmann, Betsch, *Ber.*, 1897, 30, 2101.

3 : 4-Di-*[p*-hydroxyphenyl]-hexane.

See Dihydrodiethylstilboestrol.

3 : 4-Di-*[p*-hydroxyphenyl]-hexanone-2 (1-*Ethyl-2-aceto-1 : 2-di-p-hydroxyphenylethane*)



$C_{18}H_{20}O_3$ MW, 284

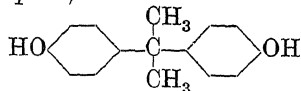
Cryst. from EtOH.Aq. M.p. 218–20°. Powerful oestrogen.

Burckhatter, Sam, *J. Am. Chem. Soc.*, 1952, 74, 187.

Di-*p*-hydroxyphenylphthalide.

See Phenolphthalein.

2 : 2-Di-*p*-hydroxyphenylpropane (*Di-phenylolpropane*)



$C_{15}H_{16}O_2$ MW, 228

Cryst. from H_2O or dil. AcOH. M.p. 156–7°. B.p. 250–2°/13 mm. Sol. EtOH, AcOH, Et_2O , C_6H_6 .

Di-Me ether: m.p. 59–61.5°. B.p. 190°/5 mm.

Di-Et ether: m.p. 49–50°.

Di-n-propyl ether: b.p. 200–2°/3 mm.

Di-n-butyl ether: m.p. 20°. B.p. 212–13°/3 mm.

Di-n-amyl ether: m.p. 34.5–35.5°. B.p. 225–30°/3 mm.

Dibenzoyl: cryst. from EtOH. M.p. 153.5°.

Zincke, Grueters, *Ann.*, 1905, 343, 85.

Schmidlin, Lang, *Ber.*, 1910, 43, 2814.

von Braun, *Ann.*, 1929, 472, 65.

Yohe, Vitcha, *J. Am. Chem. Soc.*, 1935, 57, 2259.

Luttringhaus, Buchholz, *Ber.*, 1940, 73, 134.

Campbell, *Proc. Roy. Soc.*, 1940, 129B, 528.

Hubbard, Knowlton, Huffman, *J. Am. Chem. Soc.*, 1948, 70, 3259.

1 : 2-Dihydroxy-1-phenylpropionic Acid.

See 1-Phenylglyceric Acid.

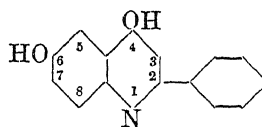
1 : 2-Dihydroxy-2-phenylpropionic Acid.

See 2-Phenylglyceric Acid.

α -[3 : 4-Dihydroxyphenyl]-propionic Acid.

See 3 : 4-Dihydroxyhydratropic Acid.

4 : 6-Dihydroxy-2-phenylquinoline



$C_{15}H_{11}O_2N$

MW, 237

M.p. 251–2°.

Di-Me ether: $C_{17}H_{15}O_2N$. MW, 265. M.p. 118°.

Dziewoński, Moszew, Maksymowicz, Trześciński, *Chem. Abstracts*, 1935, 29, 1092.

6 : 7-Dihydroxy-2-phenylquinoline.

Di-Me ether: needles from ligroin.

M.p. 131.5°. *B.HCl*: needles. M.p. 229°.

B_2, H_2PtCl_6 : greyish-brown needles from dil. HCl. M.p. 208°. *Methiodide*: m.p. 214°.

Rilliet, *Helv. Chim. Acta*, 1922, 5, 551.

Dihydroxyphenyl styryl Ketone.

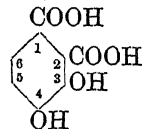
See Dihydroxychalkone.

Dihydroxyphenyl tolyl Ketone.

See Dihydroxy-methylbenzophenone.

3 : 4-Dihydroxyphthalic Acid (*Catechol-*

3 : 4-dicarboxylic acid, *norhemipinic acid*)



$C_8H_6O_6$

MW, 198.

Plates + $1H_2O$ from H_2O . M.p. 210–12° \rightarrow anhydride. Sol. EtOH, hot H_2O . Spar. sol. Et_2O , C_6H_6 . $FeCl_3 \rightarrow$ blue col.

Anhydride: $C_8H_4O_5$. MW, 180. M.p. 238°.

Di-Me ether: see Hemipinic Acid.

Freund, Horst, *Ber.*, 1894, 27, 335.

3 : 5-Dihydroxyphthalic Acid (*Resorcinol*

4 : 5-dicarboxylic acid).

Plates from AcOEt. M.p. 188–90° with effervescence, remelting at 206–10°. Readily

sol. H_2O and org. solvents except C_6H_6 and pet. ether. $\text{FeCl}_3 \rightarrow$ deep red col.

Di-Me ether: $\text{C}_{10}\text{H}_{10}\text{O}_6$. MW, 226. Prisms + H_2O from H_2O . M.p. $157-8^\circ$ with effervescence. *Di-Me ester*: $\text{C}_{12}\text{H}_{14}\text{O}_6$. MW, 254. Needles from EtOH.Aq. M.p. $92-4^\circ$. *Anhydride*: $\text{C}_{10}\text{H}_8\text{O}_5$. MW, 208. Needles. M.p. $147-9^\circ$.

Di-Et ether: *anhydride*: $\text{C}_{12}\text{H}_{12}\text{O}_5$. MW, 236. M.p. $133-4^\circ$.

Oxford, Raistrick, *Biochem. J.*, 1932, 26, 1902.

Birkinshaw, Bracken, *J. Chem. Soc.*, 1942, 368.

3 : 6-Dihydroxyphthalic Acid (*Hydroquinone-2 : 3-dicarboxylic acid*).

Yellowish-green needles + $\frac{1}{2}\text{H}_2\text{O}$ from H_2O . M.p. $219-20^\circ$ decomp. Sol. H_2O , EtOH. Insol. CHCl_3 , C_6H_6 . $\text{FeCl}_3 \rightarrow$ violet col. Br \rightarrow bromanil.

Di-Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_6$. MW, 226. Needles. M.p. $141-2^\circ$.

Di-Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_6$. MW, 254. M.p. 89° . *Di-nitrile*: 2 : 3-dicyanohydroquinone. $\text{C}_8\text{H}_4\text{O}_2\text{N}_2$. MW, 160. Yellow leaflets + $2\text{H}_2\text{O}$. Blackens at 230° . Sol. EtOH, Et_2O , AcOH. Sols. fluoresce. *Diacetyl*: leaflets from C_6H_6 . M.p. $165-6^\circ$.

Di-Me ether: 3 : 6-dimethoxyphthalic acid. $\text{C}_{10}\text{H}_{10}\text{O}_6$. MW, 226. Yellow prisms + $1\text{H}_2\text{O}$ from H_2O . Decomp. at $183-6^\circ$. *Di-Me ester*: $\text{C}_{12}\text{H}_{14}\text{O}_6$. MW, 254. Prisms. M.p. $102-3^\circ$. *Di-Et ester*: $\text{C}_{14}\text{H}_{18}\text{O}_6$. MW, 282. M.p. 89° . *Anhydride*: $\text{C}_{10}\text{H}_8\text{O}_5$. MW, 208. M.p. 261° . Sols. fluoresce pale blue.

Brunner, *Monatsh.*, 1913, 34, 924.

Helferich, *Ber.*, 1921, 54, 157.

4 : 5-Dihydroxyphthalic Acid (*Catechol-4 : 5-dicarboxylic acid, nor-metahemipinic acid*).

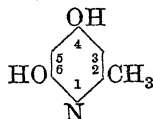
Prisms from H_2O . M.p. $175^\circ \rightarrow$ anhydride. Sol. H_2O , EtOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 . $\text{FeCl}_3 \rightarrow$ bright green col.

Di-Et ester: needles from H_2O . M.p. 152° . Sol. EtOH, Et_2O . Mod. sol. C_6H_6 .

Di-Me ether: see Metahemipinic Acid.

Brück, *Ber.*, 1901, 34, 2743.

4 : 6-Dihydroxy- α -picoline (4 : 6-Dihydroxy-2-methylpyridine)



$\text{C}_6\text{H}_7\text{O}_2\text{N}$ MW, 125

Needles from EtOH. M.p. 331° decomp. Spar. sol. H_2O , EtOH. Insol. Et_2O , CHCl_3 , C_6H_6 . Sol. alkalis, alk. carbonates and NH_3 .

Di-Et ether: $\text{C}_{10}\text{H}_{15}\text{O}_2\text{N}$. MW, 181. B.p. $238-40^\circ$.

Knoevenagel, Fries, *Ber.*, 1898, 31, 771.

2 : 6-Dihydroxy- β -picoline (2 : 6-Dihydroxy-3-methylpyridine).

Needles from EtOH. M.p. $190-1^\circ$ decomp. Sol. alkalis.

Ruhemann, *J. Chem. Soc.*, 1893, 63, 880.

2 : 6-Dihydroxy- γ -picoline (2 : 6-Dihydroxy-4-methylpyridine).

Needles + $1\text{H}_2\text{O}$ from H_2O , plates from EtOH. M.p. 194° . B.p. 305° . Sol. H_2O . Reduces $\text{NH}_3\cdot\text{AgNO}_3$. $\text{FeCl}_3 \rightarrow$ reddish violet col.

2 : 6-Dibenzoyl: needles from EtOH. M.p. 94° .

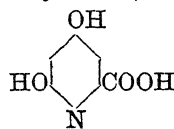
Gibson, Simonsen, *J. Chem. Soc.*, 1929, 1075.

Rogerson, Thorpe, *J. Chem. Soc.*, 1905, 87, 1689.

4 : 5-Dihydroxypicolinic Acid.

See Comenamic Acid.

4 : 6-Dihydroxypicolinic Acid (4 : 6-Dihydroxypyridine-2-carboxylic acid)



$\text{C}_6\text{H}_5\text{O}_4\text{N}$ MW, 155

M.p. $270-3^\circ$ part. decomp.

Et ester: $\text{C}_8\text{H}_9\text{O}_4\text{N}$. MW, 183. Needles from EtOH.Aq. M.p. $198-200^\circ$.

Di-Et ether: $\text{C}_{10}\text{H}_{13}\text{O}_4\text{N}$. MW, 211. M.p. $93-5^\circ$.

Sedgwick, Collie, *J. Chem. Soc.*, 1895, 67, 409.

Dihydroxypropane.

See Propylene Glycol and Trimethylene Glycol.

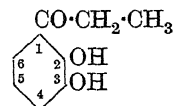
Dihydroxypropionaldehyde.

See Glyceraldehyde.

Dihydroxypropionic Acid.

See Glyceric Acid.

2 : 3-Dihydroxypropiophenone (3-Propionylcatechol)



$\text{C}_9\text{H}_{10}\text{O}_3$ MW, 166

M.p. 103° . B.p. $182-7^\circ/5\text{ mm}$.

Miller, Hartung, Rock, Crossley, *J. Am. Chem. Soc.*, 1938, 60, 9.

2 : 4-Dihydroxypropiophenone (4-Propionylresorcinol).

Yellow needles from EtOH. M.p. 97° . Hydrated form, m.p. 56° . Sol. C_6H_6 , Et_2O , AcOH. Spar. sol. H_2O , CHCl_3 , CCl_4 , pet. ether. Bactericide.

4-Me ether: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. Plates from EtOH. M.p. 58° .

Di-Me ether: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Cryst. from EtOH.Aq. M.p. 67° .

4-Et ether : $C_{11}H_{14}O_3$. MW, 194. Needles from EtOH. M.p. 54° .

Di-Et ether : $C_{13}H_{18}O_3$. MW, 222. Plates from EtOH. M.p. 76° . Oxime : needles from EtOH. M.p. 133° .

Oxime : yellow needles. M.p. $186-7^\circ$.

Brewster, Harris, *J. Am. Chem. Soc.*, 1930, 52, 4869.

Omer, Hamilton, *J. Am. Chem. Soc.*, 1937, 59, 643.

2 : 5-Dihydroxypropiophenone (2-Propionylhydroquinone).

Needles from H_2O . M.p. 92° . Sol. EtOH, Et₂O.

5-Me ether : needles from pet. ether. M.p. $47-9^\circ$.

Di-Me ether : b.p. $167-8^\circ/13$ mm.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, 43, 93.

2 : 6-Dihydroxypropiophenone (2-Propionylresorcinol).

Cryst. from H_2O . M.p. 139° . Alc. $FeCl_3 \rightarrow$ blue-black col.

Me ether : m.p. 55° .

Di-Me ether : m.p. 45° .

Diacetyl : m.p. 80° .

Dibenzoyl : cryst. from EtOH. M.p. 95° .

Limaye, Shenolikar, *Chem. Zentr.*, 1938, I, 2359.

3 : 4-Dihydroxypropiophenone (4-Propionylcatechol).

Yellow needles from C_6H_6 . M.p. 146° .

Di-Me ether : cryst. from EtOH. M.p. $62-3^\circ$. Oxime : needles from ligroin. M.p. $63-5^\circ$.

Semicarbazone : needles from EtOH.Aq. M.p. $190-2^\circ$.

3-Me : 4-Et ether : prisms from Et₂O. M.p. 62° . Oxime : needles. M.p. 114° . Semicarbazone : needles. M.p. 175° .

3-Me : 4-propyl ether : prisms from MeOH. M.p. $63-4^\circ$. Oxime : cryst. from EtOH. M.p. 114° .

3-Me : 4-benzyl ether : m.p. 93° . Oxime : needles. M.p. $118-5^\circ$.

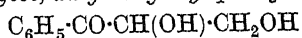
Rosenmund, Lohfert, *Ber.*, 1928, 61, 2604.

3 : 5-Dihydroxypropiophenone (5-Propionylresorcinol).

Di-Me ether : needles from pet. ether. M.p. $34-5^\circ$. B.p. $170-2^\circ/15$ mm. Semicarbazone : needles from EtOH.Aq. M.p. $130-1^\circ$.

Mauthner, *J. prakt. Chem.*, 1924, 107, 103.

β : γ -Dihydroxypropiophenone (Benzoyl-ethylene glycol, dihydroxyethyl phenyl ketone)

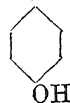
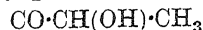


$C_9H_{10}O_3$ MW, 166

Cryst. from Et₂O- C_6H_6 . M.p. $81-5^\circ$ corr.

Cahnmann, *Bull. soc. chim.*, 1937, 4, 262.

4 : β -Dihydroxypropiophenone (Methyl-p-hydroxybenzoylcarbinol, 1-p-hydroxybenzoyl ethyl alcohol, 1-hydroxyethyl p-hydroxyphenyl ketone)



$C_9H_{10}O_3$

MW, 166

Needles from H_2O . M.p. 141° . Sol. EtOH.

Mod. sol. Et₂O. Spar. sol. C_6H_6 , CCl_4 .

Oxime : cryst. from Et₂O. M.p. 173.5° .

Auwers, Pötz, Noll, *Ann.*, 1938, 535, 249.

2 : 3-Dihydroxypropylamine.

See 3-Aminopropylene Glycol.

p - α : β -Dihydroxypropylanisole.

See Anethole Glycol.

α : β -Dihydroxypropylbenzene.

See 1-Phenylpropylene Glycol.

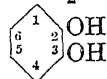
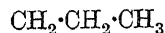
α : γ -Dihydroxypropylbenzene.

See 1-Phenyltrimethylene Glycol.

β : γ -Dihydroxypropylbenzene.

See 3-Phenylpropylene Glycol.

2 : 3-Dihydroxy-1-propylbenzene (3-Propylcatechol)



$C_9H_{12}O_2$

MW, 152

Needles from pet. ether. M.p. $70-2^\circ$.

3-Me ether : 3-propylguaiacol. $C_{10}H_{14}O_2$. MW, 166. B.p. $144-6^\circ/25$ mm.

Di-Me ether : 3-propylveratrol. $C_{11}H_{16}O_2$. MW, 180. B.p. $134-7^\circ/22$ mm.

Kurosawa, *Ber.*, 1915, 48, 1603.

2 : 4-Dihydroxy-1-propylbenzene (4-Propylresorcinol).

Prisms from C_6H_6 . M.p. $107-8^\circ$. B.p. $172-4^\circ/14-15$ mm. Sol. H_2O , EtOH, Et₂O.

Sonn, *Ber.*, 1921, 54, 773.

2 : 5-Dihydroxy-1-propylbenzene (2-Propylhydroquinone).

Needles from C_6H_6 . M.p. 90° . Sol. EtOH, Et₂O. Spar. sol. H_2O , C_6H_6 , pet. ether.

Di-Me ether : b.p. $240-6^\circ$.

Johnson, Hodge, *J. Am. Chem. Soc.*, 1913, 35, 1020.

Baddeley, Kenner, *J. Chem. Soc.*, 1934, 633.

2 : 6-Dihydroxy-1-propylbenzene (2-Propylresorcinol).

Prisms. M.p. 106° . Sol. H_2O , EtOH, C_6H_6 . No col. with $FeCl_3$.

Baker, Lothian, *J. Chem. Soc.*, 1935, 631.

Nesmejanow, Sarewitsch, *Ber.*, 1935, 68, 1478.

Limaye, Ghate, *Chem. Abstracts*, 1937, 31, 2182.

3 : 4-Dihydroxy-1-propylbenzene (4-Propylcatechol).

Prisms from C_6H_6 . M.p. 60° . B.p. $175-80^\circ/30$ mm., $152^\circ/13$ mm., $111-12^\circ/0.2$ mm. D_4^{18} 1.100. n_D^{18} 1.4440. Sol. most ord. org. solvents. Spar. sol. H_2O . $FeCl_3 \rightarrow$ bluish green col. Reduces $NH_3 \cdot AgNO_3$.

3-Me ether : see Cœrulignol.

Di-Me ether : see under Cœrulignol.

Delange, *Compt. rend.*, 1900, 130, 659.

3 : 5-Dihydroxy-propylbenzene.

See Divarinol.

4 : 6-Dihydroxy-o-propylbenzoic Acid.

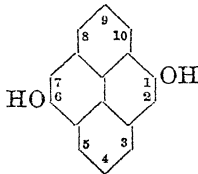
See Divaric Acid.

pp'-Dihydroxypulvinic Acid.

See Atromentic Acid.

2 : 6-Dihydroxypurine.

See Xanthine.

1 : 6-Dihydroxypyrene

$C_{16}H_{10}O_2$

MW, 234

Pptd. with acid from alk. sol. Sinters about 175° . Begins to melt with decomp. at 240° . Sol. MeOH, EtOH, Et_2O , AcOH. Spar. sol. C_6H_6 , xylene, $CHCl_3$. Gives red sols with green fluor. Red sols. with blue fluor. in alkalis. Zn dust dist. \rightarrow pyrene.

Weitzenböck, *Monatsh.*, 1913, 34, 220.

3 : 5-Dihydroxypyrene.

Cryst. from AcOH. M.p. 220° decomp. Darkens in air.

Di-Me ether : $C_{18}H_{14}O_2$. MW, 262. M.p. $177-8^\circ$.

Diacetyl : m.p. 155° .

Tietze, Bayer, *Ann.*, 1939, 540, 189.

3 : 8-Dihydroxypyrene.

Almost colourless flat needles from trichlorobenzene + phenylhydrazine. Darkens at 280° . M.p. 330° .

Di-Me ether : leaflets from chlorobenzene. M.p. 245° . Alc. sol. shows blue fluor.

Diacetyl : prisms from AcOH. M.p. 224° .

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, 531, 78, 96.

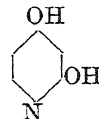
3 : 10-Dihydroxypyrene.

Pale yellow cryst. mass from EtOH.Aq. Ox. \rightarrow 3 : 10-pyrenequinone.

Diacetyl : leaflets from AcOH. M.p. 190° .

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, 531, 79.

Goldschmiedt, *Monatsh.*, 1883, 4, 320.

2 : 4-Dihydroxypyridine

$C_5H_5O_2N$

MW, 111

Cryst. from H_2O or EtOH. M.p. $260-5^\circ$ decomp. Prac. insol. Et_2O .

2 : 4-Dibenzoyl : leaflets from EtOH.Aq. M.p. 103° .

Errera, *Ber.*, 1898, 31, 1687.

2 : 5-Dihydroxypyridine.

Needles or leaflets. M.p. 248° . Sol. EtOH, hot H_2O . Spar. sol. $CHCl_3$, C_6H_6 . Reduces $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ blue col.

B, HCl, H_2O : m.p. 106° , anhyd. 154° .

5-Acetyl : needles. M.p. 156° .

Di-Et ether : $C_9H_{13}O_2N$. MW, 167. B.p. $215-7^\circ$.

Kudernatsch, *Monatsh.*, 1897, 18, 613.

Koenigs, Gerdes, Sirot, *Ber.*, 1928, 61, 1028.

2 : 6-Dihydroxypyridine.

Prisms. M.p. 195° . Sol. H_2O , EtOH.

Di-Et ether : m.p. 21.5° .

Errera, *Ber.*, 1898, 31, 1246.

3 : 4-Dihydroxypyridine.

Needles + $1H_2O$ from H_2O . Decomp. above 250° without melting. Sol. H_2O , hot EtOH. Insol. Et_2O , $CHCl_3$, CS_2 . $FeCl_3 \rightarrow$ red \rightarrow violet col.

3-Me ether : $C_6H_7O_2N$. MW, 125. Needles + $3H_2O$ from H_2O . M.p. 114° , anhyd. 173° .

3-Et ether : $C_7H_9O_2N$. MW, 139. Cryst. + $1H_2O$ from H_2O . M.p. $112-3^\circ$, anhyd. $135-6^\circ$.

3-Acetyl : needles from C_6H_6 . M.p. $207-8^\circ$.

Peratoner, Tamburello, *Gazz. chim. ital.*, 1906, 36, i, 56.

3 : 5-Dihydroxypyridine.

Needles + $\frac{1}{2}H_2O$ from H_2O . M.p. 255° decomp. Sol. acids, alkalis. Spar. sol. cold H_2O . Very spar. sol. Et_2O . $FeCl_3 \rightarrow$ reddish brown col.

B, HCl : needles from EtOH- Et_2O . M.p. 207° decomp.

5-Et ether : cryst. from EtOH- Et_2O . M.p. $127-8^\circ$.

Di-Et ether : b.p. $242-6^\circ/750$ mm. decomp.

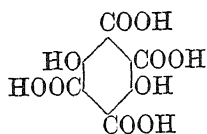
Weidel, Blau, *Monatsh.*, 1885, 6, 663.

Koenigs, Geigy, *Ber.*, 1884, 17, 1836.

Dihydroxypyridine-carboxylic Acid.

See Dihydroxypicolinic Acid, Dihydroxynicotinic Acid, Dihydroxydinicotinic Acid, Dihydroxycinchomeronic Acid, Dihydroxyquinolinic Acid, Comenamic Acid and Citrazinic Acid.

Dihydroxypyromellitic Acid (3 : 6-Dihydroxybenzene-1 : 2 : 4 : 5-tetracarboxylic acid)



$C_{10}H_6O_{10}$

MW, 286

Yellow needles + $1\frac{1}{2}H_2O$. Decomp. above 150° . Mod. sol. H_2O . Spar. sol. other solvents \rightarrow yellow sols. with green fluor. $FeCl_3 \rightarrow$ blue col.

Tetra-Me ester: $C_{14}H_{14}O_{10}$. MW, 342. Yellow plates from MeOH. M.p. 207° . *Di-Me ether*: plates from MeOH. M.p. 135° . *Diacetyl*: needles from MeOH. M.p. 147° .

Tetra-Et ester: $C_{18}H_{22}O_{10}$. MW, 398. Two forms. (i) Yellowish green needles. M.p. $132-6^\circ$. (ii) Yellow plates. M.p. $123-8.5^\circ$. *Diacetyl*: plates from EtOH. M.p. 120° . *Dibenzoyl*: plates from EtOH. M.p. 157° .

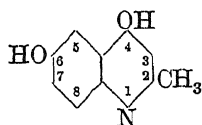
v. Pechmann, Wolman, *Ber.*, 1897, 30, 2570.

Nef, *Ann.*, 1887, 237, 30.

5 : 6-Dihydroxy- γ -pyrone-2-carboxylic Acid.

See 6-Hydroxycoumaric Acid.

4 : 6-Dihydroxyquinaldine (4 : 6-Dihydroxy-2-methylquinoline, 6-hydroxyquinaldone)



$C_{10}H_9O_2N$

MW, 175

6-Me ether: $C_{11}H_{11}O_2N$. MW, 189. M.p. 290° . *Methochloride*: needles from EtOH. M.p. 251° .

Di-Me ether: $C_{12}H_{13}O_2N$. MW, 203. Needles or prisms. M.p. 94° . Sol. EtOH, Et_2O , hot C_6H_6 . Insol. H_2O .

Conrad, Limpach, *Ber.*, 1888, 21, 1652.

4 : 7-Dihydroxyquinaldine (7-Hydroxyquinaldone).

Needles + $1H_2O$ from EtOH.Aq. Darkens above 300° . Alc. $FeCl_3 \rightarrow$ yellowish red col.

Diacetyl: needles from AcOH.Aq. or EtOH. M.p. 232° .

v. Pechmann, Schwarz, *Ber.*, 1899, 32, 3704.

4 : 8-Dihydroxyquinaldine (8-Hydroxyquinaldone).

8-Me ether: needles + $1H_2O$. M.p. anhyd. 229° .

Platinichloride: reddish yellow plates. M.p. 239° decomp.

Conrad, Limpach, *Ber.*, 1888, 21, 1654.

6 : 7-Dihydroxyquinaldine.

6-Me ether: B, HCl : cryst. from H_2O . M.p. 232° . *Picrate*: yellow needles from H_2O . M.p. 233° .

Di-Me ether: b.p. $135^\circ/0.45$ mm. *Picrate*: m.p. 217° .

Book, *Ber.*, 1903, 36, 2211.

Frisch, Bogert, *J. Org. Chem.*, 1944, 9, 338.

7 : 8-Dihydroxyquinaldine.

Yellow cryst. + $2H_2O$. Darkens at 230° . M.p. $253-4^\circ$. Alc. $FeCl_3 \rightarrow$ deep green.

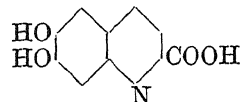
Di-Me ether: m.p. $39-40^\circ$.

Borsche, Ried, *Ber.*, 1943, 76, 1011.

4 : 8-Dihydroxyquinaldinic Acid.

See Xanthurenic Acid.

6 : 7-Dihydroxyquinaldinic Acid (6 : 7-Dihydroxyquinoline-2-carboxylic acid)



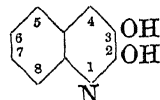
$C_{10}H_7O_4N$

MW, 205

Di-Me ether: $C_{12}H_{11}O_4N$. MW, 233. M.p. 216° .

Mannich, Schilling, *Arch. Pharm.*, 1938, 276, 582.

2 : 3-Dihydroxyquinoline (3-Hydroxycarbo-styryl)



$C_9H_7O_2N$

MW, 161

Prisms. M.p. $257-8^\circ$ (above 300°). Spar. sol. most org. solvents. Sol. alkalis. Sublimes. $FeCl_3 \rightarrow$ bluish green col.

3-Acetyl: needles. M.p. 211° .

3-Benzoyl: needles from AcOH. M.p. $286-7^\circ$.

2 : 3-Dibenzoyl: plates from pet. ether. M.p. $45-6^\circ$.

Friedländer, Weinberg, *Ber.*, 1882, 15, 2681.

Arndt, Eistert, Ender, *Ber.*, 1929, 62, 54.

2 : 4-Dihydroxyquinoline (4-Hydroxycarbo-styryl).

Needles from AcOH. M.p. 255° . Sublimes. Prac. insol. most org. solvents. Sol. alkalis, alc. HCl. $PCl_5 \rightarrow$ 2 : 4-dichloroquinoline.

2-Et ether: $C_{11}H_{11}O_2N$. MW, 189. M.p. 228° .

Monobenzoyl: needles from C_6H_6 . M.p. about 220° .

Bischoff, *Ann.*, 1889, 251, 376.

Tschitschibabin, *Chem. Abstracts*, 1925, 19, 1572.

2 : 6-Dihydroxyquinoline (6-*Hydroxycarbo-styryl*).

Leaflets from EtOH.Aq. Does not melt below 300°. Sol. caustic alkalis.

6-*Me ether*: $C_{10}H_9O_2N$. MW, 175. M.p. 218–19°. Sol. EtOH, $CHCl_3$. Insol. Et_2O , ligroin.

Gattermann, *Ber.*, 1894, 27, 1936.

2 : 8-Dihydroxyquinoline (8-*Hydroxycarbo-styryl*).

Leaflets from H_2O . M.p. above 260° decomp. Spar. sol. common org. solvents. $FeCl_3 \rightarrow$ dirty green col.

8-*Acetyl*: leaflets from AcOH. M.p. 244–7°.

Diamant, *Monatsh.*, 1895, 16, 761.

3 : 4-Dihydroxyquinoline.

Leaflets. M.p. about 340°.

Claus, Howitz, *J. prakt. Chem.*, 1894, 50, 236.

4 : 6-Dihydroxyquinoline.

Cryst. from H_2O . Decomp. about 230° without melting. Spar. sol. cold H_2O , EtOH.

Hirsch, *Monatsh.*, 1896, 17, 338.

5 : 8-Dihydroxyquinoline (*Quinoline-hydro-quinone*).

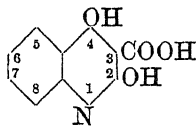
Needles from C_6H_6 . Decomp. about 270° without melting. Mod. sol. H_2O .

Fischer, Renouf, *Ber.*, 1884, 17, 1645.

Claus, Posselt, *J. prakt. Chem.*, 1890, 41, 40.

Dihydroxyquinoline - 2 - carboxylic Acid.

See 6 : 7 - Dihydroxyquinaldinic Acid and Xanthurenic Acid.

2 : 4 - Dihydroxyquinoline - 3 - carboxylic Acid

$C_{10}H_7O_4N$

MW, 205

Me ester: $C_{11}H_9O_4N$. MW, 219. Needles from EtOH. M.p. 203–4° (vac.). KOH.Aq. \rightarrow 2 : 4-dihydroxyquinoline.

Et ester: $C_{12}H_{11}O_4N$. MW, 233. 2-*Et ether*: needles from EtOH. M.p. 107°.

Nitrile: $C_{10}H_8O_2N_2$. MW, 186. Needles. Sinters about 270°. M.p. above 300° decomp.

Koller, *Ber.*, 1927, 60, 1109.

Bischoff, *Ann.*, 1889, 251, 364.

Gabriel, *Ber.*, 1918, 51, 1503.

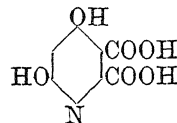
2 : 6 - Dihydroxyquinoline - 4 - carboxylic Acid.

See 2 : 6-Dihydroxyechinonic Acid.

2 : 4 - Dihydroxyquinoline - 6 - carboxylic Acid.

Et ester: $C_{12}H_{11}O_4N$. MW, 233. M.p. about 300°. Spar. sol. org. solvents. Insol. H_2O .

Höchst, D.R.P. 102,894, (*Chem. Zentr.*, 1899, II, 462).

4 : 6-Dihydroxyquinolinic Acid (4 : 6-Di-hydroxypyridine-2 : 3-dicarboxylic acid)

$C_7H_5O_6N$

MW, 199

M.p. 263°.

Meyer, Heimann, *Compt. rend.*, 1936, 203, 264.

1 : 2-Dihydroxystearic Acid

$CH_3 \cdot [CH_2]_{14} \cdot CH(OH) \cdot CH(OH) \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

Needles from AcOEt. M.p. 126°. Spar. sol. EtOH, Et_2O . $KMnO_4 \rightarrow$ palmitic acid.

Le Sueur, *J. Chem. Soc.*, 1904, 85, 1713.

4 : 5-Dihydroxystearic Acid

$CH_3 \cdot [CH_2]_{11} \cdot CH(OH) \cdot CH(OH) \cdot [CH_2]_3 \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

Needles from Et_2O . M.p. 94°.

Posternak, *Compt. rend.*, 1916, 162, 946.

5 : 6-Dihydroxystearic Acid

$CH_3 \cdot [CH_2]_{10} \cdot CH(OH) \cdot CH(OH) \cdot [CH_2]_4 \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

M.p. 122–2° (117–2°).

Steger, van Loon, *Rec. trav. chim.*, 1927, 46, 703.

6 : 7-Dihydroxystearic Acid

$CH_3 \cdot [CH_2]_9 \cdot CH(OH) \cdot CH(OH) \cdot [CH_2]_5 \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

Needles. M.p. 96–5°.

Posternak, *Compt. rend.*, 1916, 162, 946.

7 : 8-Dihydroxystearic Acid

$CH_3 \cdot [CH_2]_8 \cdot CH(OH) \cdot CH(OH) \cdot [CH_2]_6 \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

Leaflets. M.p. 98–5°.

Arnaud, Posternak, *Compt. rend.*, 1910, 150, 1527.

8 : 9-Dihydroxystearic Acid (*Note*.—Numbering from the carboxy group as 1 this is 9 : 10-dihydroxystearic acid)

$CH_3 \cdot [CH_2]_7 \cdot CH(OH) \cdot CH(OH) \cdot [CH_2]_7 \cdot COOH$

$C_{18}H_{36}O_4$

MW, 316

*Trans.**dl.*

Leaflets from EtOH. M.p. 132° (136.5°). Setting point, 122–119°. Sol. hot EtOH. Spar. sol. Et₂O, cold EtOH. Decomp. on dist. The Na, K, and Ca salts are cryst.

Me ester: C₁₉H₃₈O₄. MW, 330. Leaflets. M.p. 105–106.5°.

Et ester: C₂₀H₄₀O₄. MW, 344. Leaflets. M.p. 99–100°.

d.

Et ester: leaflets. M.p. 98–9°. [α]_D + 1.6°.

l.

Et ester: leaflets. M.p. 98–9°. [α]_D – 2.1°.

*Cis.**dl.*

Leaflets or plates from H₂O. M.p. 99°. Sol. Et₂O, hot H₂O. Mod. sol. EtOH.

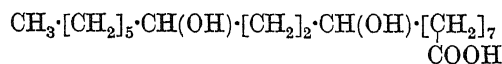
Robinson, Robinson, *J. Chem. Soc.*, 1925, 127, 177.

Le Sueur, *J. Chem. Soc.*, 1901, 79, 1315.

Saytzeff, *J. Chem. Soc.*, 1886, 50, 140.

Milas, Sussman, Mason, *J. Am. Chem. Soc.*, 1939, 61, 1844.

8 : 11-Dihydroxystearic Acid



C₁₈H₃₆O₄ MW, 316

d.

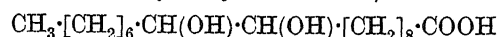
M.p. 90°. Sol. EtOH. Spar. sol. Et₂O. Insol. ligroin. [α]_D + 6.45° in EtOH.

dl.

M.p. 69.5°. Sol. EtOH, Et₂O, AcOH. Insol. ligroin.

Grün, *Ber.*, 1906, 39, 4406.

9 : 10-Dihydroxystearic Acid (See note under 8 : 9-Dihydroxystearic Acid)

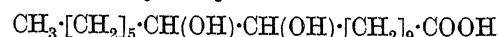


C₁₈H₃₆O₄ MW, 316

Cryst. from Et₂O–EtOH. M.p. 77–8°.

Saizew, Saizew, Saizew, *J. prakt. Chem.*, 1888, 37, 282.

10 : 11-Dihydroxystearic Acid

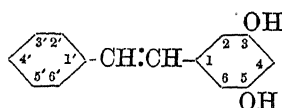


C₁₈H₃₆O₄ MW, 316

Cryst. from EtOH. M.p. 106–8°.

Fokin, *Chem. Zentr.*, 1912, II, 2058.

3 : 5-Dihydroxystilbene (Pinosylvin)



C₁₄H₁₂O₂

MW, 212

Constituent of heart-wood of *Pinus sylvestris*. Needles from AcOH. M.p. 155.5–156°.

Me ether: C₁₅H₁₄O₂. MW, 226. Cryst. from AcOH. M.p. 122–3°. *Benzoyl*: prisms from Me₂CO–MeOH. M.p. 84.5–86°.

Di-Me ether: C₁₆H₁₆O₂. MW, 240. Prisms from MeOH. M.p. 56–7°.

Diacetyl: needles from MeOH. M.p. 100–1°.

Dibenzoyl: needles from AcOH–MeOH. M.p. 150–1°.

Erdtmann, *Ann.*, 1939, 539, 116.

Cox, *J. Am. Chem. Soc.*, 1940, 62, 3512.

2 : 2'-Dihydroxystilbene.

α -Form. Needles from EtOH. M.p. 95°. Sol. EtOH, Et₂O. Alk. sols. show blue fluor.

Dibenzoyl: m.p. 107–8°.

β -Form. Needles from EtOH. M.p. 197°. Sol. Et₂O, C₆H₆.

Di-Me ether: C₁₆H₁₆O₂. MW, 240. M.p. 136°.

Tiemann, *Ber.*, 1891, 24, 3175.

Harries, *ibid.*, 3178.

Kopp, *Ann.*, 1893, 277, 352.

4 : 4'-Dihydroxystilbene.

Needles from AcOH. M.p. 284°. Sol. Me₂CO, hot AcOH. Spar. sol. Et₂O, cold EtOH. Prac. insol. C₆H₆.

Di-Me ether: leaflets. M.p. 214–15°. Sol. hot AcOH, hot C₆H₆. Sublimes. Non-volatile in steam. Shows blue fluor.

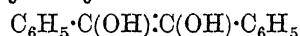
Di-Et ether: C₁₈H₂₀O₂. MW, 268. M.p. 208°.

Diacetyl: m.p. 213°.

Zincke, Fries, *Ann.*, 1902, 325, 26.

Auwers, *Ber.*, 1903, 36, 1887.

α : β -Dihydroxystilbene



C₁₄H₁₂O₂ MW, 212

Enol form of benzoin. Unknown in free state.

Di-Me ether: needles from C₆H₆–ligroin. M.p. 66–7°.

Diallyl ether: needles from C₆H₆–ligroin. M.p. 92–3°.

Diacetyl: two forms. (a) Needles from C₆H₆. M.p. 153°. (b) Cryst. from Et₂O. M.p. 118°.

Dibenzoyl: prisms from C₆H₆–ligroin. M.p. 158°.

Di-p-toluyyl: prisms from C₆H₆. M.p. 199.5°.

Thiele, *Ann.*, 1899, 306, 142.

Bachmann, *J. Am. Chem. Soc.*, 1934, 56, 963.

Dihydroxysuccindialdehyde.

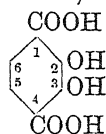
See Tartraldehyde.

Dihydroxysuccinic Acid.

See Tartaric Acid.

Dihydroxytartaric Acid.

See Diketosuccinic Acid.

2 : 3-Dihydroxyterephthalic Acid (*Catechol-3 : 6-dicarboxylic acid*) $C_8H_6O_6$

MW, 198

Cryst. + $1H_2O$ from H_2O . Anhyd. leaflets from EtOH. M.p. 308° decomp. Sol. EtOH, Et₂O. Sols. fluoresce blue. $FeCl_3 \rightarrow$ deep blue col.

Di-Me ester: $C_{10}H_{10}O_6$. MW, 226. Needles. M.p. 145° . Sol. EtOH, Et₂O. Volatile in steam.

Di-Et ester: $C_{12}H_{14}O_6$. MW, 254. M.p. $89-90^\circ$. Sol. EtOH, Et₂O.

Di-Me ether: $C_{10}H_{10}O_6$. MW, 226. M.p. $214-5^\circ$.

Hemmelmayer, *Monatsh.*, 1917, 38, 82.

2 : 5-Dihydroxyterephthalic Acid (*Hydroquinone-2 : 5-dicarboxylic acid*)

Yellow cryst. from EtOH or Et₂O. Blackens and decomposes on strong heating. Mod. sol. EtOH, Et₂O, hot H_2O . Aq. sol. fluoresces green, EtOH sol. fluoresces blue. $FeCl_3 \rightarrow$ blue col.

Mono-Et ester: $C_{10}H_{10}O_6$. MW, 226. M.p. 184° .

Di-Et ester: greenish yellow cryst. M.p. $133-3.5^\circ$. Mod. sol. most org. solvents. Two other unstable forms of the ester are known. *Diacetyl*: m.p. 156.5° . *Dibenzoyl*: m.p. 174° .

Di-Me ether: 2 : 5-dimethoxyterephthalic acid. $C_{10}H_{10}O_6$. MW, 226. Needles from H_2O . M.p. 265° . *Di-Et ester*: $C_{14}H_{18}O_6$. MW, 282. Plates. M.p. 102° .

Di-phenyl ether: m.p. 314° .

Marzin, *J. prakt. Chem.*, 1933, 138, 103.

Hemmelmayer, *Monatsh.*, 1917, 38, 82.

2 : 6-Dihydroxyterephthalic Acid (*Resorcinol-2 : 5-dicarboxylic acid*)

Prisms + $1H_2O$ from H_2O . M.p. anhyd. 250° decomp. Mod. sol. hot H_2O . $FeCl_3 \rightarrow$ violet col.

Di-Me ester: $C_{10}H_{10}O_6$. MW, 226. M.p. $151.5-152^\circ$.

Di-Et ester: yellow plates from EtOH. M.p. 133° .

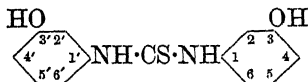
Di-Me ether: 2 : 6-dimethoxyterephthalic acid. M.p. 285° .

Brunner, *Monatsh.*, 1928, 50, 216.

Hemmelmayer, Meyer, *Monatsh.*, 1925, 46, 145.

2 : 5-Dihydroxy-tetradecylbenzene.

See Tetradecylhydroquinone.

3 : 3'-Dihydroxythiocarbanilide (*Di-m-hydroxyphenylthiourea*) $C_{13}H_{12}O_2N_2S$

MW, 260

Yellowish needles from H_2O . M.p. $164-5^\circ$. Sol. EtOH, AcOH. Insol. C_6H_6 , ligroin.

Meyer, Sundmacher, *Ber.*, 1899, 32, 2116.
Dyson, George, *J. Chem. Soc.*, 1924, 125, 1708.

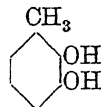
4 : 4'-Dihydroxythiocarbanilide (*Di-p-hydroxyphenylthiourea*).

M.p. $224-5^\circ$.

Di-Me ether: $C_{15}H_{16}O_2N_2S$. MW, 288. M.p. $187-8^\circ$.

Di-Et ether: $C_{17}H_{20}O_2N_2S$. MW, 316. M.p. 171° .

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 376r, (*Chem. Abstracts*, 1927, 21, 671).
Slotta, Dressler, *Ber.*, 1930, 63, 896.

2 : 3-Dihydroxytoluene (*Isohomocatechol, 3-methylcatechol*) $C_7H_8O_2$

MW, 124

Leaflets from C_6H_6 . M.p. 68° (47°). B.p. 241° , $136-7^\circ/14$ mm., $112^\circ/3$ mm. Sol. H_2O , EtOH, $CHCl_3$, C_6H_6 . Mod. sol. Et₂O. $FeCl_3 \rightarrow$ green col.

2-Me ether: 6-methylguaiaicol. $C_8H_{10}O_2$. MW, 138. M.p. 39° . B.p. 209° . Sol. EtOH, $CHCl_3$, Et₂O. Spar. sol. H_2O .

Di-Me ether: 3-methylveratrol, isohomoveratrol. $C_9H_{12}O_2$. MW, 152. B.p. $202-3^\circ$, $92-3^\circ/18$ mm.

Fahlberg, List, D.R.P. 256,345, (*Chem. Zentr.*, 1913, I, 866).

Perkin, *J. Chem. Soc.*, 1916, 109, 920.

2 : 4-Dihydroxytoluene (*Cresorcinol, 4-methylresorcinol, γ-orcinol*).

M.p. $104-5^\circ$. B.p. $267-70^\circ$. Sol. H_2O , EtOH, Et₂O. Spar. sol. C_6H_6 , ligroin. $FeCl_3 \rightarrow$ blue col. Alk. sols. turn red in air.

Di-Me ether: b.p. 211° .

Neville, Winther, *Ber.*, 1882, 15, 2981.

Wallach, *ibid.*, 2835.

2 : 5-Dihydroxytoluene.

See Toluhydroquinone.

2 : 6-Dihydroxytoluene (*2-Methylresorcinol*).

Prisms from C_6H_6 . M.p. $119-20^\circ$. B.p. 264° , $168^\circ/16$ mm. Sol. H_2O , EtOH, Et₂O. Mod. sol. C_6H_6 . $FeCl_3 \rightarrow$ purple col.

Di-Me ether: m.p. 39° .

Dibenzoyl: needles from MeOH. M.p. $105-6^\circ$.

Jones, Robertson, *J. Chem. Soc.*, 1932, 1690.

Sibata, *Chem. Abstracts*, 1939, 33, 8183.

Herzig, Wenzel, Haiser, *Monatsh.*, 1903, 24, 906.

3 : 4-Dihydroxytoluene.

See Homocatechol.

3 : 5-Dihydroxytoluene.

See Orcinol.

2 : 5-Dihydroxy- α -toluic Acid.

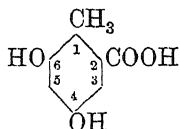
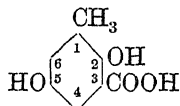
See Homogentisic Acid.

3 : 4-Dihydroxy-*o*-toluic Acid.

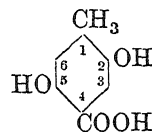
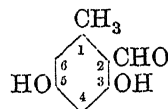
See Berberic Acid.

3 : 5-Dihydroxy-*o*-toluic Acid.

See Orsellinic Acid.

4 : 6-Dihydroxy-*o*-toluic Acid (*Cresorcinol-6-carboxylic acid, 2-methyl- α -resorcylic acid*) $C_8H_8O_4$ MW, 168Needles from H_2O . M.p. 245° decomp. Sol. $EtOH$, Et_2O , hot H_2O . Reduces Fehling's and $NH_3 \cdot AgNO_3$.Jacobsen, Wierss, *Ber.*, 1883, 16, 1960.**5 : 6-Dihydroxy-*o*-toluic Acid (*Isohomocatechol-6-carboxylic acid, 2-methylprotocatechuic acid*).**Decomp. at $200-2^\circ$. Sol. hot H_2O , Et_2O , $MeOH$. Prac. insol. C_6H_6 . Reduces $NH_3 \cdot AgNO_3$. $FeCl_3 \rightarrow$ green col.*Di-Me ether*: see 2-Methylveratric Acid.Perkin, *J. Chem. Soc.*, 1916, 109, 919.**2 : 5-Dihydroxy-*m*-toluic Acid (3-Methylgentisic acid)** $C_8H_8O_4$ MW, 168M.p. 215° .

Chem. Fabr. Schering, D.R.P. 81,297.

2 : 6-Dihydroxy-*m*-toluic Acid (3-Methyl- γ -resorcylic acid).Yellowish needles from $MeOH \cdot Aq$. M.p. 185° decomp.*Me ester*: $C_9H_{10}O_4$. MW, 182. Needles from H_2O . M.p. $130-2^\circ$.Herzig, Wenzel, Haiser, *Monatsh.*, 1903, 24, 908.**4 : 5-Dihydroxy-*m*-toluic Acid (*Homocatechol-5-carboxylic acid*).**Cryst. from H_2O . M.p. 204° .*5-Me ether*: $C_9H_{10}O_4$. MW, 182. Needles. M.p. $180-2^\circ$. Sol. $EtOH$, Et_2O . Insol. C_6H_6 , ligroin. *Me ester*: $C_{10}H_{12}O_4$. MW, 196. Prisms from $EtOH \cdot Aq$. M.p. 92° . *Et ester*: $C_{11}H_{14}O_4$. MW, 210. Needles or prisms. M.p. 77° .*4 : 5-Diacetyl*: m.p. $154-5^\circ$.Bayer, D.R.P. 281,214, (*Chem. Zentr.*, 1915, I, 180).**2 : 5-Dihydroxy-*p*-toluic Acid (*Toluhydroquinone-4-carboxylic acid, 4-methylgentisic acid*)** $C_8H_8O_4$ MW, 168Leaflets from $EtOH \cdot Aq$. M.p. about 210° decomp. Sol. $EtOH$, Et_2O . Mod. sol. hot H_2O . Reduces warm Fehling's and $AgNO_3$. $FeCl_3 \rightarrow$ blue col.*Et ester*: $C_{10}H_{12}O_4$. MW, 196. Needles. M.p. $97-8^\circ$.*2 : 5-Diacetyl*: m.p. 129° .Schmid, *Monatsh.*, 1911, 32, 440.**2 : 6-Dihydroxy-*p*-toluic Acid (4-Methyl- α -resorcylic acid).**M.p. 262° . Sol. H_2O , $EtOH$, Et_2O . Spar. sol. C_6H_6 .*Me ester*: needles from Et_2O . M.p. 190° .*Di-Me ether*: m.p. 215° . *Me ester*: needles from $MeOH$. M.p. 105° .Asahina, Asano, *Ber.*, 1933, 66, 687.**3 : 5-Dihydroxy-*p*-toluic Acid (*Para-orsellinic acid, orcinol-4-carboxylic acid, 4-methyl- γ -resorcylic acid*).**Cryst. + $1H_2O$. M.p. $175-6^\circ$. Sol. $EtOH$, Et_2O , hot H_2O . $FeCl_3 \rightarrow$ blue col. $k = 4.1 \times 10^{-2}$ at 25° .*Me ester*: $C_9H_{10}O_4$. MW, 182. Needles. M.p. $98-9^\circ$.*Et ester*: prisms from pet. ether. M.p. 61° . Reduces warm $NH_3 \cdot AgNO_3$.*3-Me ether*: $C_9H_{10}O_4$. MW, 182. M.p. $169-70^\circ$. *Me ester*: $C_{10}H_{12}O_4$. MW, 196. Needles from $MeOH$. M.p. $95-7^\circ$.*Di-Me ether*: $C_{10}H_{12}O_4$. MW, 196. M.p. 178° . *Me ester*: $C_{11}H_{14}O_4$. MW, 210. Prisms from $EtOH$. M.p. $80-4^\circ$.Hemmelmayer, *Monatsh.*, 1917, 38, 83.Mitter, Gupta, *J. Indian Chem. Soc.*, 1928, 5, 25.**3 : 5-Dihydroxy-*o*-toluic Aldehyde (*Or-cylic aldehyde, 6-methyl- β -resorcylic aldehyde*)** $C_8H_8O_3$ MW, 152Needles from H_2O . M.p. $181-2^\circ$. Sol. $EtOH$, Et_2O , $CHCl_3$, hot H_2O . Mod. sol. C_6H_6 . Sol. alkalis. $FeCl_3 \rightarrow$ reddish brown col. Does not form bisulphite comp.*Oxime*: needles from H_2O . M.p. 200° .*3-Me ether*: $C_9H_{10}O_3$. MW, 166. Needles from C_6H_6 . M.p. 188° . *Oxime*: needles from ligroin. M.p. 127° . *Phenylhydrazone*: yellow plates from $AcOH$. M.p. 159° .

5-*Me ether*: needles from EtOH.Aq. M.p. 65°.

Di-Me ether: $C_{10}H_{12}O_3$. MW, 180. Needles from ligroin. M.p. 64-5°.

5-*Me*: 3-*Et ether*: $C_{11}H_{14}O_3$. MW, 194. Plates from EtOH.Aq. M.p. 64°. *Phenylhydrazone*: yellow needles from AcOH. M.p. 100-1°.

Gattermann, Köbner, *Ber.*, 1899, 32, 279.

Gattermann, *Ann.*, 1907, 357, 372.

4 : 5-Dihydroxy-*o*-toluic Aldehyde (6-Methylprotocatechuic aldehyde).

5-*Me ether*: 6-methylisovanillin. Needles. M.p. 165°.

Di-Me ether: see 6-Methylveratric Aldehyde.

4-*Et ether*: $C_{10}H_{12}O_3$. MW, 180. M.p. 91°.

5-*Me*: 4-*Et ether*: m.p. 33-4°. B.p. 293-4°. *Oxime*: leaflets from EtOH.Aq. M.p. 116-5°.

Perkin, Weizmann, *J. Chem. Soc.*, 1906, 89, 1650.

Gattermann, *Ann.*, 1907, 357, 371.

5 : 6-Dihydroxy-*o*-toluic Aldehyde (2-Methylprotocatechuic aldehyde).

Needles from H_2O . M.p. about 168°. Sol. MeOH, Et_2O , hot H_2O . Spar. sol. C_6H_6 . $FeCl_3 \rightarrow$ green col.

Oxime: needles. Decomp. at 180-5°.

Semicarbazone: needles. Decomp. at about 230°.

Di-Me ether: see 2-Methylveratric Aldehyde.

Perkin, *J. Chem. Soc.*, 1916, 109, 913.

4 : 6-Dihydroxy-*m*-toluic Aldehyde (5-Methyl- β -resorcylic aldehyde).

Needles from C_6H_6 . M.p. 146-5°.

Di-Me ether: needles from EtOH.Aq. M.p. 116-5°. *Oxime*: leaflets from EtOH.Aq. M.p. 145°.

Gattermann, *Ann.*, 1907, 357, 340.

3 : 5-Dihydroxy-*p*-toluic Aldehyde.

See Atranol.

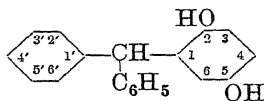
2 : 5-Dihydroxy - 3 - tridecyl - *p* - benzo - quinone.

See Rapanone.

Dihydroxytrimethoxyflavone.

See Tambulin.

2 : 5-Dihydroxytriphenylmethane



$C_{19}H_{16}O_2$

MW, 276

Di-Me ether: $C_{21}H_{20}O_2$. MW, 304. Needles from EtOH. M.p. 104°.

Kauffmann, Grombach, *Ber.*, 1905, 38, 2703.

3 : 4-Dihydroxytriphenylmethane.

Di-Me ether: plates from EtOH. M.p. 110-5°.

Sachs, Thonet, *Ber.*, 1904, 37, 3333.

2 : 2'-Dihydroxytriphenylmethane.

Di-Me ether: prisms from EtOH. M.p. 106°.

Baeyer, *Ann.*, 1907, 354, 181.

2 : 4'-Dihydroxytriphenylmethane.

Di-Me ether: cryst. from EtOH. M.p. 94°.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 772.

4 : 4'-Dihydroxytriphenylmethane.

Needles from EtOH.Aq. M.p. 161°. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O , C_6H_6 . Insol. ligroin, CS_2 . Zn dust dist. \rightarrow triphenylmethane.

Di-Me ether: $C_{21}H_{20}O_2$. MW, 304. Needles from $CHCl_3$ -MeOH. M.p. 100-1°.

Diacetyl: m.p. 109-10°.

Döbner, *Ann.*, 1883, 217, 230.

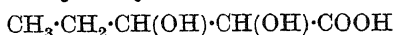
Dihydroxytropone.

See Hydroscolopline.

3 : 6-Dihydroxy - 2 - *n* - undecyl - *p* - benzo - quinone.

See Embelin.

1 : 2-Dihydroxyvaleric Acid



$C_5H_{10}O_4$

MW, 134

l-.

Cryst. from EtOH- Et_2O . M.p. 72°. $[\alpha]_D^{20} - 189^\circ$ in H_2O .

dl-.

Exists in two forms.

(i) Cryst. from AcOEt. M.p. 75°.

Phenylhydrazide: cryst. from EtOH. M.p. 140-5°.

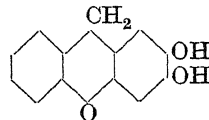
(ii) Cryst. from AcOEt. M.p. 105-6°.

Phenylhydrazide: cryst. from EtOH. M.p. 119°.

Kögl, Duisberg, Erxleben, *Ann.*, 1931, 489, 188.

Braun, *J. Am. Chem. Soc.*, 1930, 52, 3189.

2 : 3-Dihydroxyxanthene



$C_{13}H_{10}O_3$

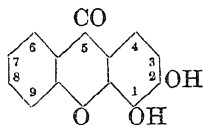
MW, 214

Pink leaflets from H_2O . M.p. 173-5°. Sol. EtOH, Et_2O , AcOH, Me_2CO , hot H_2O . Mod. sol. C_6H_6 , $CHCl_3$. Spar. sol. ligroin.

Diacetyl: needles from EtOH.Aq. M.p. 110°.

Liebermann, Lindenbaum, *Ber.*, 1904, 37, 2734.

1 : 2-Dihydroxyxanthone

 $C_{13}H_8O_4$

MW, 228

Pale yellow needles + $3H_2O$ from EtOH.Aq. M.p. anhyd. 240° .

Di-Me ether: $C_{15}H_{12}O_4$. MW, 256. Yellow needles from C_6H_6 or ligroin. M.p. 155° .

Diacetyl: m.p. 161° .

Graebe, Eichengrün, *Ber.*, 1891, 24, 969.

2 : 3-Dihydroxyxanthone.

Yellow needles from EtOH. M.p. 294° . Sol. AcOH, C_6H_6 . Mod. sol. Et_2O , ligroin, $CHCl_3$. Insol. H_2O .

Diacetyl: needles from EtOH. M.p. 186° .

Liebermann, Lindenbaum, *Ber.*, 1904, 37, 2735.

2 : 4-Dihydroxyxanthone.

Colourless needles from EtOH.Aq. M.p. 247° (259°). Sol. alkalis. Sublimes. Yellow sol. in H_2SO_4 with bluish green fluor.

2-Me ether: $C_{14}H_{10}O_4$. MW, 242. Needles from AcOH. M.p. 245° .

Diacetyl: m.p. 145° .

Kostanecki, Nessler, *Ber.*, 1891, 24, 1896.

2 : 6-Dihydroxyxanthone.

See Isoeuxanthone.

2 : 8-Dihydroxyxanthone.

Pale brown needles from EtOH.Aq. Does not melt below 300° . Sublimes in prisms. Sol. AcOH. Mod. sol. $CHCl_3$. Prac. insol. H_2O , C_6H_6 . Sol. in H_2SO_4 has yellowish blue fluor.

Diacetyl: pale yellow needles from EtOH. M.p. 204° .

Meyer, Conzetti, *Ber.*, 1897, 30, 971.

3 : 6-Dihydroxyxanthone.

See Euxanthone.

3 : 7-Dihydroxyxanthone.

See β -Isoeuxanthone.

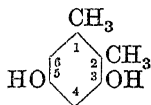
4 : 6-Dihydroxyxanthone.

Yellow plates from C_6H_6 . M.p. 187° . Sublimes. Sol. $CHCl_3$. Mod. sol. EtOH, Et_2O .

Baeyer, *Ann.*, 1910, 372, 131.

 ω : ω' -Dihydroxy-*o*-xylene.

See Phthalyl Alcohol.

3 : 5-Dihydroxy-*o*-xylene (4 : 5-Dimethyl-resorcinol) $C_8H_{10}O_2$

MW, 138

Needles from C_6H_6 , m.p. $115-17^\circ$. Prisms + $1H_2O$ from H_2O , m.p. anhyd. $136-7^\circ$. Sol. EtOH, Et_2O , AcOH. Spar. sol. $CHCl_3$, C_6H_6 . Prac. insol. CS_2 , pet. ether. Sublimes.

Herzig, Wenzel, Hornstein, *Monatsh.*, 1906, 27, 795.

Simon, *Ann.*, 1903, 329, 305.

3 : 6-Dihydroxy-*o*-xylene (2 : 3-Dimethylhydroquinone).

Cryst. from H_2O . M.p. 221° part. decomp.

Di-Et ether: $C_{12}H_{18}O_2$. MW, 194. Leaflets. M.p. $68-9^\circ$.

Monobenzoyl: cryst. from Me_2CO -pet. ether. M.p. $174-5^\circ$.

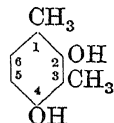
Dibenzoyl: cryst. from Me_2CO -pet. ether. M.p. 182° .

Nölting, Forel, *Ber.*, 1885, 18, 2673.

4 : 5-Dihydroxy-*o*-xylene (4 : 5-Dimethylcatechol).

Prisms from pet. ether. M.p. $87-8^\circ$. Sol. H_2O , EtOH, Et_2O . Sublimes.

Diepolder, *Ber.*, 1911, 44, 2501.

2 : 4-Dihydroxy-*m*-xylene (2 : 4-Dimethylresorcinol) $C_8H_{10}O_2$

MW, 138

Needles. M.p. $149-50^\circ$. Sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ violet col. Sublimes.

Pfannenstill, *J. prakt. Chem.*, 1892, 46, 153.

2 : 5-Dihydroxy-*m*-xylene (2 : 6-Dimethylhydroquinone).

Needles from xylene. M.p. $149-51^\circ$. Sol. EtOH, Et_2O . Volatile in steam.

5-Me ether: $C_9H_{12}O_2$. MW, 152. Needles from pet. ether. M.p. 77° .

Bamberger, Rising, *Ann.*, 1901, 316, 302.

4 : 5-Dihydroxy-*m*-xylene (3 : 5-Dimethylcatechol).

Prisms from H_2O . M.p. $73-4^\circ$. Sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ green col.

4-Me ether: b.p. $227-8^\circ$.

Diacetyl: cryst. from AcOH. M.p. 161° .

Hodgkinson, Limpach, *J. Chem. Soc.*, 1893, 63, 108.

4 : 6-Dihydroxy-*m*-xylene (4 : 6-Dimethylresorcinol, *m*-xylorcinol).

Prisms + $1H_2O$ from H_2O . M.p. $124.5-125^\circ$. B.p. $276-9^\circ$. Sol. H_2O , EtOH, Et_2O . Sublimes. $FeCl_3 \rightarrow$ blue (greenish blue) col.

6-Me ether: $C_9H_{12}O_2$. MW, 152. Needles from ligroin. M.p. 78° .

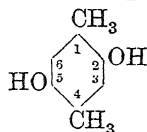
Di-Me ether: $C_{10}H_{14}O_2$. MW, 166. M.p. 76° . Sol. Et_2O , pet. ether, Me_2CO . Volatile in steam.

Di-Et ether: $C_{12}H_{18}O_2$. MW, 194. Needles from EtOH. M.p. 75°. Sol. ligroin, Me_2CO , $CHCl_3$, C_6H_6 . Volatile in steam.

Diacetyl: prisms from EtOH. M.p. 45°. B.p. 285-7°.

Pfaff, *Ber.*, 1883, 16, 1138.

2 : 5-Dihydroxy-*p*-xylene (2 : 5-Dimethyl-hydroquinone, hydrophlorone, *p*-xylohydroquinone)



$C_8H_{10}O_2$ MW, 138

Leaflets from H_2O . M.p. 217°. Sol. EtOH, Et_2O . Mod. sol. hot H_2O . Spar. sol. CS_2 , AcOH, $CHCl_3$. Prac. insol. C_6H_6 . Sublimes. Ox. \rightarrow 2 : 5-dimethyl-*p*-benzoquinone.

Me ether: $C_9H_{12}O_2$. MW, 152. Needles from ligroin. M.p. 90°. Volatile in steam.

Di-Me ether: $C_{10}H_{14}O_2$. MW, 166. Leaflets from EtOH.Aq. M.p. 108°.

Et ether: $C_{10}H_{14}O_2$. MW, 166. Needles. M.p. 80.5-81.5°.

Di-Et ether: $C_{12}H_{18}O_2$. MW, 194. Leaflets from EtOH. M.p. 111-12°.

Monoacetyl: m.p. 117°.

Diacetyl: m.p. 135°.

Monobenzoyl: leaflets from pet. ether. M.p. 162-3°.

Dibenzoyl: needles from MeOH. M.p. 159°.

Nietzki, *Ann.*, 1882, 215, 169.

Kehrmann, Stiller, *Ber.*, 1912, 45, 3348.

Jacob, Steiger, Todd, Work, *J. Chem. Soc.*, 1939, 542.

2 : 6-Dihydroxy-*p*-xylene (2 : 5-Dimethyl-resorcinol, β -orcinol, *p*-xyloresorcinol).

Needles from C_6H_6 . Prisms from H_2O . M.p. 163°. B.p. 277-80°. Sol. EtOH, Et_2O , hot H_2O .

Me ether: cryst. from C_6H_6 . M.p. 118-21°.

Diacetyl: needles from EtOH. M.p. 69°.

Kostanecki, *Ber.*, 1886, 19, 2321.

Di-iminazole.

See Glycosine.

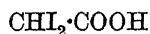
Di-indole.

See under Indole.

Di-iodoacetanilide.

See under Di-iodoaniline.

Di-iodoacetic Acid



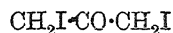
$C_2H_2O_2I_2$ MW, 312

Cryst. M.p. 110° (95-6°). Sol. EtOH, Et_2O , C_6H_6 . Mod. sol. H_2O . Turns red in air.

Amide: $C_2H_3ONi_2$. MW, 311. Cryst. from hot H_2O . Softens at 198°, melts at 201-2° decomp.

Clarke, Bolton, *J. Am. Chem. Soc.*, 1914, 36, 1907.

Di-iodoacetone



$C_3H_4OI_2$ MW, 310

Needles. M.p. 65-6°. Sol. Et_2O , Me_2CO , C_6H_6 . Spar. sol. cold $CHCl_3$, CS_2 . Zn + AcOH \rightarrow acetone. Decomp. on dist.

Lederer, D.R.P. 95,440, (*Chem. Zentr.*, 1898, I, 811).

Völker, *Ann.*, 1878, 192, 95.

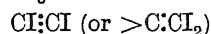
ω -Di-iodoacetophenone.

See Phenacylidene iodide.

Di-iodo-acet-toluidide.

See under Di-iodotoluidine.

Di-iodoacetylene



C_2I_2 MW, 278

Needles from ligroin. M.p. 81-2° (78.5-78.9°). Spar. sol. cold ligroin. Sublimes readily. Explodes above m.p. Forms a stable cryst. comp. with cineole, colourless needles, m.p. 37-38.5°.

Dussol, *Bull. soc. chim.*, 1924, 35, 1618.

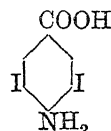
Vaughn, Nieuwland, *J. Am. Chem. Soc.*, 1932, 54, 788.

Union Carbide and Carbon Corp., U.S.P. 2,124,218, (*Chem. Zentr.*, 1938, II, 3861).

Di-iodo-*o*-aminobenzoic Acid.

See Di-iodoanthranilic Acid.

3 : 5-Di-iodo-*p*-aminobenzoic Acid



$C_7H_5O_2NI_2$ MW, 389

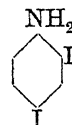
Needles from AcOH-NH₃. Does not melt below 350°. Readily sol. alkalis. Spar. sol. AcOEt, $PhNO_2$. Insol. H_2O , EtOH, AcOH.

Et ester: $C_9H_5O_2NI_2$. MW, 417. Needles from EtOH. M.p. 148°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 456.

Michael, Norton, *Am. Chem. J.*, 1879, 1, 264.

2 : 4-Di-iodoaniline



$C_6H_5NI_2$ MW, 345

Needles from EtOH. M.p. 95-6°. Sol. most ord. org. solvents.

N-Acetyl: 2 : 4-di-iodoacetanilide. $C_8H_7ONi_2$. MW, 387. M.p. 141° (171°).

N-Diacetyl: 2 : 4-di-iododiacetanilide. Needles from EtOH.Aq. M.p. 93°.

2 : 5-Di-iodoaniline

N - Benzoyl : 2 : 4 - di - iodobenzanilide. $C_{13}H_9ONI_2$. MW, 449. Needles from EtOH. M.p. 181°.

Brenans, *Compt. rend.*, 1904, 139, 64.
Volk, Elbs, *J. prakt. Chem.*, 1919, 99, 270.

2 : 5-Di-iodoaniline.

Needles. M.p. 88-9°. Sol. ord. org. solvents. Volatile in steam.

Brenans, *Compt. rend.*, 1902, 135, 178.

2 : 6-Di-iodoaniline.

Needles from EtOH. M.p. 122°. Sol. ord. org. solvents.

N - Diacetyl : 2 : 6 - di - iododiacetanilide. Needles. M.p. 147°.

Brenans, *Compt. rend.*, 1904, 138, 1505.

3 : 4-Di-iodoaniline.

Pale yellow leaflets or prisms from C_6H_6 -pet. ether. M.p. 74.5°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. pet. ether. Volatile in steam.

N - Benzoyl : 3 : 4 - di - iodobenzanilide. Needles from EtOH. M.p. 174°.

Brenans, *Compt. rend.*, 1903, 136, 1078.

3 : 5-Di-iodoaniline.

Needles from EtOH. M.p. 107°. Sol. EtOH, Et_2O , $CHCl_3$.

N - Acetyl : 3 : 5 - di - iodoacetanilide. M.p. 110°.

Willgerodt, Arnold, *Ber.*, 1901, 34, 3346.

Brenans, *Compt. rend.*, 1903, 136, 237.

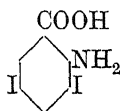
Di-iodoanisic Acid.

See under 3 : 5-Di-iodo-*p*-hydroxybenzoic Acid.

Di-iodoanisole.

See under Di-iodophenol.

3 : 5-Di-iodoanthranilic Acid (3 : 5-Di-iodo-*o*-aminobenzoic acid)



$C_7H_5O_2NI_2$ MW, 389

Prisms from EtOH. M.p. 230-2°. Sol. Et_2O . Spar. sol. hot C_6H_6 . Insol. hot H_2O .

Et ester : $C_9H_9O_2NI_2$. MW, 417. Prisms from EtOH. M.p. 101°.

Amide : $C_7H_6ON_2I_2$. MW, 388. Needles. M.p. 238-9°. Spar. sol. hot EtOH. Insol. H_2O , AcOH, $CHCl_3$, dil. NaOH.

Anilide : prisms. M.p. about 224°. Turns brown at 200°.

Wheeler, Johns, *Am. Chem. J.*, 1910, 43, 405.

4 : 5-Di-iodoanthranilic Acid.

Cryst. from dil. NH_3 on addition of HCl. Loses I above 200°. Decomp. at 210-20°. Easily sol. EtOH, Et_2O , hot C_6H_6 . Almost insol. hot H_2O .

254 1 : 2-Di-iodobenzene-4-sulphonic Acid

Et ester : prisms from EtOH. M.p. 137°. Sol. Et_2O , C_6H_6 , hot EtOH. Almost insol. hot H_2O .

Wheeler, Johns, *Am. Chem. J.*, 1910, 44, 452.

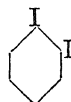
Di-iodoaspirin.

See under Di-iodosalicylic Acid.

Di-iodobenzanilide.

See under Di-iodoaniline.

o-Di-iodobenzene



$C_6H_4I_2$ MW, 330

Plates or prisms from ligroin. F.p. 23.4°. M.p. 27°. B.p. 286-7°. Spar. sol. H_2O , cold EtOH. Volatile in steam.

Körner, Wender, *Gazz. chim. ital.*, 1887, 17, 491.

m-Di-iodobenzene.

Plates from EtOH- Et_2O . F.p. 34.2°. M.p. 40° (36.5°). B.p. 285°.

Körner, *Gazz. chim. ital.*, 1874, 4, 385 (Footnote).

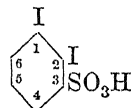
Budolph, *Ber.*, 1878, 11, 81.

p-Di-iodobenzene.

Leaflets from EtOH. M.p. 129.4°. B.p. 285°. Sol. EtOH, Et_2O . Sublimes.

Datta, Chatterjee, *J. Am. Chem. Soc.*, 1919, 41, 293.

1 : 2-Di-iodobenzene-3-sulphonic Acid



$C_6H_4O_3I_2S$ MW, 410

Cryst. M.p. 147-8°.

Me ester : $C_7H_6O_3I_2S$. MW, 424. Cryst. from Et_2O . M.p. 101°.

Et ester : $C_8H_8O_3I_2S$. MW, 438. Needles from Et_2O . M.p. 77-8°.

Chloride : $C_6H_3O_3ClI_2S$. MW, 428.5. Cryst. from Et_2O . M.p. 127°.

Boyle, *J. Chem. Soc.*, 1911, 99, 332.

1 : 2-Di-iodobenzene-4-sulphonic Acid.

Cryst. + H_2O from H_2O . M.p. 122-5° after drying at 100°. Sol. H_2O , Et_2O .

Me ester : cryst. from MeOH. M.p. 93°.

Et ester : needles from EtOH. M.p. 82-5°.

Chloride : needles from C_6H_6 -pet. ether. M.p. 82°.

Amide : $C_6H_5O_2NI_2S$. MW, 409. White powder from EtOH.Aq. M.p. 227°. Sol. EtOH. Spar. sol. hot H_2O .

Boyle, *J. Chem. Soc.*, 1909, 95, 1694.

1 : 3-Di-iodobenzene-4-sulphonic Acid.

Needles + H_2O from H_2O . M.p. anhyd. 167°. Sol. Et_2O .

Me ester: flat needles from EtOH. M.p. 78°.

Et ester: needles from EtOH. M.p. 57°.

Chloride: plates from C_6H_6 -pet. ether. M.p. 77-8°.

Amide: m.p. 230°.

Boyle, *J. Chem. Soc.*, 1909, 95, 1709.

1 : 3-Di-iodobenzene-5-sulphonic Acid.

Cryst. from Et_2O . M.p. 146° after drying at 98°.

Me ester: flat needles from EtOH. M.p. 95°.

Et ester: needles from EtOH- Et_2O . M.p. 112°.

Chloride: needles from Et_2O . M.p. 93°.

Boyle, *J. Chem. Soc.*, 1909, 95, 1705.

1 : 4-Di-iodobenzene-2-sulphonic Acid.

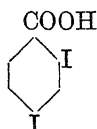
Plates + $3\text{H}_2\text{O}$ from H_2O . M.p. 132° after drying at 95-100°. M.p. 195° after drying at 130° (anhydride formation). Sol. H_2O , Et_2O . Almost insol. min. acids.

Me ester: needles from EtOH. M.p. 106°.

Et ester: needles from EtOH- Et_2O . M.p. 120.5° (112.5°).

Chloride: needles from Et_2O . M.p. 131-2°.

Boyle, *J. Chem. Soc.*, 1909, 95, 1701.

2 : 4-Di-iodobenzoic Acid

$\text{C}_7\text{H}_4\text{O}_2\text{I}_2$

MW, 374

Needles. M.p. 169-70°. Sol. EtOH. Prac. insol. H_2O . Sublimes.

Neumann, *Ann.*, 1887, 241, 63.

2 : 5-Di-iodobenzoic Acid.

Prisms from EtOH.Aq. M.p. 183°. Sol. EtOH, Et_2O , hot C_6H_6 . Insol. H_2O .

Et ester: $\text{C}_9\text{H}_5\text{O}_2\text{I}_2$. MW, 402. Needles from EtOH. M.p. 65°. Sol. Et_2O , C_6H_6 , hot EtOH.

Wheeler, Johns, *Am. Chem. J.*, 1910, 43, 404.

3 : 4-Di-iodobenzoic Acid.

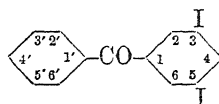
Needles from EtOH. M.p. 257°. Sol. EtOH. Insol. H_2O .

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 457.

3 : 5-Di-iodobenzoic Acid.

Pale yellow prisms from EtOH.Aq. M.p. 235-6°. Sol. EtOH. Insol. H_2O .

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 458, 505.

3 : 5-Di-iodobenzophenone

$\text{C}_{13}\text{H}_8\text{OI}_2$

MW, 434

Prisms from MeOH. M.p. 91°.

Waters, *J. Chem. Soc.*, 1929, 2111.

2 : 2'-Di-iodobenzophenone.

Leaflets from EtOH.Aq. M.p. 106-7°.

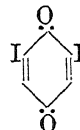
Heyl, *J. prakt. Chem.*, 1899, 59, 447.

4 : 4'-Di-iodobenzophenone.

Needles from C_6H_6 . M.p. 238.5°. B.p. 281°/12 mm.

Oxime: needles from EtOH. M.p. 173°.

Montagne, *Ber.*, 1918, 51, 1486.

2 : 6-Di-iodo-p-benzoquinone

$\text{C}_6\text{H}_2\text{O}_2\text{I}_2$

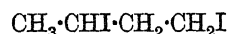
MW, 360

Yellow plates from pet. ether. M.p. 179°. Insol. H_2O .

Hodgson, Nixon, *J. Chem. Soc.*, 1930, 1869.

Ishikara, *Chem. Abstracts*, 1930, 24, 1361.

Elbs, Volk, *J. prakt. Chem.*, 1919, 99, 271.

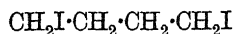
1 : 3-Di-iodobutane

$\text{C}_4\text{H}_8\text{I}_2$

MW, 310

B.p. 115-16° in vacuo.

Wurtz, *Bull. soc. chim.*, 1884, 41, 362.

1 : 4-Di-iodobutane (Tetramethylene iodide)

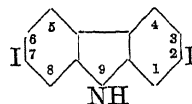
$\text{C}_4\text{H}_8\text{I}_2$

MW, 310

M.p. 5.8°. B.p. 125-6°/15 mm. decomp. (128°/18 mm.). D^{15}_4 2.3659. n^{15}_D 1.6239.

Marvel, Tanenbaum, *J. Am. Chem. Soc.*, 1922, 44, 2650.

Heisig, *J. Am. Chem. Soc.*, 1939, 61, 525.

2 : 7-Di-iodocarbazole

$\text{C}_{12}\text{H}_7\text{NI}_2$

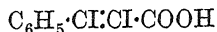
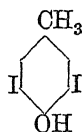
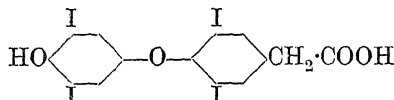
MW, 419

Yellowish brown needles from C_6H_6 . M.p. 265-6°.

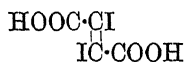
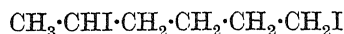
Ponte, *Chem. Zentr.*, 1934, II, 3116.

3 : 6-Di-iodocarbazole.

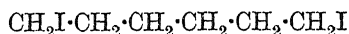
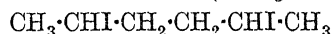
Leaflets from EtOH. M.p. 202-4°.

Acetyl: needles from EtOH or C₆H₆. M.p. 224-5°.Tucker, *J. Chem. Soc.*, 1926, 549.**α : β-Di-iodocinnamic Acid**C₆H₅O₂I₂ MW, 400Plates from EtOH.Aq. + SO₂. Cryst. from CHCl₃. M.p. 172°.*Me ester*: C₁₀H₈O₂I₂. MW, 414. Leaflets from EtOH.Aq. M.p. 77°.*Et ester*: C₁₁H₁₀O₂I₂. MW, 428. Cryst. from EtOH. M.p. 63°. Sol. Et₂O. Spar. sol. H₂O.James, Sudborough, *J. Chem. Soc.*, 1907, 91, 1040.**3 : 5-Di-iodo-*p*-cresol**C₇H₆OI₂ MW, 360Cryst. from AcOH. M.p. 62°. Sol. EtOH. Spar. sol. H₂O, ligroin.*Acetyl*: m.p. 62.5°.Datta, Prosad, *J. Am. Chem. Soc.*, 1917, 39, 443.**3 : 5-Di-iodo-4-(3' : 5'-di-iodo-4'-hydroxyphenoxy) - phenylacetic Acid (2 : 6 : 3' : 5' - Tetra-iodo-4' - hydroxy-4 - carboxymethyl - diphenyl ether)**C₁₄H₈O₄I₄ MW, 748

Cryst. from 50% MeOH.Aq. M.p. 219-20° decomp.

Harrington, Pitt-Rivers, *Biochem. J.*, 1952, 50, 438.**Di-iodoethane.***See* Ethylene di-iodide and Ethylidene iodide.**sym.-Di-iodoethylene.***See* Acetylene di-iodide.**Di-iodofumaric Acid**C₄H₂O₄I₂ MW, 368Needles from Et₂O-C₆H₆. Decomp. with evolution of I at 220° (192°). Sol. H₂O. EtOH, Et₂O, AcOH. Insol. CHCl₃, C₆H₆, ligroin.*Di-Me ester*: C₆H₆O₄I₂. MW, 396. Needles from AcOH. M.p. 126°.*Di-Et ester*: C₈H₁₀O₄I₂. MW, 424. Needles from EtOH. M.p. 88.5°.*Dichloride*: C₄O₂Cl₂I₂. MW, 405. Plates from C₆H₆. M.p. 49°.*Diamide*: C₄H₄O₂N₂I₂. MW, 366. Decomp. at 210°.Eichelberger, *J. Am. Chem. Soc.*, 1926, 48, 1320.**1 : 5-Di-iodo-*n*-hexane**C₆H₁₂I₂ MW, 338

Brown liq. B.p. 159-60°/33 mm.

Dionneau, *Ann. chim.*, 1915, 3, 207.**1 : 6-Di-iodo-*n*-hexane (Hexamethylene iodide)**C₆H₁₂I₂ MW, 338Needles. M.p. 9.5° (6-7°). B.p. 163°/17.5 mm., 141-2°/10 mm. D₁₅ 2.0466. n_D¹⁵ 1.5899. Volatile in steam.Müller, Rölz, *Ber.*, 1928, 61, 571.**2 : 5-Di-iodo-*n*-hexane (Diallyl dihydriodide)**C₆H₁₂I₂ MW, 338

Exists in two forms. (1) M.p. 44°. B.p. 133-4.5°/15 mm. (2) Liq. at -60°. B.p. 132-3°/15 mm.

Griner, *Ann. chim.*, 1892, 26, 329.**2 : 4-Di-iodohippuric Acid**C₉H₇O₃NI₂ MW, 431

M.p. 209°.

Dohrn, Diedrich, U.S.P. 2,160,413, (*Chem. Abstracts*, 1939, 33, 7317).**2 : 5-Di-iodohippuric Acid.**

Cryst. from EtOH.Aq. M.p. 210-11°.

Klemme, Hunter, *J. Org. Chem.*, 1940, 5, 231.**3 : 4-Di-iodohippuric Acid.**

Cryst. from EtOH.Aq. Softens at 148°. M.p. 150-4°.

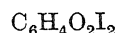
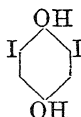
Klemme, Hunter, *J. Org. Chem.*, 1940, 5, 231.**3 : 5-Di-iodohippuric Acid.**

Cryst. from EtOH.Aq. M.p. 208-9° (213°).

Klemme, Hunter, *J. Org. Chem.*, 1940, 5, 231.

Di-iodohydrin.

See Di-iodoisopropyl Alcohol and Di-iodopropyl Alcohol.

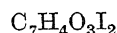
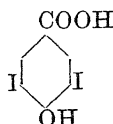
2 : 6-Di-iodohydroquinone

MW, 362

Needles from hot H₂O. M.p. 144°.

Di-Me ether: m.p. 55–5.5°.

Elbs, Volk, *J. prakt. Chem.*, 1919, **99**, 271.

3 : 5-Di-iodo-*p*-hydroxybenzoic Acid

MW, 390

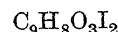
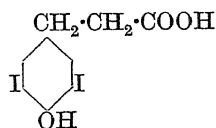
Needles from EtOH.Aq. M.p. 237°. Gives off I above 220°. Decomp. at 260°. Sol. EtOH, Et₂O. Almost insol. hot H₂O. Fused with KOH → gallic acid. With FeCl₃ in warm → red col.

Me ester: C₈H₆O₃I₂. MW, 404. Needles from EtOH. M.p. 167°. Sol. EtOH, dil. NaOH. Insol. H₂O.

Me ether: 3 : 5-di-iodoanisic acid. C₈H₆O₃I₂. MW, 404. Prisms from EtOH. Decomp. at 255–6°.

Paal, Mohr, *Ber.*, 1896, **29**, 2303.

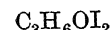
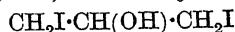
Datta, Prosad, *J. Am. Chem. Soc.*, 1917, **39**, 449.

3 : 5-Di-iodo-*p*-hydroxyhydrocinnamic Acid

MW, 418

Needles. M.p. 162°. Sol. EtOH, Et₂O, CHCl₃. Insol. H₂O.

Bougault, *Compt. rend.*, 1900, **131**, 43; *Ann. chim.*, 1902, **25**, 503.

1 : 3-Di-iodoisopropyl Alcohol (Glycerol 1 : 3-di-iodohydrin, α-di-iodohydrin, iotone)

MW, 312

Yellowish cryst. F.p. –16° to –20°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. D₁₅ 2.4.

Lauryl: m.p. 34–5°.

Palmityl: m.p. 48–9°.

Stearyl: m.p. 49–50°.

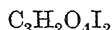
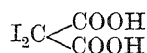
Dict. of Org. Comp.—II

p-Nitrobenzoyl: m.p. 81–2°.

Lusignani, *Chem. Abstracts*, 1940, **34**, 2322.

Claus, *Ann.*, 1873, **168**, 24.

Fairbourn, Stephens, *J. Chem. Soc.*, 1932, 1976.

Di-iodomalonic Acid

MW, 356

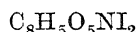
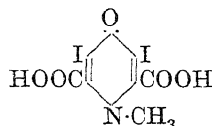
Yellow cryst. from formic acid. M.p. 119–20° decomp. Sol. H₂O. Loses CO₂ in aq. sol. Decomp. in EtOH, Et₂O, CS₂ and on standing in H·COOH with elimination of I.

Di-Me ester: C₅H₆O₄I₂. MW, 384. Pale yellow needles from pet. ether. M.p. 79–80°. Sol. EtOH, Et₂O. Insol. H₂O. Sols. rapidly turn brown.

Willstätter, *Ber.*, 1902, **35**, 1377.

Di-iodomethane.

See Methylene iodide.

3 : 5-Di-iodo-1-methylchelidamic Acid

MW, 449

M.p. 174–5° decomp. → 3 : 5-di-iodo-1-methyl-4-pyridone.

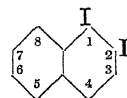
Di-Na salt: iodoxy, uroselectan B. Used in X-ray contrast media.

Di-Me ester: m.p. 194–6°.

Di-Et ester: m.p. 112–15°.

Dohrn, Dietrich, *Ann.*, 1932, **494**, 284.

Hackman, Lemberg, *J. Soc. Chem. Ind.*, 1946, **65**, 204.

1 : 2-Di-iodonaphthalene

MW, 380

Scales from EtOH. M.p. 81°.

Meldola, *J. Chem. Soc.*, 1885, **47**, 522.

1 : 4-Di-iodonaphthalene.

Needles. M.p. 109–10°.

Meldola, *J. Chem. Soc.*, 1885, **47**, 522.

1 : 8-Di-iodonaphthalene.

Yellow needles from MeOH. M.p. 109°.

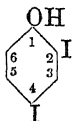
Scholl, Seer, Weitzenböck, *Ber.*, 1910, **43**, 2207.

1 : 4-Di-iodo-*n*-pentane
 $\text{C}_5\text{H}_{10}\text{I}_2$ MW, 324

B.p. 125–30°/13 mm.

v. Braun, *Ber.*, 1910, 43, 3222.**1 : 5-Di-iodo-*n*-pentane** (*Pentamethylene iodide*)
 $\text{C}_5\text{H}_{10}\text{I}_2$ MW, 324
M.p. 9°. B.p. 149°/20 mm., 128–30°/10 mm. D^{15}_D 2.1903. n^{15}_D 1.6046. Spar. volatile in steam.Müller, Rölz, *Monatsh.*, 1928, 50, 108.**2 : 4-Di-iodo-*n*-pentane**
 $\text{C}_5\text{H}_{10}\text{I}_2$ MW, 324
B.p. 147°/34 mm. D^{20}_D 2.195. n^{20}_D 1.600.Demyanov, Pinegin, *Chem. Abstracts*, 1914, 8, 1964.Combes, *Ann. chim.*, 1887, 12, 235.**Di-iodophenetole.**

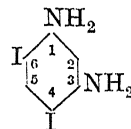
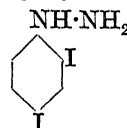
See under Di-iodophenol.

2 : 4-Di-iodophenol
 $\text{C}_6\text{H}_4\text{OI}_2$ MW, 346
Needles from H_2O . M.p. 72°. Sol. EtOH, Et_2O . Spar. sol. H_2O , CHCl_3 , C_6H_6 . Sublimes above m.p.*Me ether*: 2 : 4-di-iodoanisole. $\text{C}_7\text{H}_6\text{OI}_2$. MW, 360. Prisms from EtOH.Aq. M.p. 68°. Sol. EtOH, AcOH, C_6H_6 .*Et ether*: 2 : 4-di-iodophenetole. $\text{C}_8\text{H}_8\text{OI}_2$. MW, 374. Prisms from MeOH. M.p. 46° (51°). Sol. EtOH, AcOH, C_6H_6 .*Propyl ether*: $\text{C}_9\text{H}_{10}\text{OI}_2$. MW, 388. Leaflets from C_6H_6 or AcOH. M.p. 32°.*Isopropyl ether*: b.p. 235–7°/77 mm.*Allyl ether*: $\text{C}_9\text{H}_8\text{OI}_2$. MW, 386. B.p. 110–12°/39 mm.*Acetyl*: prisms from EtOH.Aq. M.p. 70–1°.*Succinyl*: prisms from C_6H_6 . M.p. 209°.*Benzoyl*: needles. M.p. 98°.Brenans, *Compt. rend.*, 1901, 132, 831.Brenans, Yeu, *Compt. rend.*, 1930, 190, 1560.**2 : 5-Di-iodophenol.**Prisms from pet. ether. M.p. 99°. Sol. EtOH, CHCl_3 , AcOH, pet. ether. Spar. sol. H_2O , Et_2O .*Acetyl*: prisms from AcOH. M.p. 70°.Brenans, *Compt. rend.*, 1902, 135, 179.**2 : 6-Di-iodophenol.**

M.p. 68°. Sol. EtOH. Volatile in steam.

Me ether: 2 : 6-di-iodoanisole. Needles from EtOH. Prisms from AcOH. M.p. 35°.*Et ether*: 2 : 6-di-iodophenetole. Needles from EtOH. Plates from AcOH. M.p. 41–2°.*Propyl ether*: b.p. 138–40°/62 mm.*Isopropyl ether*: b.p. 198–201°/62 mm.*Allyl ether*: plates from C_6H_6 or AcOH. M.p. 46°.*Acetyl*: prisms from AcOH. M.p. 107°.Brenans, *Compt. rend.*, 1902, 134, 357; 1904, 138, 1505.**3 : 4-Di-iodophenol.**Needles from H_2O . M.p. 83°. Sol. EtOH, Et_2O , CHCl_3 , AcOH, C_6H_6 . Insol. ligroin. Spar. volatile in steam.*Benzoyl*: m.p. 123°.Brenans, *Compt. rend.*, 1903, 136, 1078.**3 : 5-Di-iodophenol.**Needles from H_2O . M.p. 104°. Sol. EtOH, Et_2O , CHCl_3 , AcOH, C_6H_6 . Spar. volatile in steam.*Me ether*: 3 : 5-di-iodoanisole. Cryst. from pet. ether. M.p. 85°.*Et ether*: 3 : 5-di-iodophenetole. Needles from MeOH. M.p. 30°. Sol. EtOH, AcOH, C_6H_6 . Volatile in steam.*Acetyl*: needles from MeOH or pet. ether. M.p. 79°.*Benzoyl*: m.p. 93°.Brenans, *Compt. rend.*, 1903, 136, 238.Hodgson, Wignall, *J. Chem. Soc.*, 1926, 2078.**2 : 6-Di-iodophenol-4-sulphonic Acid.**

See Sozoiodolic Acid.

4 : 6-Di-iodo-*m*-phenylenediamine
 $\text{C}_6\text{H}_6\text{N}_2\text{I}_2$ MW, 360
Yellow needles from C_6H_6 . M.p. 81°. De-comp. at 83°. Sol. EtOH, Et_2O .Morgan, Wootton, *J. Chem. Soc.*, 1905, 87, 938.**2 : 6-Di-iodo-*p*-phenylenediamine.**Needles from H_2O . M.p. 108°. Sol. EtOH, Et_2O . $\text{CrO}_3 \rightarrow$ 2 : 6-di-iodo-*p*-benzoquinone.Willgerodt, Arnold, *Ber.*, 1901, 34, 3351.**2 : 4-Di-iodophenylhydrazine**
 $\text{C}_6\text{H}_6\text{N}_2\text{I}_2$

MW, 360

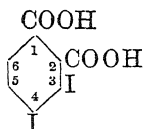
Needles from ligroin. M.p. 112°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

B.HCl: leaflets from H₂O. M.p. 163° decomp.

N-Benzylidene: plates from EtOH. M.p. 104°.

Neufeld, *Ann.*, 1888, **248**, 99.

3 : 4-Di-iodophthalic Acid



C₈H₄O₄I₂

MW, 418

Leaflets from H₂O. M.p. 212–3° corr. (with evolution of H₂O). Readily sol. Et₂O when amorphous. Spar. sol. H₂O, Et₂O when cryst.

Anhydride: C₈H₂O₃I₂. MW, 400. Prisms from C₆H₆-Ac₂O. M.p. 198–8.5° corr.

Anil: cryst. from xylene. M.p. 270–1° corr.

Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, **40**, 223.

3 : 6-Di-iodophthalic Acid.

Leaflets. Loses H₂O slowly at 100°.

Anhydride: prisms from C₆H₆. M.p. 235° corr.

Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, **40**, 225.

4 : 5-Di-iodophthalic Acid.

Leaflets from H₂O. M.p. 221–2° corr. Sol. hot AcOH. Insol. hot C₆H₆.

Anhydride: prisms from C₆H₆ or AcOH. M.p. 217° corr.

Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, **40**, 229.

1 : 3-Di-iodopropane (*Trimethylene iodide*)



C₃H₆I₂

MW, 296

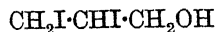
Liq. at –20°. B.p. 227° part. decomp., 110°/19 mm. D₁₅ 2.5173. n_D²⁰ 1.6363.

Finkelstein, *Ber.*, 1910, **43**, 1531.

Knoll, D.R.P. 230,172, (*Chem. Zentr.*, 1911, I, 359).

Ogg, Priest, *J. Am. Chem. Soc.*, 1938, **60**, 217.

2 : 3-Di-iodopropyl Alcohol (*Allyl alcohol di-iodide*, *glycerol 2 : 3-di-iodohydrin*, *β-di-iodohydrin*)



C₃H₆OI₂

MW, 312

Needles. M.p. 43° (45° decomp.). Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Insol. H₂O. Rapidly turns brown on standing.

Lauryl: m.p. 38–9°.

Palmityl: m.p. 55°.

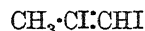
Stearyl: m.p. 55–6°.

p-Nitrobenzoyl: m.p. 66–7°.

Hübner, Lellmann, *Ber.*, 1881, **14**, 207.

Fairbourn, Stephens, *J. Chem. Soc.*, 1932, 1976.

1 : 2-Di-iodopropylene (*Allylene di-iodide*)



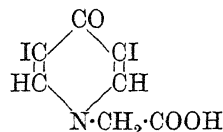
C₃H₄I₂

MW, 294

B.p. 198°. D^o 2.62.

Oppenheim, *Bull. soc. chim.*, 1865, **4**, 434.

3 : 5-Di-iodo-4-pyridone-N-acetic Acid



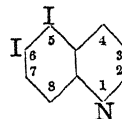
C₇H₅O₃NI₂

MW, 405

Rhombic cryst. M.p. 240°. Sol. Me₂CO, EtOH, hot H₂O. Insol. pet. ether, C₆H₆, CHCl₃.

Dohrn, Diedrich, *Ann.*, 1932, **494**, 294.

5 : 6-Di-iodoquinoline



C₉H₅NI₂

MW, 381

Needles from EtOH. M.p. 125°. Darkens in light. Spar. volatile in steam.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 73.

5 : 7-Di-iodoquinoline.

Needles from EtOH. M.p. 132°. Sublimes.

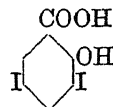
Willgerodt, Arnold, *Ber.*, 1901, **34**, 3349.

5 : 8-Di-iodoquinoline.

Needles from EtOH. M.p. 162°. Volatile in steam.

Howitz, Fraenkel, Schroeder, *Ann.*, 1913, **396**, 61.

3 : 5-Di-iodosalicylic Acid (*3 : 5-Di-iodo-o-hydroxybenzoic acid*)



C₇H₄O₃I₂

MW, 390

Needles from EtOH. M.p. 326–7° (228–30° decomp.). Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ → violet col. Heat of comb. C_p 700.2 Cal., C_v 699.9 Cal.

Me ester: C₈H₆O₃I₂. MW, 404. Needles. M.p. 110°. B.p. 221°/17 mm. part. decomp. Sol. hot EtOH.

Et ester: C₉H₈O₃I₂. MW, 418. Leaflets from EtOH. M.p. 133°. Mod. sol. hot EtOH. Insol. H₂O.

Phenyl ester: di-iodosalol. $C_{13}H_9O_3I_2$. MW, 466. Needles from AcOH-EtOH or Et₂O. M.p. 135°.

Bornyl ester: $C_{17}H_{20}O_3I_2$. MW, 526. Needles from Me₂CO. M.p. 148°. Sol. Et₂O, CHCl₃, C₆H₆, xylene. $[\alpha]_D^{25} + 24.70^\circ$.

Chloride: $C_7H_5O_2CHI_2$. MW, 408.5. Yellow needles from pet. ether. M.p. 97-8°.

2-Acetyl : 3 : 5-di-iodoaspirin. M.p. 153°.

Dezani, *Chem. Abstracts*, 1927, 21, 475.

Brenans, Prost, *Compt. rend.*, 1923, 176, 1629.

Cofman, *Gazz. chim. ital.*, 1920, 50, ii, 296.

Di-iodosalol.

See under Di-iodosalicylic Acid.

2 : 3-Di-iodotoluene



$C_7H_6I_2$ MW, 344

Plates from EtOH. M.p. 31-2°. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 452.

2 : 4-Di-iodotoluene.

Liq. at -13°. B.p. 296°. HNO₃ at 200° → 2 : 4-di-iodobenzoic acid.

Neumann, *Ann.*, 1887, 241, 59.

2 : 5-Di-iodotoluene.

Plates from EtOH. M.p. 30-1°. Sol. Et₂O, pet. ether, hot EtOH. Insol. H₂O.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 502.

2 : 6-Di-iodotoluene.

Needles from EtOH. M.p. 40-2°.

Cohen, Miller, *J. Chem. Soc.*, 1904, 85, 1627.

3 : 4-Di-iodotoluene.

Needles from EtOH. M.p. 117.5°.

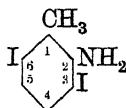
Willgerodt, Simonis, *Ber.*, 1906, 39, 279.

3 : 5-Di-iodotoluene.

Pale yellow needles from EtOH. M.p. 44.5-45.5°. Sol. Et₂O, C₆H₆, pet. ether, hot EtOH. Insol. H₂O.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 450.

3 : 6-Di-iodo-o-toluidine



$C_7H_7NI_2$ MW, 359

Needles from EtOH. M.p. 86°.

Wheeler, *Am. Chem. J.*, 1910, 44, 137.

4 : 5-Di-iodo-o-toluidine.

Needles from EtOH. M.p. 85°.

Wheeler, *Am. Chem. J.*, 1910, 44, 500.

2 : 5-Di-iodo-m-toluidine.

Pale brown prisms from EtOH. M.p. 82°.

N-Acetyl : 2 : 5-di-iodo-m-acet-toluidide. $C_9H_9ONI_2$. MW, 401. Needles from EtOH. M.p. 198-9°.

Wheeler, *Am. Chem. J.*, 1910, 44, 497.

2 : 6-Di-iodo-m-toluidine.

Needles from EtOH. M.p. 88°.

N-Acetyl : 2 : 6-di-iodo-m-acet-toluidide. Prisms from EtOH. M.p. 171°.

Wheeler, *Am. Chem. J.*, 1910, 44, 135.

4 : 5-Di-iodo-m-toluidine.

Needles from EtOH. M.p. 66-7°.

N-Acetyl : 4 : 5-di-iodo-m-acet-toluidide. Needles from EtOH. M.p. 183-4°.

Wheeler, *Am. Chem. J.*, 1910, 44, 142.

4 : 6-Di-iodo-m-toluidine.

Needles from EtOH. M.p. 73-4°. Sol. EtOH, Et₂O, C₆H₆, pet. ether.

N-Acetyl : 4 : 6-di-iodo-m-acet-toluidide. Needles. M.p. 213°.

Wheeler, *Am. Chem. J.*, 1910, 44, 129, 132.

5 : 6-Di-iodo-m-toluidine.

Brown cryst. from EtOH. M.p. 106°. Sol. EtOH. Spar. sol. H₂O, pet. ether.

N-Acetyl : 5 : 6-di-iodo-m-acet-toluidide. Cryst. from EtOH. M.p. 208°.

Wheeler, *Am. Chem. J.*, 1910, 44, 503.

2 : 5-Di-iodo-p-toluidine.

Brownish yellow prisms from EtOH. M.p. 110°.

N-Acetyl : 2 : 5-di-iodo-p-acet-toluidide. $C_9H_9ONI_2$. MW, 401. M.p. 193°.

Wheeler, *Am. Chem. J.*, 1910, 44, 501.

Nicolet, Sampey, *J. Am. Chem. Soc.*, 1927, 49, 1807.

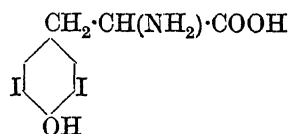
3 : 5-Di-iodo-p-toluidine.

Needles. M.p. 125°.

N-Acetyl : 3 : 5-di-iodo-p-acet-toluidide. Prisms from EtOH. M.p. 226°.

Wheeler, Liddle, *Am. Chem. J.*, 1909, 42, 449.

3 : 5-Di-iodotyrosine (Dityrin)



$C_9H_9O_3NI_2$

MW, 433

Constituent of thyreoglobulin present in the thyroid gland. Intermediate stage in the biosynthesis of thyroxine. Used in medicine for treatment of Grave's disease and other disorders.

dl.

Needles or plates from H_2O . M.p. 195° decomp. Stable in H_2O at 100° .

d.

Needles from 50% AcOH. M.p. 194° decomp. $[\alpha]_D + 2.75^\circ$ in N/HCl .

l.

Needle clusters from H_2O or 70% EtOH. M.p. 213° decomp. corr. (204°). $[\alpha]_D^{20} - 2.27^\circ$ in 25% NH_4OH , -2.98° in 4% HCl . Loses I on heating aq. sol.

Me ester: $C_{10}H_{11}O_3NI_2$. MW, 447. Plates from EtOH. Darkens at 186.5° . Decomp. at 192° corr. *B.HCl*: needles from MeOH-Et₂O. Darkens at 208° . Decomp. at 211° corr.

O : *N-Dipalmityl*: needles from AcOH. M.p. $55-62^\circ$.

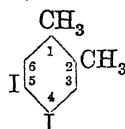
Bauer, Strauss, *Ber.*, 1936, 69, 246.

Harrington, Randall, *Biochem. J.*, 1931, 25, 1032.

ω : ω' -Di-iodo-xylene.

See Xylylene di-iodide.

4 : 5-Di-iodo-*o*-xylene



$C_8H_8I_2$ MW, 358

Cryst. from Et₂O or CCl_4 . M.p. 73° .

Varma, Raman, *J. Indian Chem. Soc.*, 1935, 12, 343.

4 : 6-Di-iodo-*m*-xylene.

Needles from EtOH. M.p. 72° . Sol. Et₂O, C_6H_6 , $CHCl_3$, hot EtOH.

Töhl, Bauch, *Ber.*, 1893, 26, 1105.

Varma, Raman, *J. Indian Chem. Soc.*, 1935, 12, 343.

2 : 5-Di-iodo-*p*-xylene

M.p. 104° .

Varma, Raman, *J. Indian Chem. Soc.*, 1935, 12, 343.

Di-isoamyl.

See 2 : 7-Dimethyloctane.

Di-isoamylamine



$C_{10}H_{23}N$ MW, 157

M.p. -44° . B.p. 188° . Insol. H_2O . $D_4^{21} 0.7672$. $n_D^{20} 1.42289$. Heat of comb. C_p 1666.9 Cal., C_v 1663.9 Cal. $k = 9.6 \times 10^{-4}$ at 25° .

B.HCl: leaflets. M.p. 276° .

B.HBr: leaflets. M.p. 315° .

B.HI: decomp. at 260° .

B.HAuBr_4: needles. M.p. 220° .

B.HBr.HgBr_2: leaflets. M.p. 97° .

B.HI.HgI_2: yellow leaflets. M.p. 110° .

Methiodide: needles. M.p. 221° .

B.C_2I_4: m.p. 150° .

Picrate: m.p. 94.5° .

Traube, Engelhardt, *Ber.*, 1911, 44, 3151.

Custer, *Ber.*, 1879, 12, 1333.

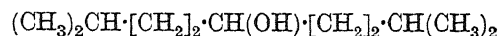
Skita, Keil, Havemann, *Ber.*, 1933, 66, 1406.

See also Plumptre, *J. Chem. Soc.*, 1881, 39, 332.

Di-isoamylaminoethyl Alcohol.

See *N*-[2-Hydroxyethyl]-di-isoamylamine.

Di-isoamylcarbinol (2 : 8-Dimethylnonanol-5)

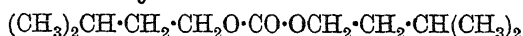


$C_{11}H_{24}O$ MW, 172

B.p. $105^\circ/9$ mm. $D_4^{16} 0.8305$. $n_D^{16} 1.43801$.

Grignard, *Compt. rend.*, 1901, 132, 337.

Di-isoamyl carbonate

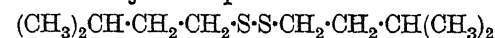


$C_{11}H_{22}O_3$ MW, 202

B.p. 228.7° . $D^{15} 0.912$.

Röse, *Ann.*, 1880, 205, 232.

Di-isoamyl disulphide



$C_{10}H_{22}S_2$ MW, 206

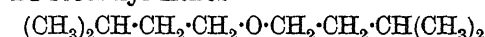
B.p. 250° ($245-8^\circ$ decomp.). $D^{18} 0.918$.

$C_{10}H_{22}S_2.HgI_2$: yellow cryst. M.p. 85° .

Hilditch, *Ber.*, 1911, 44, 3586.

Otto, Rössing, *Ber.*, 1875, 19, 3134.

Di-isoamyl Ether



$C_{10}H_{22}O$ MW, 158

B.p. $172.5-173^\circ$, $60^\circ/10$ mm. $D^{15} 0.78073$.

Zeltner, Tarassoff, *Ber.*, 1910, 43, 942

(*Bibl.*).

Schröter, Sondag, *Ber.*, 1908, 41, 1922,

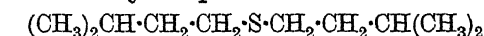
1924; D.R.P. 200,150, (*Chem. Zentr.*,

1908, II, 551).

Di-isoamyl Ketone.

See Isocaprone.

Di-isoamyl sulphide



$C_{10}H_{22}S$ MW, 174

B.p. 216° , $98-100^\circ/14$ mm. $D_4^{20} 0.8323$. $n_D^{20} 1.4520$. Heat of comb. C_p 1775.7 Cal.

$(C_{10}H_{22}S)_2.SnCl_4$: m.p. 64.6° .

$(C_{10}H_{22}S)_2.SnBr_4$: m.p. $45-6^\circ$.

$(C_{10}H_{22}S)_2.PdCl_2$: m.p. 95° .

$(C_{10}H_{22}S)_2.PdBr_2$: m.p. 133° .

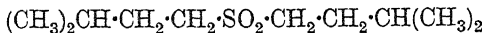
($C_{10}H_{22}S$)₂.PdI₂: m.p. 143°.
 ($C_{10}H_{22}S$)₂.Pd(NO₂)₂: m.p. 180°.

Wegscheider, Schreiner, *Monatsh.*, 1919, 40, 329.

Sabatier, Maihle, *Compt. rend.*, 1910, 150, 1571.

Ayers, Agruss, *J. Am. Chem. Soc.*, 1939, 61, 84.

Di-isoamyl sulphone

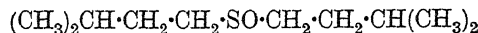


$C_{10}H_{22}O_2S$ MW, 206

Needles. M.p. 31°. B.p. 295°. Sol. ord. org. solvents. Spar. sol. H₂O.

Beckmann, *J. prakt. Chem.*, 1878, 17, 441.

Di-isoamyl sulphoxide



$C_{10}H_{22}OS$ MW, 190

Needles. M.p. 38–40° (37°). B.p. 148°/12 mm. Insol. H₂O.

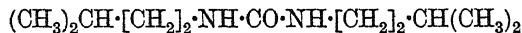
Hilditch, *Ber.*, 1911, 44, 3586.

Gazdar, Smiles, *J. Chem. Soc.*, 1908, 93, 1834.

Grignard, Zorn, *Compt. rend.*, 1910, 150, 1178.

Knoll, *J. prakt. Chem.*, 1926, 113, 45.

sym.-Di-isoamylurea



$C_{11}H_{24}ON_2$ MW, 200

Needles from hot EtOH.Aq. M.p. 46° (38–9°). B.p. 270°. Sol. EtOH, Et₂O, C₆H₆, Me₂CO, CHCl₃. Spar. sol. H₂O.

Curtius, *J. prakt. Chem.*, 1930, 125, 196.

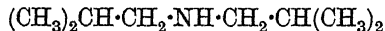
Di-isobutenyl.

See 2 : 5-Dimethyl-1 : 5-hexadiene.

Di-isobutyl.

See 2 : 5-Dimethylhexane.

Di-isobutylamine



$C_8H_{18}N$ MW, 129

F.p. –77°. B.p. 139–40°. Spar. sol. H₂O. D₂₀²⁰ 0.7450. n_D²⁰ 1.40934. Heat of comb. C_p 1353.6 Cal., C_v 1351.2 Cal. k = 4.8 × 10^{–4} at 25°.

B,HCl: sublimes above 240°. Part. melting at 262°. M.p. 170–5° (sealed tube). Sol. H₂O, EtOH.

B,HBr: m.p. 313°.

B,HI: decomp. at 260°.

B,(COOH)₂: m.p. 245–8°.

B,CH₃COOH: m.p. 86°.

B,HAuCl₄: yellow plates. M.p. 220–3° (decomp. at 199–200°).

B,HAuBr₄: m.p. 245°.

B,HBr,HgBr₂: m.p. 60°.

B,HN₃: m.p. 115°.

N-Nitroso: di-isobutylnitrosamine. B.p. 213–16° part. decomp., 122–3°/37 mm. D₄²¹ 0.8915. n_D²¹ 1.44387.

N-Benzenesulphonyl: m.p. 56.5–57°.

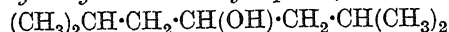
Taipale, *Chem. Abstracts*, 1925, 19, 3478.

Malbot, *Compt. rend.*, 1887, 104, 63.

Di-isobutylaminoethyl Alcohol.

See N-[2-Hydroxyethyl]-di-isobutylamine.

Di-isobutylcarbinol (2 : 6-Dimethylheptanol-4, 4-hydroxy-2 : 6-dimethylheptane)



$C_9H_{20}O$ MW, 144

B.p. 174–5°, 113–15°/87 mm., 81–2°/18 mm. D₄²¹ 0.809, D₂₀²⁰ 0.8129. n_D²⁰ 1.4242.

Phenylurethane: m.p. 154° (61–2°).

1-Naphthylurethane: m.p. 71–4°.

Xenylurethane: m.p. 118°.

Allophanate: m.p. 156°.

Pyruvate: b.p. 118–20°/18 mm.

Skita, Ritter, *Ber.*, 1910, 43, 3396.

Skita, Paal, D.R.P. 230,774, (*Chem. Zentr.*, 1911, I, 522).

Willcox, Brunel, *J. Am. Chem. Soc.*, 1916, 38, 1838.

White, Rose, Calingaert, Soroos, *Chem. Abstracts*, 1939, 33, 4578.

Tuot, *Chem. Zentr.*, 1936, II, 60.

Di-isobutyl carbonate



$C_9H_{18}O_3$ MW, 174

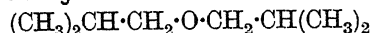
B.p. 190°. D₄²⁰ 0.9138. n_D²⁰ 1.4072.

Röse, *Ann.*, 1880, 205, 232.

Di-isobutylene.

A mixture of isomers. See Trimethylpentene.

Di-isobutyl Ether



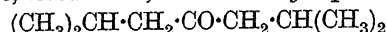
$C_8H_{18}O$ MW, 130

B.p. 122–4°. D₁₅¹⁵ 0.7616.

Batafsche Petroleum Maatschappij, *Chem. Abstracts*, 1931, 25, 302.

Senderens, *Compt. rend.*, 1925, 181, 700.

Di-isobutyl Ketone (*Di-isopropylacetone*, *valerone*, *isovalerone*, 2 : 6-dimethylheptanone-4)



$C_9H_{18}O$ MW, 142

B.p. 165–6°, 60–1°/18 mm., 56°/11 mm. D₄²¹ 0.805. n_D²¹ 1.412.

Oxime: b.p. 205–10°, 114–16°/20 mm., 104–6°/10 mm.

Semicarbazone: m.p. 126°.

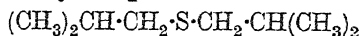
2 : 4-Dinitrophenylhydrazone: m.p. 92°.

Freydon, *Ann. chim.*, 1910, 19, 572.

Ivanow, *Bull. soc. chim.*, 1928, 43, 441.

Kubota, Yoshikawa, *Chem. Abstracts*, 1925, 19, 2771; 1926, 20, 860.

Delépine, Horeau, *Bull. soc. chim.*, 1937, 4, 40.

Di-isobutyl sulphide

$\text{C}_8\text{H}_{18}\text{S}$ MW, 146

B.p. $172-3^\circ$ (171°). D_4^{20} 0.8262. n_D^{20} 1.4463.

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PdCl}_2$: m.p. 95° .

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PdBr}_2$: m.p. 140° .

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PdI}_2$: m.p. 145° .

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{Pd}(\text{NO}_2)_2$: m.p. 155° .

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PtCl}_2$: (a) m.p. 83° . (b) M.p. 139° .

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PtCl}_4$: m.p. 162° .

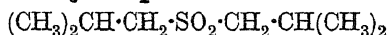
$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PtBr}_2$: m.p. $143-4^\circ$.

$(\text{C}_8\text{H}_{18}\text{S})_2, \text{PtI}_2$: m.p. 187° .

$\text{C}_8\text{H}_{18}\text{S}, \text{AuCl}_3$: m.p. 83° .

Grabowsky, Saytzeff, *Ann.*, 1874, 171, 254.

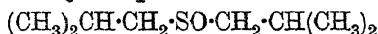
Ayers, Agruss, *J. Am. Chem. Soc.*, 1939, 61, 84.

Di-isobutyl sulphone

$\text{C}_8\text{H}_{18}\text{O}_2\text{S}$ MW, 178

M.p. 17° . B.p. 265° . D^{18} 1.0056.

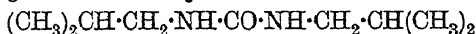
Beckmann, *J. prakt. Chem.*, 1878, 17, 448.

Di-isobutyl sulfoxide

$\text{C}_8\text{H}_{18}\text{OS}$ MW, 162

Cryst. M.p. 68.5° . Less sol. in hot than in cold H_2O .

Beckmann, *J. prakt. Chem.*, 1878, 17, 446.

sym.-Di-isobutylurea

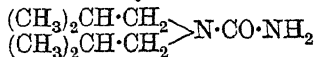
$\text{C}_9\text{H}_{20}\text{ON}_2$ MW, 172

Needles from EtOH.Aq. M.p. $135-6^\circ$. Sol. EtOH, Et₂O, hot H_2O .

Anschütz, *Ann.*, 1908, 359, 212.

Dixon, *J. Chem. Soc.*, 1895, 67, 560.

Boehmer, *Rec. trav. chim.*, 1936, 55, 390.

unsym.-Di-isobutylurea

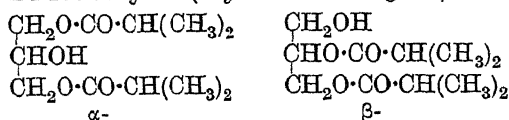
$\text{C}_9\text{H}_{20}\text{ON}_2$ MW, 172

Cryst. M.p. $72-4^\circ$. B.p. $180^\circ/25$ mm. Sol. EtOH, Et₂O. Less sol. in hot than in cold H_2O .

$\text{B}_2, (\text{COOH})_2$: m.p. 115° decomp.

Picrate: m.p. $90-90.5^\circ$.

McKee, *Am. Chem. J.*, 1909, 42, 7.

Di-isobutyryl (Glycerol di-isobutyrate)

$\text{C}_{11}\text{H}_{20}\text{O}_5$ MW, 232

α-, or 1:3-

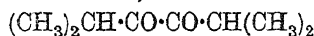
B.p. $272-5^\circ$, $164-7^\circ/22$ mm.

β-, or 1:2-

B.p. $269-72^\circ$, $159-62^\circ/20$ mm.

Guth, *Zeitschrift für Biologie*, 1903, 44, 97.

Di-isobutyryl (Di-isopropyl diketone, 2:5-di-methylhexandione-3:4)



$\text{C}_8\text{H}_{14}\text{O}_2$ MW, 142

B.p. $144-5^\circ$, $48^\circ/12$ mm. D_4^{20} 0.92322. n_D^{20} 1.42057.

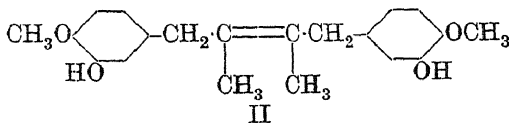
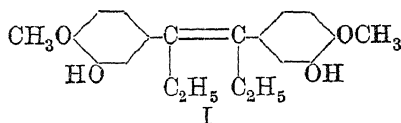
Monoxime: m.p. $125-6^\circ$. B.p. $135^\circ/10$ mm.

Dioxime: m.p. 171.5° ($166-7^\circ$).

Bouveault, Locquin, *Bull. soc. chim.*, 1906, 35, 653.

Ponzio, *Gazz. chim. ital.*, 1900, 30, ii, 26.

Krestinski, Baschenowa-Koslowskaja, *Ber.*, 1933, 66, 99.

Di-isochavibetol

$\text{C}_{20}\text{H}_{24}\text{O}_4$ MW, 328

Product obtained by dimerisation of isochavibetol. Four forms isolated, probably corresponding to the isomers of the structures given above.

α-Form-

M.p. $156-7^\circ$.

Di-Et ether: m.p. $122.5-3.5^\circ$.

Di-propyl ether: m.p. $98-100^\circ$.

β-Form-

M.p. $179-81^\circ$.

γ-Form-

M.p. $183.5-8.5^\circ$.

δ-Form-

M.p. $194-201^\circ$.

Imoto, *Chem. Abstracts*, 1934, 28, 3393.

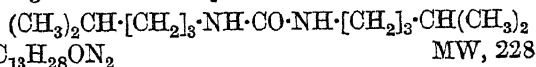
Funakubo et al., *Chem. Abstracts*, 1947, 41, 3441, 4121.

Di-isocrotyl.

See 2:5-Dimethyl-2:4-hexadiene.

Di-isoeugenol.

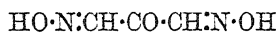
See under Isoeugenol.

sym.-Di-isohexylurea

Cryst. from hot EtOH.Aq. M.p. 44° . Sol. EtOH, Et₂O, C_6H_6 , CHCl_3 , ligroin. Insol. H_2O .

Curtius, *J. prakt. Chem.*, 1930, 125, 167.

Di-isonitrosoacetone (*Mesoxalic dialdehyde dioxime*)



$\text{C}_3\text{H}_4\text{O}_3\text{N}_2$ MW, 116

Prisms from MeOH. Decomp. at $143-4^\circ$. Sol. EtOH, Et₂O. Spar. sol. H₂O, CHCl₃, C₆H₆, ligroin. Decomp. by acids. $\text{Sn} + \text{HCl} \rightarrow$ diaminoacetone. Reagent for colorimetric detection and estimation of ferrous iron.

Diacetyl: cubes from Et₂O. M.p. $80-1^\circ$.

Hydrazone: m.p. 153° .

Semicarbazone: m.p. 224° .

Koessler, Hanke, *J. Am. Chem. Soc.*, 1918, 40, 1717.

Dubský, Brychta, Kuraš, *Chem. Abstracts*, 1932, 26, 2943.

Di-isonitrosoethane.

See Glyoxime.

Di-isopropenyl.

See 2 : 3-Dimethyl-1 : 3-butadiene.

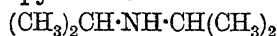
Di-isopropyl.

See 2 : 3-Dimethylbutane.

Di-isopropylacetone.

See Di-isobutyl Ketone.

Di-isopropylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. 84° . D_{20}^{25} 0.722.

B, HCl: m.p. $216.5-217^\circ$ ($212-14^\circ$).

B, HNO₂: m.p. 140° .

B₂, (COOH)₂: m.p. $168-9^\circ$.

B, HAuCl₄: m.p. $146-146.5^\circ$ ($169-70^\circ$).

B₂, H₂PtCl₆: reddish yellow plates. M.p. $186-9^\circ$.

Picrate: m.p. 140° ($145-6^\circ$).

N-Nitroso: di-isopropyl nitrosamine. M.p. 48° . B.p. $194-5^\circ$. Sol. EtOH, Et₂O, C₆H₆.

Skita, Keil, *Ber.*, 1928, 61, 1457.

Maihle, *Compt. rend.*, 1920, 170, 1265.

Winans, Adkins, *J. Am. Chem. Soc.*, 1933, 55, 2051.

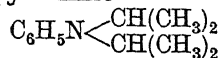
Di-isopropylamine-dicarboxylic Acid.

See 2 : 2'-Iminodibutyric Acid.

Di-isopropylaminoethyl Alcohol.

See *N*-[2-Hydroxyethyl]-di-isopropylamine.

Di-isopropylaniline



$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

B.p. 221° , $98-100^\circ/13$ mm. D_{20}^{25} 0.9190.

B, HBr: m.p. 199° decomp.

Zander, *Ann.*, 1882, 214, 170.

4 : 4'-Di-isopropylazobenzene.

See *p*-Azocumene.

***pp'*-Di-isopropylbenzil.**

See Cuminil.

Di-*p*-isopropylbenzilic Acid.

See Cuminiilic Acid.

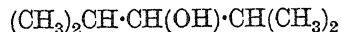
Di-isopropylbenzoin.

See Cuminoin.

Di-isopropylbenzylamine.

See Dicuminyllamine.

Di-isopropylcarbinol (2 : 4-Dimethylpentan-3-ol)



$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 139° . D_{20}^{25} 0.8288. n_D^{20} 1.42259. $\text{CrO}_3 \rightarrow$ di-isopropyl ketone + acetone + isobutyric acid.

Acetyl: b.p. $160-1^\circ$.

Phthaloyl: b.p. $231^\circ/20$ mm. D_4^{25} 1.0040. n_D^{25} 1.4903.

3-Nitrophthaloyl: m.p. $154.8-5.3^\circ$.

Phenylurethane: m.p. $96-9^\circ$.

$(\text{C}_7\text{H}_{16}\text{O})_2, \text{HBr}$: m.p. $68-9^\circ$.

$(\text{C}_7\text{H}_{16}\text{O})_2, \text{HI}$: m.p. $77-8^\circ$.

Graves, *Ind. Eng. Chem.*, 1931, 23, 1383.

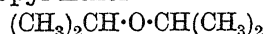
Conant, Blatt, *J. Am. Chem. Soc.*, 1929, 51, 1233.

Neunhöffer, Schlüter, *Ann.*, 1936, 526, 71.

Di-isopropyl Diketone.

See Di-isobutyryl.

Di-isopropyl Ether



$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

B.p. 69° . D_0^{21} 0.7247.

van Hove, *Chem. Zentr.*, 1908, II, 292.

Erlenmeyer, *Ann.*, 1863, 126, 306.

Nazarov, Remiz, *Chem. Abstracts*, 1937, 31, 6187.

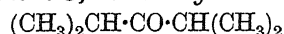
Rosen, Buc, Lebo, U.S.P. 2,105,508, (*Chem. Abstracts*, 1938, 32, 2148).

Katuno, *Brit. Chem. Abstracts*, 1940, B, 591.

Di-isopropylideneacetone.

See Phorone.

Di-isopropyl Ketone (*Isobutyronone*, 2 : 4-dimethylpentanone-3, tetramethylacetone)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. $124-5^\circ$. Misc. with EtOH, Et₂O. Insol. H₂O. D_4^{20} 0.8108. n_D^{20} 1.4001. Red. \rightarrow di-isopropylcarbinol. $\text{CrO}_3 \rightarrow$ acetone + isobutyric acid. Does not form bisulphite comp.

Oxime: m.p. 34° . B.p. $181-5^\circ$.

Semicarbazone: m.p. 160° ($151.5-3.5^\circ$).

2 : 4-Dinitrophenylhydrazones: m.p. $94-8^\circ$.

Sabatier, Maihle, *Compt. rend.*, 1914, 158, 832.

Ivanoff, *Bull. soc. chim.*, 1928, 43, 441.

Pfeiffer, Adkins, *J. Am. Chem. Soc.*, 1931, 53, 1047.

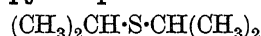
Bruzav, *Ann. chim.*, 1934, 1, 266.

Hauser, Renfrew, *J. Am. Chem. Soc.*, 1937, 59, 1826.

Di-isopropylmethane.

See 2 : 4-Dimethylpentane.

Di-isopropyl sulphide



$\text{C}_6\text{H}_{14}\text{S}$ MW, 118

B.p. 120–1°. D_4^{20} 0.8135. n_D^{20} 1.4381.

($C_6H_{14}S$)₂. $PtCl_2$: m.p. 163°.

($C_6H_{14}S$)₂. $PtBr_2$: m.p. 174°.

($C_6H_{14}S$)₂. PtI_2 : m.p. 176°.

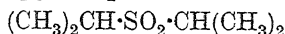
($C_6H_{14}S$)₂. PtI_4 : m.p. 139°.

Claus, *Ber.*, 1875, **8**, 532.

Ayers, Agruss, *J. Am. Chem. Soc.*, 1939, **61**, 84.

I.G., F.P. 797,606, (*Chem. Zentr.*, 1936, **II**, 1062).

Di-isopropyl sulphone

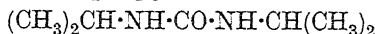


$C_6H_{14}O_2S$ MW, 150

Cryst. from Et_2O . M.p. 36°. Sol. H_2O .

Beckmann, *J. prakt. Chem.*, 1878, **17**, 459.

sym.-Di-isopropylurea



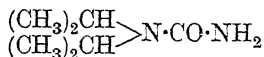
$C_7H_{16}ON_2$ MW, 144

Needles from $EtOH.Aq$. M.p. 192°. Insol. H_2O , Et_2O .

Curtius, *J. prakt. Chem.*, 1930, **125**, 186.

Boehmer, *Rec. trav. chim.*, 1936, **55**, 390.

unsym.-Di-isopropylurea



$C_7H_{16}ON_2$ MW, 144

Cryst. from Et_2O . M.p. 103°.

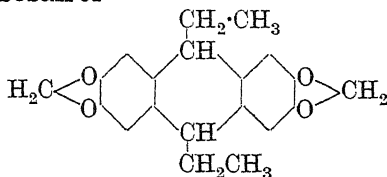
$B.HNO_3$: m.p. 79°.

$B_2(COOH)_2$: decomp. at 111°.

Picrate: m.p. 134°.

van der Zande, *Rec. trav. chim.*, 1889, **8**, 231.

Di-isosafrol



Suggested structure.

$C_{20}H_{20}O_4$ MW, 324

Dimer of isosafrol. Exists in two forms.

(a) Cryst. from $AcOH$. M.p. 145°. B.p. 380°, 320°/110 mm.

(b) Cryst. from ligroin or $MeOH.Aq$. M.p. 95° (92°). B.p. 220°/3 mm. Heat \rightarrow (a).

Puxeddu, *Gazz. chim. ital.*, 1913, **43**, I, 131; 1916, **46**, II, 176.

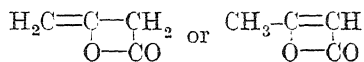
Mayer, *Atti accad. Lincei*, 1914 [5], **23**, I, 358.

Robinson, *J. Chem. Soc.*, 1915, **107**, 275.

Imoto, *Chem. Abstracts*, 1938, **32**, 4152.

Takebayashi, Yamada, *J. Chem. Soc. Japan*, 1945, **66**, 51, (*Chem. Abstracts*, 1949, **43**, 7924).

Diketene



$C_4H_4O_2$

MW, 84

Liq. with pungent odour. Lachrymatory. M.p. -6.5° . B.p. 127.4°. Insol. H_2O . D_4^{20} 1.0897. n_D^{20} 1.4379. Slowly polymerises on standing. This polymerisation is retarded by cooling, in solvents, and by antioxidants, and accelerated by acids, alkalis, amines and peroxides. Polymerisation with catalysts \rightarrow dehydracetic acid. Pyrolysis at 500–600° \rightarrow ketene. $H_2O \rightarrow$ acetoacetic acid \rightarrow $Me_2CO + CO_2$. Alcohols \rightarrow acetoacetic esters. Amines \rightarrow acetoacetamides. Phenylhydrazines \rightarrow phenylmethylpyrazolones.

Boese, *Ind. Eng. Chem.*, 1940, **32**, 16 (Review).

Carbide and Carbon Chemical Corp., D.R.P. 628,321, (*Chem. Abstracts*, 1936, **30**, 4518); F.P. 761,731, (*Chem. Abstracts*, 1934, **28**, 4072); B.P. 410,394, (*Chem. Abstracts*, 1934, **28**, 6160).

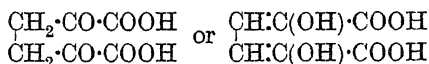
Law, Can. P. 352,920, (*Chem. Abstracts*, 1935, **29**, 8008).

Whitten, Thompson, *J. Chem. Soc.*, 1946, 1005.

Wassermann, *J. Chem. Soc.*, 1948, 1323.

Hurd, Blanchard, *J. Am. Chem. Soc.*, 1950, **72**, 1461.

1:4-Diketoadipic Acid (*Succinodiformic acid*)



$C_6H_6O_6$

MW, 174

Keto form.

Plates from dioxan. Loses CO_2 at 110°. De-comp. at 234°.

Di-Me ester: $C_8H_{10}O_6$. MW, 202. Cryst. from $Me_2CO + H_2O_2$. M.p. 98–100°. Remelts at 164–5°. *Di-phenylhydrazones*: prisms from dioxan- $MeOH$. M.p. 143–5°. *Di-2:4-dinitrophenylhydrazones*: yellow needles from $AcOH$. M.p. 242–3° decomp.

Di-2:4-dinitrophenylhydrazones: cryst. from $AcOH$. M.p. 245°.

Enol form.

Cryst. from dioxan. M.p. 226–7° decomp. Reduces $AgNO_3$. $FeCl_3 \rightarrow$ reddish brown col. $H_2O_2 \rightarrow$ succinic acid.

Di-Me ether: cryst. from dioxan- Aq . M.p. 116°. *Di-Me ester*: cryst. from dioxan. M.p. 169–70°.

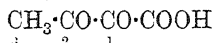
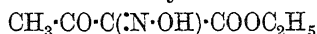
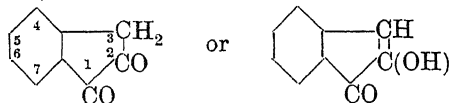
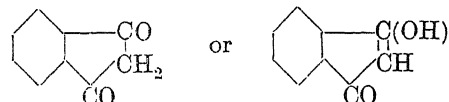
Wille, *Ann.*, 1939, **538**, 246.

2:3-Diketoadipic Acid.

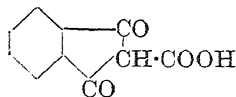
See Ketipic Acid.

α : δ -Diketo-*n*-amylbenzene.

See Phenacylaceton.

12 : 13-Diketobehenic Acid.*See* Behenoxylic Acid.**2 : 3-Diketobutane.***See* Diacetyl.**Diketobutyric Acid** (*Acetylgluoxalic acid*, *pyruvylformic acid*) $\text{C}_4\text{H}_4\text{O}_4$ MW, 116*Me ester* : $\text{C}_5\text{H}_6\text{O}_4$. MW, 130. Dark yellow liq. B.p. 65–8°/12 mm. Forms hydrate with H_2O , m.p. 80°.*Et ester* : $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. Orange-yellow liq. B.p. 80°/22 mm. D_4^{16} 1.1289. Forms hydrate with $\frac{1}{2}\text{H}_2\text{O}$, m.p. 140°. α -*Oxime* : isonitrosoacetoacetic ethyl ester $\text{C}_6\text{H}_9\text{O}_4\text{N}$. MW, 159. Colourless cryst. M.p. 57°. B.p. 155°/15 mm. Sol. EtOH, Et₂O, CHCl₃. *Disemicarbazone* : powder. M.p. 270°. β -*Phenylhydrazone* : cryst. from pet. ether. M.p. 102°. α -*p-Nitrophenylhydrazone* : yellow needles from EtOH.Aq. M.p. 122–3°. β -*p-Nitrophenylhydrazone* : orange needles from EtOH.Aq. M.p. 171–2°. *Di-p-nitrophenylhydrazone* : yellowish red needles. Sinters at 220–30°. M.p. 294° decomp. 2:4:6-*Tribromophenylhydrazone* : m.p. 123°.2-*p-Nitrophenylhydrazone* : m.p. 175–6°. Red col. with alkalis.*p-Nitrophenylosazone* : m.p. 297–9°.Denis, *Am. Chem. J.*, 1907, **38**, 587.**2 : 4-Diketocaproic Acid.***See* Triacetic Acid.**2 : 3-Diketocoumaran.***See* Coumarandione.**Diketocyclodocosane.***See* Cyclodocosane-1 : 12-dione.**Diketocycloeicosane.***See* Cycloeicosane-1 : 11-dione.**Diketocyclohexadecane.***See* Cyclohexadecane-1 : 9-dione.**Diketocyclohexane.***See* Cyclohexandione-1 : 2, Dihydroresorcinol and Tetrahydro-*p*-benzoquinone.**2 : 5-Diketocyclohexane-1 : 4-dicarboxylic Acid.***See* Succinosuccinic Acid.**Diketocyclo-octadecane.***See* Cyclo-octadecane-1 : 10-dione.**Diketocyclopentane.***See* Cyclopentandione.**Diketocyclotriacontane.***See* Cyclotriacontane-1 : 16-dione.**Diketodihydrothionaphthene.***See* Thionaphthenequinone.**3 : 5-Diketodihydro-1 : 2 : 4-triazole.***See* Urazole.**3 : 6-Diketo-2 : 5-dimethyl-1 : 4-dioxan.***See* Lactide.**Diketodioxan.***See under* Diglycollic Acid.**4 : 4'-Diketo-4 : 4'-diphenyl-2-butylene.***See sym.*-Dibenzoylethylene.**1 : 5-Diketo-1 : 5-diphenylpentane.***See* 1 : 3-Dibenzoylpropane.**1 : 2-Diketo-1 : 3-diphenylpropane.***See* Phenyl benzyl Diketone.**Diketoheptane.***See* Butyrylacetone and Heptandione.**Diketoexahydropyrimidine.***See* Hydrouracil.**2 : 5-Diketoexahydroterephthalic Acid.***See* Succinosuccinic Acid.**2 : 3-Diketoexane.***See* Acetylbutyryl.**2 : 4-Diketoexane.***See* Propionylacetone.**2 : 5-Diketoexane.***See* Acetylacetone.**3 : 4-Diketoexane.***See* Dipropionyl.**2 : 5-Diketoexane-3-carboxylic Acid.***See* 1 : 2-Diacetopropionic Acid.**2 : 5-Diketo-3-hexene.***See* 1 : 2-Diacetoethylene.**1 : 2-Diketohydrindene** (*Indandione*-1 : 2, *oxindone*) $\text{C}_9\text{H}_6\text{O}_2$ MW, 146Yellow leaflets. M.p. 95° (95–115°). Sol. MeOH, EtOH, CHCl₃, hot H₂O.2-*Oxime* : needles. M.p. 215° decomp.2-*Semicarbazone* : m.p. 230–3° decomp.*Phenylhydrazone* : m.p. 123–4°.*Di-phenylhydrazone* : m.p. 222–3° decomp. (230–5°).Ishiwara, *J. prakt. Chem.*, 1924, **108**, 198.Perkin, Roberts, Robinson, *J. Chem. Soc.*, 1912, 101, 234.**1 : 3-Diketohydrindene** (*Indandione*-1 : 3) $\text{C}_9\text{H}_6\text{O}_2$ MW, 146Needles from ligroin. M.p. 130–1°. Sol. hot EtOH, hot C₆H₆. Spar. sol. H₂O. Deep yellow sols. in caustic alkalis (enol form).*Dioxime* : m.p. 220–5° decomp.*Phenylhydrazone* : m.p. 162–3°.*Di-phenylhydrazone* : pink needles. M.p. 171°.Ponzio, Pichetto, *Gazz. chim. ital.*, 1923, **53**, 20.Wolff, *Ann.*, 1913, **399**, 285.Teeters, Shriner, *J. Am. Chem. Soc.*, 1933, **55**, 3027.

1 : 3-Diketohydrindene-2-carboxylic Acid

C₁₀H₆O₄ MW, 190

Et ester: C₁₂H₁₀O₄. MW, 218. Yellow needles. M.p. 75–8°. Sol. EtOH, Et₂O, C₆H₆, ligroin. Insol. H₂O. Decomp. by alkalis → 1 : 3-diketohydrindene. Alc. FeCl₃ → red col.

Wislicenus, *Ann.*, 1888, 246, 349.

3 : 5-Diketoisohexane.

See Isobutyrylacetone.

4 : 6-Diketo-2-methyl-2-heptene.

See Acetylmesityl oxide.

Diketo-3-methylhexane.

See *unsym.*-Methylpropionylacetone and 3-Methylacetylacetone.

2 : 5-Diketo-3-methylhexane-3-carboxylic Acid.

See 1 : 2-Diacetoisobutyric Acid.

2 : 4-Diketo-3-methylpentane.

See Methylacetylacetone.

Diketononane.

See Caproylacetone, Diacetopentane and Propionylcaproyl.

Diketo-octadiene.

See Octadienedione.

Diketo-octane.

See Octandione.

Diketo-octene.

See Octenedione.

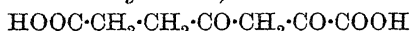
Diketopentane.

See Acetylpropionyl and Acetylacetone.

Diketopentane-dicarboxylic Acid.

See Diketopimelic Acid.

1 : 3-Diketopimelic Acid (1 : 3-Diketopentane-1 : 5-dicarboxylic acid)

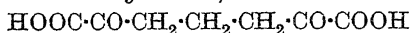
C₇H₈O₆ MW, 188

Softens above 100°, liq. at 125°. Sol. H₂O, EtOH, Et₂O, AcOH. Spar. sol. C₆H₆. Insol. ligroin. Dist. → levulinic acid.

Di-Et ester: C₁₁H₁₆O₆. MW, 244. M.p. 19°. B.p. 198°/27 mm. Sol. EtOH, Et₂O. FeCl₃ → red col.

Wislicenus, Goldstein, Münzesheimer, *Ber.*, 1898, 31, 625.

1 : 5-Diketopimelic Acid (1 : 5-Diketopentane-1 : 5-dicarboxylic acid)

C₇H₈O₆ MW, 188

Cryst. from hot AcOH. M.p. 127° decomp. Sol. H₂O, EtOH. Spar. sol. Et₂O. Insol. C₆H₆.

Di-Me ester: C₉H₁₂O₆. MW, 216. Cryst. from Et₂O-pet. ether. M.p. 62°. Sol. EtOH. *Disemicarbazone*: cryst. from EtOH-H·COOH. M.p. 250–1° decomp.

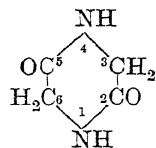
Di-Et ester: C₁₁H₁₆O₆. MW, 244. Liq. Decomp. on vac. dist. *Dioxime*: cryst. from EtOH-Aq. M.p. 144°. *Disemicarbazone*: cryst. from EtOH-H·COOH. M.p. about 250° decomp. *Di-phenylhydrazone*: cryst. from Me₂CO. M.p. 147°.

Dioxime: m.p. 175° decomp.

Di-semicarbazone: Cryst. + 2H₂O. M.p. 250–1° decomp.

Blaise, Gault, *Compt. rend.*, 1904, 139, 138; *Bull. soc. chim.*, 1907, 1, 78.

2 : 5-Diketopiperazine (α-Diacipiperazine, "glycine anhydride")

C₄H₆O₂N₂ MW, 114

Plates from hot H₂O. Sublimes at 260°. M.p. 311–12° decomp. (rapid heat). Spar. sol. H₂O. Alkalis or min. acids hyd. to glycylglycine. Weak base.

B.HCl: m.p. 129–30°.*Di-α-naphthylurethane*: m.p. 232° decomp.

Richardson, Welch, Calvert, *J. Am. Chem. Soc.*, 1929, 51, 3074.

Curtius, Gobel, *J. prakt. Chem.*, 1888, 37, 173.

Ges. für Kohlentechnik, D.R.P. 629,807, (*Chem. Zentr.*, 1936, II, 1247).

Diketopyrimidine.

See Uracil.

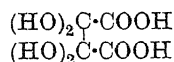
Diketopyrrolidone.

See Succinimide.

Diketostearic Acid.

See Taroxyllic Acid and Stearoxyllic Acid.

Diketosuccinic Acid

C₄H₆O₈ MW, 182

The free acid HOOC·CO·CO·COOH is unknown. The hydrated form (above formula), *dihydroxytartaric acid* or *tetrahydroxysuccinic acid* has m.p. 114–15° decomp. → CO₂ + tartronic acid. Aq. sol. of acid and salts decomp. on heating. Esters of the hydrated form are unknown.

Di-Et ester: C₂H₅OOC·CO·CO·COOC₂H₅. C₈H₁₀O₆. MW, 202. Orange yellow oil. B.p. 233–4° slight decomp., 142–4°/35 mm., 120–2°/13 mm. (115–16°/12 mm.). D₄²⁰ 1.1873. 2 : 5-Dichlorophenylhydrazone: yellow plates from pet. ether. M.p. 101°. *Di-2 : 5-dichlorophenylhydrazone*: cryst. from pet. ether. M.p. 207°. 2 : 4-Dibromophenylhydrazone: pale yellow cryst.

from EtOH. M.p. 95°. *Di*-2 : 4-dibromophenylhydrazone: yellow plates from EtOH. M.p. 229°. *m*-Nitrophenylhydrazone: m.p. 116°. *p*-Nitrophenylhydrazone: m.p. 125°. *Di*-*p*-nitrophenylhydrazone: m.p. 190°.

Di-*p*-chlorophenylhydrazone: m.p. 195° decomp.

Di-2 : 4-dichlorophenylhydrazone: orange-red. M.p. 198° decomp.

Di-2 : 5-dichlorophenylhydrazone: yellow. M.p. 195° decomp.

Di-2 : 4 : 5-trichlorophenylhydrazone: m.p. 224°.

Di-*p*-bromophenylhydrazone: orange red powder. M.p. 201°.

Di-2 : 4-dibromophenylhydrazone: orange cryst. M.p. 205° decomp.

syn-*Dioxime*: prisms + 2H₂O from Et₂O-CHCl₃. M.p. 90° decomp. Cryst. + 4H₂O from H₂O. M.p. 70-5°, anhyd. 145-50°.

anti-*Dioxime*: cryst. + 2H₂O. Anhyd. at 45°. M.p. 145-50°.

Chattaway, Adair, *J. Chem. Soc.*, 1932, 1022.

Chattaway, Humphreys, *J. Chem. Soc.*, 1927, 1324.

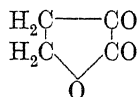
Auwers, *Ber.*, 1918, 51, 1121.

Fillipi, *Rec. trav. chim.*, 1910, 29, 113.

Lachman, *J. Am. Chem. Soc.*, 1921, 43, 2094.

See also Debus, *J. Chem. Soc.*, 1904, 85, 1388.

2 : 3-Diketotetrahydrofuran (1-Ketobutyrolactone)



C₄H₄O₃

MW, 100

Parent compound unknown.

Oxime: cryst. from *n*-butyl alcohol. M.p. 183-5°.

Phenylhydrazone: m.p. 220°.

2 : 4-Dinitrophenyllosazone: m.p. 268°.

Snyder, Andreen, Cannon, Peters, *J. Am. Chem. Soc.*, 1942, 64, 2082.

2 : 4-Diketotetrahydrofuran.

See Tetronic Acid.

2 : 5-Diketotetrahydrofuran.

See Succinic Anhydride.

Diketotetrahydroglyoxaline.

See Hydantoin.

Diketothiocoumaran.

See Thionaphthenequinone.

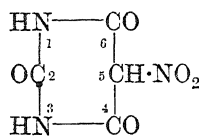
1 : 3-Diketo-*n*-valeric Acid.

See Acetopyruvic Acid.

Dilaurin.

See under Glycerol.

Dilituric Acid (5-Nitrobarbituric acid, nitromalonylurea)



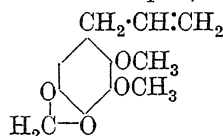
C₄H₃O₅N₃

MW, 173

Cryst. + 3H₂O. M.p. anhyd. 176° decomp. Sol. hot H₂O. Mod. sol. EtOH. Insol. Et₂O. The >CH·NO₂ group also functions as the isonitro group >C:NO·OH. HI → aminobarbituric acid. Metallic salts are mostly stable to min. acids but decomp. with some violence on strong heating.

Hartman, Sheppard, *Organic Syntheses*, 1932, XII, 58.

Dill-apiol (2 : 3-Dimethoxy-4 : 5-methylenedioxy-1-allylbenzene. Cf. *Apiol*)



C₁₂H₁₄O₄

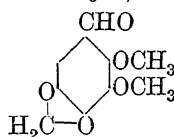
MW, 222

Constituent of Japanese, East Indian, and Spanish dill oils (*Anethum sowa*, Roxb.). M.p. 29-5°. B.p. 285°, 162°/11 mm. (161-2°/16 mm.). D₄²⁵ 1.1644. n_D²⁵ 1.5278. CrO₃ in AcOH → dill-apiolaldehyde + dill-apiolic acid. Alc. KOH → iso-dill-apiol, the corresponding propenyl analogue, m.p. 44°, b.p. 296° decomp. *Picrate*: m.p. 81-5°.

Ciamician, Silber, *Ber.*, 1896, 29, 1800.

Baker, Jukes, Subrahmanyam, *J. Chem. Soc.*, 1934, 1682.

Dill-apiolaldehyde (2 : 3-Dimethoxy-4 : 5-methylenedioxybenzaldehyde)



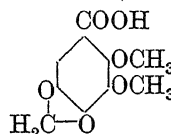
C₁₀H₁₀O₅

MW, 210

Needles from EtOH. M.p. 75°.

Ciamician, Silber, *Ber.*, 1896, 29, 1805.

Dill-apiolic Acid (2 : 3-Dimethoxy-4 : 5-methylenedioxybenzoic acid)



C₁₀H₁₀O₆

MW, 226

Needles from hot H₂O. M.p. 151-2°. Sol. hot EtOH. Spar. sol. hot H₂O.

Ciamician, Silber, *Ber.*, 1896, 29, 1804.

Dimedone.

See 1 : 1-Dimethylcyclohexandione-3 : 5.

Dimenthoformal.

See under Menthol.

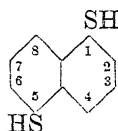
Dimercaptobenzene.

See Dithiocatechol, Dithioresorcinol and Dithiohydroquinone.

Dimercaptoethane.

See Ethylene Dithioglycol.

1 : 5-Dimercaptanaphthalene (1 : 5-Dithionaphthol)



$C_{10}H_8S_2$ MW, 192

Yellow leaflets. M.p. 119°. Sol. EtOH, Et₂O,

C_6H_6 . Volatile in steam.

Di-Me ether : $C_{12}H_{12}S_2$. MW, 220. M.p. 150°.

Diacetyl : cryst. from EtOH. M.p. 187-9°.

Dibenzoyl : leaflets from $CHCl_3$. M.p. 232°.

Polak, Gebauer-Fulnegg, *Monatsh.*, 1928, 50, 321.

Corbellini, Albenga, *Gazz. chim. ital.*, 1931, 61, 122.

1 : 8-Dimercaptanaphthalene (1 : 8-Dithionaphthol).

Plates from EtOH-HCl. M.p. 113-4°.

Di-Me ether : plates from AcOH. M.p. 84°.

Price, Smiles, *J. Chem. Soc.*, 1928, 2373.

2 : 6-Dimercaptanaphthalene (2 : 6-Dithionaphthol).

M.p. 177-8°. Sol. EtOH, Et₂O, C_6H_6 . Spar. volatile in steam.

Braun, Ebert, *Ber.*, 1892, 25, 2735.

2 : 7-Dimercaptanaphthalene (2 : 7-Dithionaphthol).

Leaflets from EtOH. M.p. 180-1° (173-4°). Spar. sol. EtOH, Et₂O, ligroin, toluene. Sublimes.

Diacetyl : m.p. 110°.

Dibenzoyl : m.p. 152-3°.

Grosjean, *Ber.*, 1890, 23, 2370.

Ebert, Kleiner, *Ber.*, 1891, 24, 145.

Dimercaptopropane.

See Propylene Dithioglycol and Trimethylene Dithioglycol.

Dimercaptopropanol.

See Dithioglycerol.

 ω -Dimercaptoxylene.

See Xylylene Dimercaptan.

Dimesityl.

See 2 : 4 : 6 : 2' : 4' : 6'-Hexamethyldiphenyl.

3 : 4-Dimethoxyacetophenone.

See Acetoveratrone.

Dimethoxy-o-aldehydobenzoic Acid.

See Opianic Acid.

3 : 4-Dimethoxy-1-allylbenzene.

See under Eugenol.

Dimethoxyazoxybenzene.

See under Dihydroxyazoxybenzene.

Dimethoxybenzaldehyde.

See under the relevant Dihydroxybenzaldehydes.

Dimethoxybenzene.

See Veratrol, and under Resorcinol and Hydroquinone.

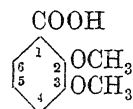
Dimethoxybenzidine.

See Dianisidine.

pp'-Dimethoxybenzil.

See Anisil.

2 : 3-Dimethoxybenzoic Acid (o-Veratric acid)



$C_9H_{10}O_4$ MW, 182

M.p. 120-2°.

Me ester : $C_{10}H_{12}O_4$. MW, 196. M.p. 57-5°. B.p. 184-5°/50 mm.

Anhydride : $C_{18}H_{18}O_7$. MW, 346. Needles from pet. ether. M.p. 93°.

Edwards, Perkin, Stoyale, *J. Chem. Soc.*, 1925, 127, 197.

Rodionov, Kanewskaia, *Bull. soc. chim.*, 1934, 1, 674.

2 : 4-Dimethoxybenzoic Acid (β -Resorcylic acid dimethyl ether).

Needles from H_2O . M.p. 109°. Sol. EtOH, Et₂O. Spar. sol. cold H_2O .

Me ester : b.p. 294-6°, 160-2°/13 mm.

Et ester : $C_{11}H_{14}O_4$. MW, 210. B.p. 170°/13 mm.

Anhydride : prisms from AcOEt-pet. ether. M.p. 81-2°.

Nierenstein, *J. Am. Chem. Soc.*, 1930, 52, 4012.

Robinson, Venkataraman, *J. Chem. Soc.*, 1929, 62.

2 : 5-Dimethoxybenzoic Acid (*Gentisic acid dimethyl ether*).

Needles from H_2O . M.p. 76°. Sol. EtOH, Et₂O, hot H_2O . Sols. show violet fluor.

Et ester : b.p. 285°, 168°/14 mm. D_{20}^{25} 1.1443.

Chloride : $C_9H_9O_3Cl$. MW, 200.5. M.p. 53-4°. B.p. 163-4°/15 mm.

Amide : $C_9H_{11}O_3N$. MW, 181. Needles. M.p. 141-2°. Sol. hot H_2O .

Nitrile : $C_9H_9O_2N$. MW, 163. Needles. M.p. 82°. Sol. C_6H_6 .

Anilide : m.p. 98-9°.

Anhydride : prisms from AcOEt. M.p. 102-3°.

Kauffmann, *Ann.*, 1906, 344, 73.

Mauthner, *J. prakt. Chem.*, 1915, 91, 180.

2 : 6-Dimethoxybenzoic Acid (γ -Resorcylic acid dimethyl ether).

Plates. M.p. 186-7° (179°). Mod. sol. hot H₂O. Sol. EtOH, Et₂O.

Me ester : m.p. 88°.

Amide : m.p. 207-8°.

Nitrile : m.p. 118°. B.p. 310°.

Mauthner, *J. prakt. Chem.*, 1929, 121, 259.

3 : 4-Dimethoxybenzoic Acid.

See Veratric Acid.

3 : 5-Dimethoxybenzoic Acid (α -Resorcylic acid dimethyl ether).

Needles from hot H₂O. Prisms from EtOH. M.p. 185-6°. Sol. EtOH, Et₂O. Spar. sol. cold H₂O. Sublimes.

Me ester : m.p. 42-4°. B.p. 298°, 157°/13 mm. Spar. sol. ligroin.

Et ester : m.p. 26-7°. B.p. 285°, 200°/50 mm.

Chloride : cryst. from ligroin. M.p. 35-6°. B.p. 157-8°/16 mm.

Amide : m.p. 148-9°.

Anhydride : needles from AcOEt. M.p. 134-5°.

Seka, Fuchs, *Monatsh.*, 1931, 57, 65.

Bülow, Riess, *Ber.*, 1902, 35, 3001.

Graves, Adams, *J. Am. Chem. Soc.*, 1923, 45, 2452.

Lock, Nottes, *Monatsh.*, 1936, 68, 52.

pp'-Dimethoxybenzoin.

See Anisoin.

3 : 4-Dimethoxybenzyl Alcohol.

See Veratryl Alcohol.

Dimethoxybenzylamine.

See Veratrylamine and under Dihydroxybenzylamine.

Dimethoxybenzylideneacetone.

See Dianisylideneacetone.

4 : 5-Dimethoxy-2-carboxymethyl-phenoxycetic Acid.

See Derric Acid.

4 : 5-Dimethoxy-2-carboxyphenoxyacetic Acid.

See Rissic Acid.

Dimethoxycoumarin.

See Citropten and under Scopoletin.

Dimethoxydiphenylglycollic Acid.

See Anisilic Acid.

Dimethoxydistyryl Ketone.

See Dianisylideneacetone.

Dimethoxyethane.

See under Acetaldehyde and Ethylene Glycol.

3 : 5-Dimethoxy-4-ethoxybenzoic Acid.

See Syringic Acid.

6 : 7-Dimethoxy-8-ethoxycoumarin.

See under Fraxetin.

Dimethoxyhydrazobenzene.

See Hydrazoanisole.

4 - 5-Dimethoxyisophthalaldehyde.

See under 4-Hydroxy-5-methoxyisophthalaldehyde.

4 : 5-Dimethoxyisophthalic Acid.

See Isohemipinic Acid.

4 : 5 - Dimethoxy - 3 - isopropylphthalic Acid.

See Apogossypolic Acid.

6 : 7-Dimethoxy-1-keto-1 : 2 : 3 : 4-tetrahydroisoquinoline.

See Corydaldine.

Dimethoxymethane.

See Methylal.

Dimethoxy - methylenedioxy - allylbenzene.

See Apiol and Dill-apiol.

Dimethoxy - methylenedioxy - benzaldehyde.

See Apiolaldehyde and Dill-apiolaldehyde.

1 : 4-Dimethoxy - 2 : 3 - methylenedioxy - benzene.

See Apione.

Dimethoxy - methylenedioxy - benzoic Acid.

See Apiotic Acid and Dill-apiotic Acid.

Dimethoxy - methylenedioxy - propenyl - benzene.

See Isoapiol, and under Dill-apiol.

6 : 7 - Dimethoxy - 1 - methyl - 1 : 2 : 3 : 4 - tetrahydroisoquinoline.

See Salsolidine.

3 : 4-Dimethoxyphenylacetaldehyde.

See Homoveratric Aldehyde.

2 : 3-Dimethoxyphenylacetic Acid.

See o-Homoveratric Acid.

3 : 4-Dimethoxyphenylacetic Acid.

See Homoveratric Acid.

3 : 4-Dimethoxyphenylethylamine.

See Homoveratrylamine.

Dimethoxy-o-phthalaldehydic Acid.

See Opianic Acid.

Dimethoxyphthalazone.

See Opiazone.

3 : 4-Dimethoxyphthalic Acid.

See Hemipinic Acid.

3 : 6-Dimethoxyphthalic Acid.

See under 3 : 6-Dihydroxyphthalic Acid.

4 : 5-Dimethoxyphthalic Acid.

See Metahemipinic Acid.

Dimethoxyphthalide.

See Meconine.

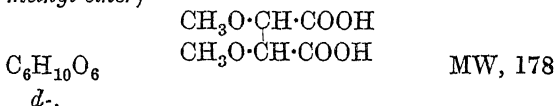
3 : 4-Dimethoxy-1-propenylbenzene.

See under Isoeugenol.

5 : 6-Dimethoxy- γ -pyrone-2 - carboxylic Acid.

See under 6-Hydroxycomenic Acid.

Dimethoxysuccinic Acid (*Tartaric acid dimethyl ether*)



Prisms from H₂O. Plates from Me₂CO. M.p. 153°. Sol. H₂O, EtOH. Mod. sol. Et₂O. Spar. sol. C₆H₆. $[\alpha]_D^{20} + 74.74^\circ$ in H₂O, $+ 95.8^\circ$ in

Me₂CO. Decomp. on dist. *Di-Na salt*: $[\alpha]_D^{20} + 52.68^\circ$ in H₂O. *Ag salt*: sol. H₂O.

Di-Me ester: C₆H₁₄O₆. MW, 206. M.p. 51° (53-4°). B.p. 130-2⁵/12 mm. $[\alpha]_D^{20} + 79.63^\circ$ in Me₂CO.

Di-Et ester: C₁₀H₁₈O₆. MW, 234. B.p. 155°/25 mm. D₄²⁰ 1.096. $[\alpha]_D^{20} + 89.96^\circ$.

Dichloride: C₆H₈O₄Cl₂. MW, 215. Prisms from Et₂O. M.p. 90-3°. $[\alpha]_D^{20} + 80^\circ$ in Me₂CO.

Monoamide: tartramidic acid di-Me ether. C₆H₁₁O₅N. MW, 177. Prisms from EtOH. M.p. 185°. $[\alpha]_D^{20} + 90^\circ$ in H₂O.

Diamide: tartramidic amide di-Me ether. C₆H₁₃O₄N₂. MW, 176. Needles from H₂O. M.p. about 270° decomp. $[\alpha]_D^{20} + 97.06^\circ$ in H₂O.

Anhydride: C₆H₈O₅. MW, 160. Cryst. from Et₂O. M.p. 80-2°. $[\alpha]_D^{20} + 14.87^\circ$ in Me₂CO.

Monoanilide: tartranilic acid di-Me ether. Prisms from Me₂CO. M.p. 117-9°. $[\alpha]_D^{20} + 129.6^\circ$ in Me₂CO.

Dianilide: tartranilic anilide di-Me ether. Needles from C₆H₆. M.p. 137-9°. $[\alpha]_D^{20} + 255.4^\circ$ in Me₂CO.

l-.

M.p. 154°.

Di-Me ester: cryst. from Et₂O-pet. ether. M.p. 52°. B.p. 125-35°/9 mm. $[\alpha]_D^{20} - 28.26^\circ$.

dl-.

Di-Me ester: cryst. from Et₂O. M.p. 68°. n_D^{20} 1.4343.

Meso-.

Cryst. from H₂O. M.p. 161°.

Di-Me ester: cryst. from Et₂O or C₆H₆. M.p. 68°.

Asahina, Takimoto, *Ber.*, 1931, 64, 1805.

Levene, Tipson, *J. Biol. Chem.*, 1932, 97, 491.

Patterson, Patterson, *J. Chem. Soc.*, 1915, 107, 152.

Purdie, Young, *J. Chem. Soc.*, 1910, 97, 1532.

Dimethoxyterephthalic Acid.

See under Dihydroxyterephthalic Acid.

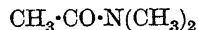
Dimethoxytoluene.

See Homoveratrol, and under Dihydroxytoluene and Orcinol.

Dimethylacetal.

See under Acetaldehyde.

N-Dimethylacetamide (*Acetyl*dimethylamine)



C₄H₉ON MW, 87

B.p. 165-75°, 84°/32 mm. D₄²⁰ 0.9434. n_D^{20} 1.43708.

B.HAuCl₄·5H₂O: yellow cryst. M.p. 64°.

Mitchell, Reid, *J. Am. Chem. Soc.*, 1931, 53, 1879.

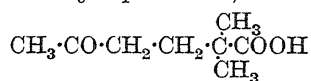
1 : 1-Dimethylacetoacetic Acid.

See 1-Acetoisobutyric Acid.

3 : 3-Dimethylacetoacetic Acid.

See 2-Ketoisocaproic Acid.

1 : 1-Dimethyl-3-acetobutyric Acid (4-Keto-1 : 1-dimethylcaproic acid)



C₈H₁₄O₃ MW, 158

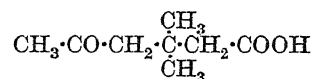
Cryst. from ligroin or C₆H₆-ligroin. M.p. 49-50°. NaOBr → 1 : 1-dimethylglutaric acid.

Semicarbazone: cryst. from AcOH or MeOH. M.p. 169°.

Auwers, Hessenland, *Ber.*, 1908, 41, 1813.

Wallach, Kempe, *Ann.*, 1903, 329, 99.

2 : 2-Dimethyl-3-acetobutyric Acid (4-Keto-2 : 2-dimethylcaproic acid)



C₈H₁₄O₃ MW, 158

B.p. 160°/29 mm., 150-5°/17 mm. Sol. H₂O, EtOH, Et₂O. D₄^{19.5} 1.0365. $n_D^{19.5}$ 1.4465. NaOBr → 2 : 2-dimethylglutaric acid.

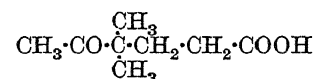
Me ester: C₉H₁₆O₃. MW, 172. B.p. 213-17°.

Et ester: C₁₀H₁₈O₃. MW, 186. B.p. 104°/14 mm. (110-15°/13 mm.).

Semicarbazone: needles from EtOH. M.p. 172° decomp. (168-9° decomp.).

Ruzicka, *Helv. Chim. Acta*, 1919, 2, 154.

3 : 3-Dimethyl-3-acetobutyric Acid (4-Keto-3 : 3-dimethylcaproic acid)



C₈H₁₄O₃ MW, 158

Prisms from H₂O. M.p. 50°. B.p. 178°/20 mm. Sol. H₂O, EtOH, Et₂O, C₆H₆, ligroin. NaOBr → 1 : 1-dimethylglutaric acid.

Oxime: needles from H₂O. M.p. 97-8°.

Semicarbazone: needles from EtOH. M.p. 185°.

Tiemann, *Ber.*, 1897, 30, 253.

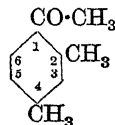
1 : 1-Dimethylacetone.

See Methyl isopropyl Ketone.

Dimethylacetonilcarbinol.

See Diacetone Alcohol.

2 : 4-Dimethylacetophenone (4-Aceto-m-xylene)



C₁₀H₁₂O

MW, 148

B.p. 228° (234-5°), 108°/12 mm., 92-4°/5 mm.
Sol. EtOH, Et₂O, CS₂. D₁₅²⁰ 1.0121. n_D²⁰ 1.5340.
KMnO₄ → 2 : 4-dimethylbenzoylformic acid.
Oxime : needles from pet. ether. M.p. 63-4°.
B.p. 153-4°/15 mm.

Semicarbazone : m.p. 185-7°.

C₁₀H₁₂O, H₃PO₄ : m.p. 104-5°.

Verley, *Bull. soc. chim.*, 1897, 17, 910.

Perkin, Stone, *J. Chem. Soc.*, 1925, 127, 2283.

Florence, *Chem. Zentr.*, 1933, II, 2123.

Auwers, Lechner, Bundesmann, *Ber.*, 1925, 58, 48.

2 : 5-Dimethylacetophenone (2-Aceto-p-xylene).

B.p. 230-1°, 112°/18 mm., 107°/13 mm., 93-4°/8 mm. Sol. EtOH, Et₂O, C₆H₆, CS₂. D₄¹⁵ 0.9963. n_D²⁰ 1.5291. Volatile in steam. Ox. → 2 : 5-dimethylbenzoic acid + 4-methylisophthalic acid.

Oxime : m.p. 58°.

Semicarbazone : m.p. 168-9°.

C₁₀H₁₂O, H₃PO₄ : m.p. 82-3°.

Freund, Fleischer, *Ann.*, 1918, 414, 5.

3 : 4-Dimethylacetophenone (4-Aceto-o-xylene).

B.p. 246-7° (251°), 213°/310 mm., 95-7°/4 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Insol. H₂O. D₁₅¹⁴ 1.0090. n_D¹⁵ 1.5413, n_D²⁰ 1.5381. KMnO₄ → 3 : 4-dimethylbenzoic acid.

Oxime : m.p. 85°. Acetyl deriv. : m.p. 71-2°.

Semicarbazone : m.p. 233-4°.

C₁₀H₁₂O, H₃PO₄ : m.p. 97°.

Claus, *J. prakt. Chem.*, 1890, 41, 409.

Florence, *Chem. Zentr.*, 1933, II, 2123.

3 : 5-Dimethylacetophenone (5-Aceto-m-xylene).

B.p. 236-7°.

Oxime : needles from MeOH. M.p. 114-114.5°.

Semicarbazone : m.p. 219°.

p-Nitrophenylhydrazones : yellow needles from AcOH or xylene. M.p. 179-80°.

Auwers, Jordan, *Ber.*, 1925, 58, 47.

1 : 1-Dimethyl-4-aceto-n-valeraldehyde.

See Geronaldehyde.

1 : 1-Dimethyl-4-aceto-n-valeric Acid.

See Geronic Acid.

3 : 3-Dimethyl-4-aceto-n-valeric Acid.

See Isogeronic Acid.

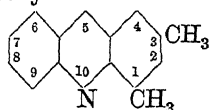
Dimethylacetylcarbinol.

See Trimethylketol.

Dimethylacetylene.

See 2-Butyne.

1 : 3-Dimethylacridine



C₁₅H₁₃N

MW, 207

M.p. 73-4° (71°). Sol. EtOH, C₆H₆.

Picrate : decomp. above 200°.

Kaufmann, *Ann.*, 1894, 279, 286.

1 : 9-Dimethylacridine.

Colourless cryst. from EtOH. M.p. 78-80°. Slightly sol. H₂O, very sol. Me₂CO, C₆H₆, pet. ether without fluor. Weaker and less irritant odour than acridine. Does not give characteristic acridine col. in pH 4 buffer.

B,HCl : long yellow needles from N/HCl. Sol. H₂O with yellow col., giving pronounced green fluor. on dil.

B,CH₃COOH : hydrolyses almost completely in 10% AcOH.

Albert, Willis, *J. Soc. Chem. Ind.*, 1946, 65, 26.

2 : 3-Dimethylacridine.

Pale yellow plates from MeOH.Aq. M.p. 162°. Sol. conc. H₂SO₄ with green fluor.

Kranzlein, *Ber.*, 1937, 70, 1786.

2 : 5-Dimethylacridine.

Needles from pet. ether. M.p. 121-2°. Sol. EtOH. H₂SO₄ sol. shows yellowish green fluor.

Picrate : m.p. about 225°. Prac. insol. boiling EtOH.

Borsche, *Ann.*, 1910, 377, 96.

3 : 5-Dimethylacridine.

Plates from pet. ether. M.p. 90°. Sol. EtOH, C₆H₆. Mod. sol. Et₂O. Volatile in steam.

Picrate : yellow needles from EtOH. Darkens at 215°. M.p. 225°.

Jensen, Rethwisch, *J. Am. Chem. Soc.*, 1928, 50, 1146.

3 : 7-Dimethylacridine.

Needles. M.p. 176°. Sol. EtOH, C₆H₆, Py. Sols. show green fluor. Yellow sol. in conc. H₂SO₄ with green fluor.

B,HCl : m.p. about 275°.

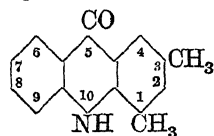
Haare, *Ber.*, 1903, 36, 590.

Allmann, *Ber.*, 1903, 36, 1018.

Stollé, Bergdoll, Luther, Auerhahn,

Wacker, *J. prakt. Chem.*, 1930, 128, 40.

1 : 3-Dimethylacridone



C₁₅H₁₃ON

MW, 223

Yellow needles by sublimation. M.p. 294°. Sol. hot EtOH, hot AcOH. Sol. alc. KOH. EtOH sol. shows blue fluor.

Kaufmann, *Ann.*, 1894, 279, 285.

1 : 10-Dimethylacridone (1 : N-Dimethylacridone).

Greenish yellow needles from EtOH. M.p. 183-4°. Sol. EtOH with blue fluor.

Graebe, Locher, *Ann.*, 1894, 279, 279.

2 : 3-Dimethylacridone.

Long yellow needles from AcOH. M.p. 297°. Sol. AcOH, Py. Sol. H₂SO₄, HCl.

Kranzlein, *Ber.*, 1937, 70, 1785.

2 : 10-Dimethylacridone (2 : N-Dimethylacridone).

Cryst. + 1H₂O from EtOH.Aq. M.p. anhyd. 188°.

Gleu, Nitzsche, *J. prakt. Chem.*, 1939, 153, 200.

3 : 10-Dimethylacridone (3 : N-Dimethylacridone).

Cryst. from EtOH.Aq. M.p. 150-1°. Violet-blue fluor. in EtOH. Violet fluor. in C₆H₆.

Drozdov, *J. Gen. Chem. U.S.S.R.*, 1937, 7, 2292, (*Chem. Zentr.*, 1938, I, 602).

Gleu, Nitzsche, *J. prakt. Chem.*, 1939, 153, 200.

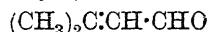
4 : 10-Dimethylacridone (4 : N-Dimethylacridone).

M.p. 141°.

Gleu, Nitzsche, *J. prakt. Chem.*, 1939, 153, 200.

1 : 2-Dimethylacrolein.

See Tiglic Aldehyde.

2 : 2-Dimethylacrolein (2-Methylcrotonaldehyde, senecioaldehyde)

C₅H₈O MW, 84

B.p. 132-3°/730 mm. D₄²⁰ 0.8722. n_D²⁰ 1.4526. Very easily oxidised. AcOH + conc. H₂SO₄ or SbCl₃ → green col.

Di-Et acetal: b.p. 163-5°/730 mm. D₄²⁰ 0.8555. n_D²⁰ 1.4201. Easily decomp.

Semicarbazone: cryst. from MeOH. M.p. 221-2°.

Spar. sol. MeOH.

Phenylhydrazone: reddish violet cryst. M.p. 161-2°.

Fischer, Ertel, Löwenberg, *Ber.*, 1931, 64, 30.

Fischer, Löwenberg, *Ann.*, 1932, 494, 272.

Burkhardt, Heilbron, Aldersley, B.P. 512,465, (*Brit. Chem. Abstracts*, 1939, B, 1212).

1 : 2-Dimethylacrylic Acid.

See Angelic Acid and Tiglic Acid.

2 : 2-Dimethylacrylic Acid (2-Methylcrotonic acid, senecioic acid)

C₅H₈O₂ MW, 100

Prisms from H₂O. M.p. 70°. B.p. 199°, 114°/40 mm. Sol. ord. org. solvents. Sublimes. $k = 0.759 \times 10^{-5}$ at 25°.

Me ester: C₆H₁₀O₂. MW, 114. B.p. 135-8°. D₄²⁰ 0.9337. n_D²⁰ 1.432.

Et ester: C₇H₁₂O₂. MW, 128. B.p. 153-4°. 61.5°/30 mm. D₄²¹ 0.9217. n_D²⁰ 1.4345.

Dict. of Org. Comp.—II

Chloride: C₅H₇OCl. MW, 118.5. B.p. 145-50°. D₄²⁰ 1.058. n_D²⁰ 1.4763.

Amide: C₅H₉ON. MW, 99. M.p. 107-8°.

Nitrile: C₅H₇N. MW, 81. B.p. 140-2°. D₄²⁰ 0.8314. n_D²⁰ 1.43720.

Anilide: cryst. from pet. ether. M.p. 126-7°.

Cuculescu, *Chem. Abstracts*, 1932, 26, 1897.

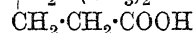
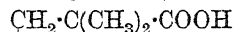
de Laet, *Chem. Abstracts*, 1929, 23, 4443.

Weinig, *Ann.*, 1894, 280, 253.

Barbier, Léser, *Bull. soc. chim.*, 1905, 33, 815.

Dutt, *Quart. J. Indian Chem. Soc.*, 1925, 1, 297.

Smith, Prichard, Spillane, *Organic Syntheses*, 1943, XXIII, 27.

1 : 1-Dimethyladipic Acid (1 : 1-Dimethylbutane-1 : 4-dicarboxylic acid)

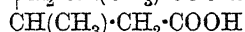
C₈H₁₄O₄ MW, 174

Needles from CHCl₃-pet. ether. M.p. 89-90° (87-8°). Readily sol. usual org. solvents. Ox. → 1 : 1-dimethylglutaric acid.

Di-Et ester: C₁₂H₂₂O₄. MW, 230. B.p. 148°/18 mm.

Rupe, Liechtenhan, *Ber.*, 1908, 41, 1284.

Blanc, *Compt. rend.*, 1904, 138, 580.

1 : 3-Dimethyladipic Acid (1 : 3-Dimethylbutane-1 : 4-dicarboxylic acid)

C₈H₁₄O₄ MW, 174

Mixture of all four stereoisomerides. M.p. 80°. B.p. 210-12°/14 mm.

Di-Et ester: C₁₂H₂₂O₄. MW, 230. B.p. 131-2°/14 mm. D₄¹⁶ 0.9900.

Dichloride: C₈H₁₂O₂Cl₂. MW, 211. B.p. 127-31°/14 mm. D₄¹⁵ 1.1730.

Diamide: C₈H₁₆O₂N₂. MW, 172. Cryst. from EtOH-Et₂O. M.p. 153-9°.

Dihydrazide: cryst. from EtOH. M.p. 139-42°.

Braun, Haensel, *Ber.*, 1926, 59, 2007.

Haller, Desfontaines, *Compt. rend.*, 1905, 140, 1206.

1 : 4-Dimethyladipic Acid (1 : 4-Dimethylbutane-1 : 4-dicarboxylic acid, hexane-2 : 5-dicarboxylic acid)

C₈H₁₄O₄ MW, 174

Meso.

Prisms from H₂O. M.p. 143°. B.p. 320-2°. Spar. sol. Et₂O, CHCl₃. 100 Parts H₂O dissolve 0.5664 parts at 22°. k (first) = 4.2×10^{-5} at 25°; (second) = 1.7×10^{-6} at 25°.

dl.

Cryst. from H_2O . M.p. $74-6^\circ$. B.p. $320-2^\circ$. Sol. EtOH , Et_2O , CHCl_3 . 100 Parts H_2O dissolve 6.7 parts at 15° . k (first) $= 4.2 \times 10^{-5}$ at 25° ; (second) $= 1.7 \times 10^{-6}$ at 25° . Dist. with $\text{CaO} \rightarrow 1 : 3$ -dimethylcyclopentanone-2.

d.

Cryst. from H_2O . M.p. 105.5° . $[\alpha]_D^{25} + 31.3^\circ$ in 10% EtOH .

l.

$[\alpha]_D^{25} - 23.4^\circ$ in 10% EtOH .

Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, **32**, 1060.

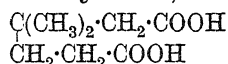
Mohr, *J. Chem. Soc.*, 1901, **34**, 808.

Lean, *J. Chem. Soc.*, 1894, **65**, 1005.

Zelinsky, *Ber.*, 1891, **24**, 3999.

Best, Thorpe, *J. Chem. Soc.*, 1909, **95**, 707.

2 : 2-Dimethyladipic Acid (2 : 2-Dimethylbutane-1 : 4-dicarboxylic acid)



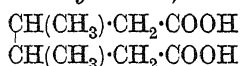
$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Needles from EtOH . M.p. $86-7^\circ$. Sol. H_2O , EtOH , Et_2O , C_6H_6 , AcOEt . Insol. ligroin.

Crossley, Renouf, *J. Chem. Soc.*, 1905, **87**, 1496.

Tiemann, Schmidt, *Ber.*, 1898, **31**, 884.

2 : 3-Dimethyladipic Acid (2 : 3-Dimethylbutane-1 : 4-dicarboxylic acid)



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Exists in two forms.

(i) *High melting form.*

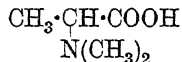
Leaflets from H_2O . M.p. 133° corr. Sol. Et_2O , hot H_2O . Spar. sol. cold H_2O . Almost insol. ligroin.

(ii) *Low melting form.*

Cryst. from Et_2O . M.p. $104-5^\circ$.

Faltis, Wagner, *Ann.*, 1923, **433**, 109.

Dimethyl-*dl*-alanine (1-Dimethylaminopropionic acid)



$\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117

Needles from H_2O . M.p. 189° . Sublimes with part. decomp. on heating. Sol. H_2O , EtOH . Insol. Et_2O .

Me ester: $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. B.p. $37.5-8.5^\circ/12$ mm. $n_D^{25} 1.4163$.

Et ester: $\text{C}_7\text{H}_{15}\text{O}_2\text{N}$. MW, 145. B.p. 156.5° ($154-7^\circ$), $48-8.5^\circ/11$ mm. Misc. with H_2O . $n_D^{20} 1.4161$.

Curtius, *J. prakt. Chem.*, 1917, **95**, 340.

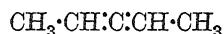
Major, Cline, *J. Am. Chem. Soc.*, 1932, **54**, 246.

Duvillier, *Bull. soc. chim.*, 1892, **7**, 99.

Dimethylalizarin.

See Dihydroxydimethylantraquinone.

***sym.*-Dimethylallene** (2 : 3-Pentadiene)



C_5H_8 MW, 68

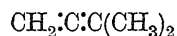
B.p. $49-51^\circ$. $D_4^{20} 0.7024$. Alc. $\text{KOH} \rightarrow \text{CH}_3 \cdot \text{CH}_2 \cdot \text{C} : \text{C} \cdot \text{CH}_3$.

S.C.I., B.P. 298,090, (*Chem. Abstracts*, 1929, **23**, 2722).

Kukuritschkin, *Chem. Zentr.*, 1904, **I**, 577.

Kopper, Pongratz, *Monatsh.*, 1933, **62**, 86.

***unsym.*-Dimethylallene** (2-Methyl-2 : 3-butadiene)



C_5H_8 MW, 68

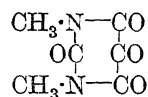
B.p. $40-40.5^\circ$. $D_4^{20} 0.6833$. $n_D^{20} 1.41658$ (1.4094). $\text{CrO}_3 \rightarrow$ acetic acid + acetone.

$\text{HBr} \rightarrow \text{CH}_3 \cdot \text{CH} \cdot \text{CBr}(\text{CH}_3)_2$ and finally $\text{CH}_2\text{Br} \cdot \text{CH}_2 \cdot \text{CBr}(\text{CH}_3)_2$.

Badische, D.R.P. 264,008, (*Chem. Zentr.*, 1913, **II**, 1178).

Auwers, *Ber.*, 1918, **51**, 1126.

Dimethylalloxan



$\text{C}_6\text{H}_6\text{O}_4\text{N}_2$ MW, 170

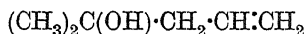
Yellow prisms from benzyl cyanide + some HCl . Plates + $2\text{H}_2\text{O}$ from H_2O . M.p. anhyd. $270-2^\circ$ corr. Sol. H_2O , EtOH , Me_2CO , AcOH , CHCl_3 , C_6H_6 . $\text{CrO}_3 \rightarrow$ dimethylparabanic acid. $\text{H}_2\text{S} \rightarrow$ amalic acid. Boil with $2\text{N}/\text{HCl} \rightarrow$ amalic acid + dimethylparabanic acid.

Biltz, Struff, *Ann.*, 1914, **404**, 134, 165.

7 : 8-Dimethylalloxazine.

See Lumichrome.

Dimethylallylcarbinol (4-Methyl-1-pentanol-4, 4-hydroxy-4-methyl-1-pentene)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 119.5° . Spar. sol. H_2O . $D_4^{17} 0.8326$. $n_D^{17} 1.4277$. Heat of comb. C_p 895.2 Cal. Forms hydrate, $\text{C}_6\text{H}_{12}\text{O} \cdot \text{H}_2\text{O}$, b.p. 117° .

Acetyl: b.p. 137.5° .

Phenylurethane: needles from pet. ether. M.p. $49-50^\circ$.

Jaworski, *Ber.*, 1909, **42**, 436.

Bacon, Farmer, *J. Chem. Soc.*, 1937, 1071.

Dimethylamine



$\text{C}_2\text{H}_7\text{N}$ MW, 45

B.p. 7°. Sol. H₂O. D₄ 0.6804. Heat of comb. C_p (gas), 420.5 Cal. $k = 5.2 \times 10^{-4}$ at 25°. Decomp. above 800°. Forms large number of add. comps. with metal halides (+ hydrogen halides).

B.HCl: dimethylammonium chloride. Volatile cryst. M.p. 171°. Sol. H₂O, EtOH, CHCl₃. Insol. Et₂O.

B.HBr: dimethylammonium bromide. Volatile cryst. M.p. 133.5°. Sol. EtOH. Spar. sol. CHCl₃. Insol. Et₂O.

B.HI: dimethylammonium iodide. M.p. 155°. Sol. EtOH. Insol. CHCl₃, Et₂O.

B.HNO₃: dimethylammonium nitrate. Volatile cryst. M.p. 74°.

N-Nitroso: see Dimethylnitrosamine.

N-Nitro: see Dimethylnitramine.

B.HAuCl₄: m.p. 195–8° (200–3°).

Picrate: m.p. 158°.

Müller, *Chem. Abstracts*, 1932, 26, 5071.

I.G., D.R.P. 468,895, (*Chem. Abstracts*, 1929, 23, 846).

Werner, *J. Chem. Soc.*, 1917, 111, 850.

Menschutkin, *Chem. Zentr.*, 1898, II, 478.

Dimethylamine-dicarboxylic Acid.

See Iminodiacetic Acid.

Dimethylamine NN-disulphide.

See Dithiodimethylamine.

Dimethylaminoacetic Acid.

See Dimethylglycine.

Dimethylaminoacetone (Acetonyldimethylamine)



C₅H₁₁ON MW, 101

B.p. 123°. Sol. H₂O, EtOH, Et₂O.

Oxime: m.p. 99°. Sol. H₂O, EtOH, Et₂O.

B₂H₂PtCl₆: m.p. 176° decomp. (slow heat.).

B.HAuCl₄: m.p. 145–6°.

Stoermer, Dzinski *Ber.*, 1895, 23, 2223.

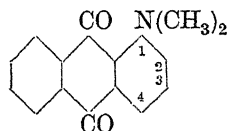
5-Dimethylamino-n-amyl Alcohol.

See Pentahomocholine.

Dimethylaminoanisole.

See under Dimethylaminophenol.

1-Dimethylaminoanthraquinone



C₁₆H₁₃O₂N MW, 251

Red prisms from EtOH. M.p. 140.5°. Sol. PhNO₂, Py. Mod. sol. hot EtOH. Yellow sol. in conc. H₂SO₄.

Bayer, D.R.P. 136,777, (*Chem. Zentr.*, 1902, II, 1372).

Allais, *Compt. rend.*, 1945, 220, 202.

2-Dimethylaminoanthraquinone.

Red needles from toluene. M.p. 181°. Sol. EtOH, AcOH, PhNO₂. Spar. sol. Et₂O, C₆H₆.

Haller, Guyot, *Bull. soc. chim.*, 1901, 25, 206.

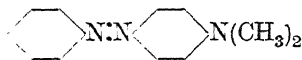
Société chimique St. Denis, D.R.P. 112,297, (*Chem. Zentr.*, 1900, I, 1214).

Limpricht, *Ann.*, 1899, 307, 312.

Dimethylaminoantipyrine.

See Pyramidone.

4-Dimethylamino-azobenzene (Benzene-azo-dimethylaniline)



C₁₄H₁₅N₃ MW, 225

Yellow leaflets from EtOH. M.p. 117°.

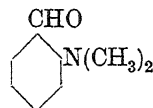
Methochloride: orange prisms + H₂O. M.p. 194°.

Methobromide: leaflets from H₂O at 80°, m.p. 196°. Cryst. from EtOH, m.p. 192°.

Methiodide: reddish orange cryst. from EtOH, m.p. 173°. Yellowish orange cryst. from H₂O at 80°, m.p. about 184°.

Möhlau, *Ber.*, 1884, 17, 1491.

o-Dimethylaminobenzaldehyde



C₉H₁₁ON MW, 149

Yellow oil. B.p. 244°, 142°/30 mm., 120°/11 mm. Sol. ord. org. solvents. Volatile in steam.

Oxime: colourless, silky needles. M.p. 87°.

Phenylhydrazone: m.p. 74°.

p-Nitrophenylhydrazone: purple prisms. M.p. 191°.

B.H₂SO₃: m.p. 162°.

B.HAuCl₄: m.p. 124–5°.

B₂H₂PtCl₆: m.p. 205–6°.

Methiodide: m.p. 163.5°.

Bamberger, *Ber.*, 1904, 37, 987.

m-Dimethylaminobenzaldehyde.

Pale yellow oil. B.p. 137.5–138°/9 mm. Sol. EtOH, Et₂O, C₆H₆, min. acids.

Oxime: prisms from EtOH.Aq. M.p. 75–6°.

Semicarbazone: plates. M.p. 228–9° (rapid heat.).

p-Nitrophenylhydrazone: m.p. 188°.

2:4-Dinitrophenylhydrazone hydrochloride: scarlet cryst. from 25% EtOH. M.p. 231° decomp.

B₂H₂PtCl₆: reddish yellow needles from H₂O. M.p. 167–8° decomp. (rapid heat.).

Methiodide: m.p. 185–6° decomp.

Picrate: plates from EtOH. M.p. 147–7.5°.

Cocker, Harris, Loach, *J. Chem. Soc.*, 1938, 751.

***p*-Dimethylaminobenzaldehyde.**

Leaflets. M.p. 74°. B.p. 176–7°/17 mm.
Sol. ord. org. solvents.

B.HCl: white cryst. M.p. 107–9°.

syn-Oxime: m.p. 185° decomp.

anti-Oxime: m.p. 144°.

Phenylhydrazone: needles from EtOH. M.p. 148°.

p-Nitrophenylhydrazone: m.p. 182°.

2:4-Dinitrophenylhydrazone: m.p. 324.5–26° decomp.

p-Bromophenylhydrazone: m.p. 181° decomp.

Semicarbazone: needles. Decomp. at 222°.

Anil: greenish yellow cryst. M.p. 100°.

2:4-Dinitrophenylsemicarbazone: m.p. 247° decomp.

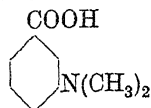
Adams, Coleman, *Organic Syntheses*, Collective Vol. I, 208 (*Bibl.*).

Duff, *J. Chem. Soc.*, 1945, 276.

***o*-Dimethylaminobenzoic Acid.**

See Dimethylanthranilic Acid.

***m*-Dimethylaminobenzoic Acid**



$\text{C}_9\text{H}_{11}\text{O}_2\text{N}$ MW, 165

Needles. M.p. 151°. Sol. EtOH, Et₂O. Spar. sol. hot H₂O. *k* (acid) = 8.0×10^{-6} at 25°; *k* (base) = 1.94×10^{-11} at 25°.

Me ester: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Yellow liq. B.p. 270°. Insol. H₂O. *Hydrochloride*: m.p. 175–7°. *Methiodide*: m.p. 220–1° decomp.

Cumming, *Chem. Zentr.*, 1906, II, 1007.

***p*-Dimethylaminobenzoic Acid.**

Needles from EtOH. M.p. 242.5–3.5°. Sol. EtOH. Spar. sol. Et₂O. *k* (acid) = 9.4×10^{-6} at 25°; *k* (base) = 3.25×10^{-12} at 25°.

Me ester: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Leaflets from EtOH. M.p. 102°. B.p. 304–5°. Sol. Et₂O, C₆H₆, CHCl₃. *Methiodide*: m.p. 170° decomp.

Et ester: $\text{C}_{11}\text{H}_{15}\text{O}_2\text{N}$. MW, 193. Leaflets. M.p. 68°.

Phenyl ester: $\text{C}_{15}\text{H}_{15}\text{O}_2\text{N}$. MW, 241. M.p. 180–1°. *Picrate*: m.p. 146–7°.

Chloride: $\text{C}_9\text{H}_{10}\text{ONCl}$. MW, 183.5. Leaflets. M.p. 147–9°.

Amide: $\text{C}_8\text{H}_{12}\text{ON}_2$. MW, 164. Needles. M.p. 206°. Sol. EtOH, hot H₂O.

Nitrile: *p*-cyanodimethylaniline. $\text{C}_9\text{H}_{10}\text{N}_2$. MW, 146. Yellow needles. M.p. 75–6°. B.p. 318°.

Anilide: m.p. 182–3°.

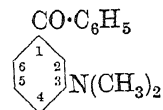
Rivier, Richard, *Helv. Chim. Acta*, 1925, 8, 493.

Morton, Stevens, *J. Am. Chem. Soc.*, 1931, 53, 4031.

Rivier, Schneider, *Helv. Chim. Acta*, 1919, 2, 717.

Willstätter, Kahn, *Ber.*, 1904, 37, 411.

3-Dimethylaminobenzophenone



$\text{C}_{15}\text{H}_{15}\text{ON}$

MW, 225

Yellow plates from EtOH. M.p. 47°. B.p. 216°/15 mm.

Methiodide: cryst. from H₂O. M.p. 165° decomp.

Baeyer, *Ann.*, 1907, 354, 189.

4-Dimethylaminobenzophenone.

Needles from hot EtOH. M.p. 92–3° (89–90°). Sol. Et₂O. Insol. H₂O.

syn-Oxime: m.p. 163°.

anti-Oxime: m.p. 176°.

Phenylhydrazone: m.p. 105°.

Anil: m.p. 151°.

B.HCl: m.p. 129–30°.

B.HClO₄: m.p. 162°.

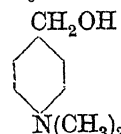
Methiodide: plates from H₂O. M.p. 188–90° decomp.

Shah, Deshpande, Chaubal, *J. Chem. Soc.*, 1932, 645.

Shah, Chaubal, *ibid.*, 650.

Hurd, Webb, *Organic Syntheses*, Collective Vol. I, 211.

***p*-Dimethylaminobenzyl Alcohol (4-Dimethylaminophenylcarbinol, 4-hydroxymethyl-dimethylaniline, *p*-methyloldimethylaniline)**



$\text{C}_9\text{H}_{13}\text{ON}$

MW, 151

M.p. 68–70°. B.p. 123°/1 mm. Mod. sol. H₂O. $D_4^{15} 1.059$. $n_D^{15} 1.5727$.

Benzoyl: prisms from pet. ether. M.p. 91°.

m-Nitrobenzoyl: m.p. 76° (80°).

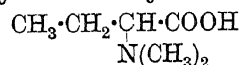
$\text{B.H}_2\text{PtCl}_6 \cdot 2\text{C}_2\text{H}_5\text{OH}$: m.p. 100° decomp.

Methiodide: m.p. 232° (199°) decomp.

Clemo, Smith, *J. Chem. Soc.*, 1928, 2424 (*Bibl.*).

Smith, Welch, *J. Chem. Soc.*, 1934, 730.

1-Dimethylaminobutyric Acid



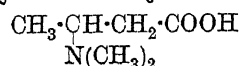
$\text{C}_6\text{H}_{13}\text{O}_2\text{N}$

MW, 131

Needles. M.p. 179°. Sol. H₂O, EtOH. Hygroscopic.

Duvillier, *Bull. soc. chim.*, 1906, 35, 156.

2-Dimethylaminobutyric Acid



$\text{C}_6\text{H}_{13}\text{O}_2\text{N}$

MW, 131

B.HCl: cryst. from EtOH-Et₂O. M.p. 136-7° (rapid heat.).

B.HAuCl₄: m.p. 194-5°.

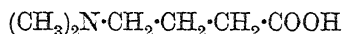
B₂H₂PtCl₆: m.p. 178° decomp.

Et ester: C₈H₁₇O₂N. MW, 159. B.p. 183.5-184.5° decomp., 81.5°/21 mm. D₂₀²⁰ 0.9196. n_D²⁰ 1.42641. *Methiodide*: m.p. 127-8°.

Breckpot, *Chem. Abstracts*, 1924, 18, 1114.

Décombe, *Ann. chim.*, 1932, 18, 144.

3-Dimethylaminobutyric Acid



C₆H₁₃O₂N MW, 131

M.p. 102-4°. B.p. 135-7°/10 mm.

B.HCl: m.p. 145-7°.

B.HAuCl₄: m.p. 151-2° (142°).

B₂H₂PtCl₆: m.p. 170° decomp.

Me ester: C₇H₁₅O₂N. MW, 145. B.p. 171.5-173°. Volatile in steam. Sol. H₂O.

Et ester: b.p. 78-90°/18 mm. D_{13.6}^{13.6} 0.9187. n_D^{13.6} 1.42640.

Keil, *Z. physiol. Chem.*, 1927, 171, 242.

Prelog, *Chem. Zentr.*, 1931, I, 1096.

5-Dimethylaminocaproic Acid



C₈H₁₇O₂N MW, 159

M.p. 107-9°.

B.HAuCl₄: m.p. 97-9°.

Me ester: C₉H₁₉O₂N. MW, 173. B.p. 209-10°.

Prelog, *Chem. Zentr.*, 1931, I, 1096.

2-Dimethylaminodiethyl Ether (*Dimethyl-2-ethoxyethylamine, ethyl 2-dimethylaminoethyl ether*)



C₆H₁₅ON MW, 117

B.p. 121°. D₂₀²⁰ 0.806. n_D²⁰ 1.406.

B.HAuCl₄: m.p. 85-90°.

Picrate: m.p. 119-21°.

Methiodide: prisms from EtOH. M.p. 160-5°.

Knorr, *Ber.*, 1904, 37, 3504.

6-Dimethylamino-4:4 diphenylheptanone-3.

See Amidone.

2-Dimethylaminoethyl Alcohol (*Dimethyl-2-hydroxyethylamine, N-dimethylethanolamine, dimethylaminoethanol*)



C₄H₁₁ON MW, 89

B.p. 135°. D₂₀²⁰ 0.8866. n_D²⁰ 1.43.

B.HAuCl₄: m.p. 195° (189-90°).

Picrate: m.p. anhyd. 96-7°.

Acetyl: b.p. 86-8°/80 mm.

Fränkel, Cornelius, *Ber.*, 1918, 51, 1660.

Knorr, Matthes, *Ber.*, 1901, 34, 3482.

β-Dimethylaminoethylamine.

See unsym.-Dimethylethylenediamine.

Dimethylaminoethyl p-butylamino-benzoate.

See Decicaine.

p-β-Dimethylaminoethylphenol.

See Hordenine.

Dimethylaminoformic Acid.

See Dimethylcarbamic Acid.

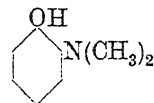
3-Dimethylaminomethylindole.

See Donaxine.

Dimethylaminophenetole.

See under Dimethylaminophenol.

N-Dimethyl-o-aminophenol (*o-Hydroxy-dimethylaniline*)



C₈H₁₁ON MW, 137

Prisms. M.p. 45°. B.p. 199-200°. Sol. EtOH, Et₂O, AcOH, hot H₂O. Volatile in steam. FeCl₃ → reddish violet col.

Me ether: dimethyl-o-anisidine, 2-dimethyl-aminoanisole. C₉H₁₃ON. MW, 151. B.p. 210-12°. D₂₃²³ 1.016.

Oxalate: m.p. 167-8° decomp.

Pinnow, *Ber.*, 1899, 32, 1405.

N-Dimethyl-m-aminophenol (*m-Hydroxy-dimethylaniline*).

Needles from ligroin. M.p. 85°. B.p. 265-8°, 206°/100 mm., 194°/50 mm., 153°/5 mm., (138°/10 mm.). Sol. EtOH, Et₂O, C₆H₆, Me₂CO, alkalis, min. acids. Prac. insol. H₂O. Reduces NH₃.AgNO₃.

Me ether: dimethyl-m-anisidine, 3-dimethyl-aminoanisole. C₉H₁₃ON. MW, 151. B.p. 237°.

Et ether: dimethyl-m-phenetidine, 3-dimethyl-aminophenetole. C₁₀H₁₅ON. MW, 165. B.p. 247°.

Acetyl: m.p. 36.5°. B.p. 160°/5 mm.

Benzoyl: m.p. 94°. B.p. 250°/5 mm.

Carbonate: C₁₇H₂₀O₃N₂. MW, 300. M.p. 137-8°. B.p. 265°/15 mm. *B₂HCl*: m.p. 205° decomp. *Picrate*: m.p. 162°.

Methylurethane: cryst. from EtOH. M.p. 87°.

Ethylurethane: cryst. from C₆H₆-pet. ether. M.p. 150° (99-100°).

Badische, D.R.P. 121,683, (*Chem. Zentr.*, 1901, II, 74).

Bobranskii, Eker, *J. Applied Chem.*, U.S.S.R., 1941, 14, 524, (*Chem. Abstracts*, 1942, 36, 3159).

N-Dimethyl-p-aminophenol (*p-Hydroxy-dimethylaniline*).

M.p. 74-6° (76-7°). B.p. 165°/30 mm. Sol. EtOH, Et₂O.

Me ether: dimethyl-*p*-anisidine, 4-dimethylaminoanisole. Leaflets from EtOH. M.p. 49°.

Et ether: dimethyl-*p*-phenetidine, 4-dimethylaminophenetole. Leaflets from EtOH. M.p. 35-36.5°. Volatile in steam.

p-Dimethylaminophenyl ether: *pp'*-tetramethyldiaminodiphenyl ether. $C_{16}H_{20}ON_2$. MW, 256. Needles from EtOH.Aq. M.p. 119°. *Picrate*: m.p. 150° decomp.

Acetyl: m.p. 78-9°.

p-Toluenesulphonyl: needles from EtOH. M.p. 130°. *Hydrochloride*: m.p. 188°. *Picrate*: yellow needles. M.p. 146°.

Ellis, B.P. 28,736, (*Chem. Abstracts*, 1915, 9, 1669).

Sandoz, F.P. 467,085, (*Chem. Abstracts*, 1915, 9, 2365).

Bamberger, Leyden, *Ber.*, 1901, 34, 21, 25.

Slotta, Behnisch, *J. prakt. Chem.*, 1932, 135, 235.

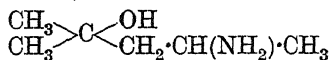
Dimethylaminopropionic Acid.

See Dimethylalanine.

γ -Dimethylaminopropylbenzene.

See under 3-Phenylpropylamine.

Dimethyl-2-aminopropylcarbinol (4-Amino-2-methylpentanol-2, 2-hydroxy-4-amino-2-methylpentane)



$C_6H_{15}ON$ MW, 117

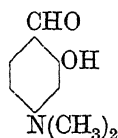
M.p. 35-6°. B.p. 174°/745 mm. Sol. EtOH, Et_2O , C_6H_6 , hot H_2O .

$B_2(COOH)_2$: m.p. 211-12° decomp.

Kemp, *Ann.*, 1896, 290, 151.

Kohn, Lindauer, *Monatsh.*, 1902, 23, 756.

4-Dimethylaminosalicylaldehyde (4-Dimethylamino-2-hydroxybenzaldehyde)



$C_9H_{11}O_2N$ MW, 165

Prisms or leaflets. M.p. 79-80°. Sol. EtOH, Et_2O , C_6H_6 .

Geigy, D.R.P. 105,103, (*Chem. Zentr.*, 1900, I, 238).

Dimethyl-aminotolylbenzthiazole.

See Dehydrothioxylidine.

Dimethylaminoxylene.

See Dimethylxylidine.

Dimethylammonium salts.

See under Dimethylamine.

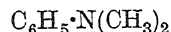
Dimethyl-*n*-amylcarbinol.

See 2-Methylheptanol-2.

Dimethyl-active-amylcarbinol.

See 2:4-Dimethylhexanol-2.

Dimethylaniline



$C_8H_{11}N$ MW, 121

F.p. 1.96°. M.p. 2.5°. B.p. 192.5-193.5°, 177.4°/500 mm., 153.4°/250 mm., 126°/100 mm., 100°/34 mm., 77°/13 mm. Sol. most ord. org. solvents. Prac. insol. H_2O . Volatile in steam. D_4^{20} 0.9557. n_D^{20} 1.55819. Heat of comb. C_p 1142.9 Cal., C_v 1141.55 Cal. $k = 2.42 \times 10^{-10}$ at 18°. $\text{HNO}_3 + \text{H}_2\text{SO}_4 \rightarrow m$ -nitro- (80%) + *o*-nitro- (20%) derivs. $\text{HNO}_2 \rightarrow p$ -nitroso-deriv. $\text{CH}_3\text{I} \rightarrow$ trimethylphenylammonium iodide. Formaldehyde \rightarrow 4:4'-tetramethyldiaminodiphenylmethane (Methane Base). $\text{COCl}_2 \rightarrow$ 4:4'-tetramethyldiaminobenzophenone (Michler's Ketone). Important intermediate for basic dyestuffs.

$B_2, \text{H}_2\text{SO}_4$: m.p. 80° (84-5°).

B, HCl : m.p. 85-95°. Hygroscopic.

$B, 2\text{HCl}$: cryst. M.p. 60-70°.

B, HBr : m.p. 83-4°.

B, HI : m.p. 111° (150°).

$B, (\text{COOH})_2$: m.p. 144°.

Picrate: m.p. 163-4°.

Ray, *J. Indian Chem. Soc.*, 1928, 5, 383.

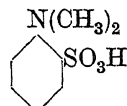
Britton, Williams, U.S.P. 1,794,057, (*Chem. Abstracts*, 1931, 25, 2157).

Voss, Blanke, *Ann.*, 1931, 485, 280.

Dimethylaniline.

See also Xylidine.

Dimethylaniline-*o*-sulphonic Acid (N-Dimethylorhanilic acid)



$C_8H_{11}O_3NS$ MW, 201

Needles from H_2O . M.p. 229-30°. Sol. H_2O , EtOH.

Amide: $C_8H_{12}O_3N_2S$. MW, 200. Plates from H_2O . M.p. 105.5-106.5°.

Houben, Schreiber, *Ber.*, 1920, 53, 2347.

Bamberger, Tschirner, *Ber.*, 1899, 32, 1893.

Dimethylaniline-*p*-sulphonic Acid (N-Dimethylsulphanilic acid).

Prisms or leaflets + H_2O . M.p. 270-1°. Sol. AcOH, hot H_2O . Spar. sol. EtOH, Et_2O . $k = 3.75 \times 10^{-4}$ at 25°.

Anilide: cryst. from EtOH. M.p. 176°.

Bamberger, Tschirner, *Ber.*, 1899, 32, 1892.

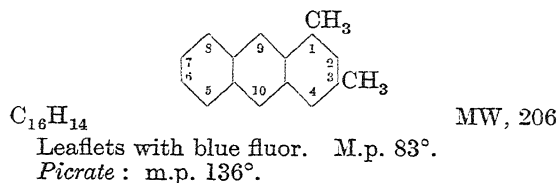
Houben, Schreiber, *Ber.*, 1920, 53, 2348.

Dimethylanisaldehyde.

See under Hydroxydimethylbenzaldehyde.

Dimethylanisic Acid.

See under 4-Hydroxy-2:5-dimethylbenzoic Acid.

Dimethylanisidine.*See under* Dimethylaminophenol.**Dimethylanisole.***See under* Xylenol.**1 : 3-Dimethylanthracene***Picrate* : m.p. 136°.Braun, Bayer, *Ber.*, 1926, 59, 918.Barnett, Hewett, *Ber.*, 1931, 64, 1581.**1 : 4-Dimethylanthracene.**

Needles from EtOH. M.p. 74°.

Picrate : m.p. 140°.Braun, Bayer, *Ber.*, 1926, 59, 919.**1 : 5-Dimethylanthracene.**

Pale pellow plates from EtOH. M.p. 139–40°.

Picrate : scarlet needles from EtOH. M.p. 166–7°.Haworth, Sheldrick, *J. Chem. Soc.*, 1934, 1952.**2 : 3-Dimethylanthracene.**Cryst. from C_6H_6 . M.p. 252°.Barnett, Marrison, *Ber.*, 1931, 64, 541.**2 : 6-Dimethylanthracene.**Cryst. from CS_2 . M.p. 250°.Morgan, Coulson, *J. Chem. Soc.*, 1929, 2212 (*Bibl.*).**2 : 7-Dimethylanthracene.**Pale yellow flakes with purple fluor. from CS_2 or AcOH. M.p. 241°. Does not form a *picrate*.Mayer, Günther, *Ber.*, 1930, 63, 1460.Morgan, Coulson, *J. Chem. Soc.*, 1929, 2210 (*Bibl.*).**2 : 9-Dimethylanthracene.**

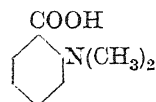
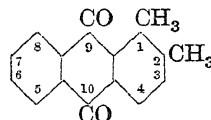
Yellow cryst. from pet. ether. M.p. 85°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1758.**3 : 9-Dimethylanthracene.**

Pale yellow cryst. from MeOH. M.p. 85°.

Barnett, Goodway, *J. Chem. Soc.*, 1929, 1759.**9 : 10-Dimethylanthracene (ms-Dimethylanthracene).**

Cryst. from EtOH. M.p. 180–1°.

Picrate : m.p. 176–7° decomp.Gibson, Johnson, *J. Chem. Soc.*, 1931, 753.Barnett, Matthews, *Ber.*, 1926, 59, 1437.**Dimethylantraflavic Acid.***See* Dihydroxydimethylantraquinone.**N-Dimethylantranilic Acid (o-Dimethylaminobenzoic acid)** $C_9H_{11}O_2N$ MW, 165Needles from hot Et_2O . M.p. 72°. Sol. H_2O , EtOH. Sublimes with part. decomp. k (acid) = 2.3×10^{-9} at 25°; k (base) = 2.8×10^{-13} at 25°.*B.HCl* : m.p. 192–3° decomp.*B.HI* : m.p. anhyd. 175°.*Me ester* : $C_{10}H_{13}O_2N$. MW, 179. B.p. 160–1°/38 mm., 130–1°/11.5 mm. $k = 6.05 \times 10^{-11}$.*Hydriodide* : m.p. 163°. *Methiodide* : prisms from H_2O . M.p. 153°.*Amide* : $C_9H_{12}ON_2$. MW, 164. Needles. M.p. 140°.Willstätter, Kahn, *Ber.*, 1904, 37, 406, 409.**1 : 2-Dimethylantraquinone** $C_{16}H_{12}O_2$ MW, 236Cryst. from Me_2CO . M.p. 156°.Barnett, Marrison, *Ber.*, 1931, 64, 537.**1 : 3-Dimethylantraquinone.**M.p. 162°. Spar. sol. EtOH, C_6H_6 .Diels, Alder, *Ber.*, 1929, 62, 2358.**1 : 4-Dimethylantraquinone.**

Yellow needles from EtOH. M.p. 140–1°. Sol. AcOH.

Heller, *Ber.*, 1910, 43, 2891.Braun, Bayer, *Ber.*, 1926, 59, 919.**1 : 5-Dimethylantraquinone.**

Pale yellow needles from AcOH. M.p. 190°.

Haworth, Sheldrick, *J. Chem. Soc.*, 1934, 1952.**2 : 3-Dimethylantraquinone.**

Cryst. from toluene. M.p. 210°. Sublimes.

I.G., D.R.P. 500,160, (*Chem. Abstracts*, 1930, 24, 4791).Barnett, Marrison, *Ber.*, 1931, 64, 537.Allen, Bell, *Organic Syntheses*, 1942, XXII, 37.**2 : 6-Dimethylantraquinone.**

Needles from AcOH. M.p. 242°. Sublimes.

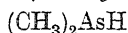
Mayer, Günther, *Ber.*, 1930, 63, 1459.Morgan, Coulson, *J. Chem. Soc.*, 1929, 2212.Seer, *Monatsh.*, 1911, 32, 154.

2 : 7-Dimethylantraquinone.

Needles from EtOH. M.p. 170°.

Morgan, Coulson, *J. Chem. Soc.*, 1929, 2210.Mayer, Günther, *Ber.*, 1930, 63, 1459.**Dimethylanthrurufin.**

See Dihydroxydimethylantraquinone.

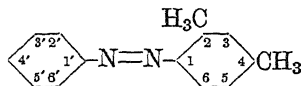
Dimethylarsine (Cacodyl hydride) $\text{C}_2\text{H}_7\text{As}$

MW, 106

B.p. 36°. Misc. with EtOH, Et_2O , CHCl_3 , C_6H_6 . D_{20}^{29} 1.213. Takes fire in air. Forms unstable salts with min. acids. Reduces AgNO_3 . Readily oxidised. $\text{S} \rightarrow$ cacodyl sulphide and disulphide.

Dehn, *Am. Chem. J.*, 1908, 40, 97.**Dimethylarsinic Acid.**

See Cacodylic Acid.

2 : 4-Dimethylazobenzene (4-Benzeneazo-xylene) $\text{C}_{14}\text{H}_{14}\text{N}_2$

MW, 210

Orange red oil. B.p. 205–15°/50 mm. D_4^{20} 1.071.

Jacobson, *Ber.*, 1895, 28, 2557.Michaelis, Petou, *Ber.*, 1898, 31, 993.**3 : 5-Dimethylazobenzene (5-Benzeneazo-m-xylene).**

Red oil. B.p. 190–200°/18–20 mm. D^{20} 1.060.

Jacobson, *Ann.*, 1922, 427, 208.**2 : 2'-Dimethylazobenzene (o-Azotoluene).**

Red prisms from Et_2O . M.p. 55°. Sol. Et_2O , C_6H_6 . Mod. sol. EtOH. Volatile in steam.

Vorländer, Meyer, *Ann.*, 1902, 320, 127.Wülfing, D.R.P. 100,234, (*Chem. Zentr.*, 1899, I, 720).Elbs, Kopp, *Chem. Zentr.*, 1898, II, 775.**2 : 3' - Dimethylazobenzene (om' - Azo - toluene).**

Red oil. Sol. Et_2O , EtOH. Spar. volatile in steam.

Michaelis, Petow, *Ber.*, 1898, 31, 993.Schultz, *Ber.*, 1884, 17, 470.**2 : 4'-Dimethylazobenzene (op' - Azotoluene).**

Orange needles from EtOH. M.p. 72°.

Michaelis, Petow, *Ber.*, 1898, 31, 989.**3 : 3'-Dimethylazobenzene (m-Azotoluene).**

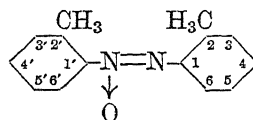
Orange red cryst. M.p. 54–5°. Sol. EtOH, Et_2O .

Michaelis, Petow, *Ber.*, 1898, 31, 992–3.Vorländer, Meyer, *Ann.*, 1902, 320, 127.Rohde, *Chem. Zentr.*, 1899, I, 422.**3 : 4' - Dimethylazobenzene (mp' - Azo - toluene).**

Reddish brown cryst. from EtOH.Aq. M.p. 56–8°. Sol. EtOH, Et_2O , C_6H_6 .

Jacobson, *Ber.*, 1895, 28, 2557.Zincke, Lawson, *Ber.*, 1886, 19, 1459.**4 : 4'-Dimethylazobenzene (p-Azotoluene).**

Orange yellow needles from ligroin. M.p. 144°. Sol. Et_2O , pet. ether. Spar. sol. EtOH.

Schultz, *Ber.*, 1884, 17, 472.Vorländer, Meyer, *Ann.*, 1902, 320, 128.Michaelis, Petow, *Ber.*, 1898, 31, 991.**2 : 2'-Dimethylazoxybenzene (o-Azoxy-toluene)** $\text{C}_{14}\text{H}_{14}\text{ON}_2$

MW, 226

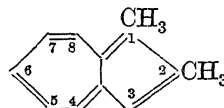
Yellow cryst. from EtOH. M.p. 60° (58–5°). $D_4^{65.3}$ 1.0215. $n_D^{65.3}$ 1.61804.

Varma, Rao, *J. Indian Chem. Soc.*, 1929, 6, 917.Zechmeister, Rom, *Ann.*, 1929, 468, 117.**3 : 3'-Dimethylazoxybenzene (m-Azoxy-toluene).**

Yellow needles. M.p. 39°. Sol. EtOH, Et_2O , C_6H_6 . $D_4^{65.2}$ 1.0123. $n_D^{65.2}$ 1.61519.

Zechmeister, Rom, *Ann.*, 1929, 468, 117.**4 : 4'-Dimethylazoxybenzene (p-Azoxy-toluene).**

Yellow needles. M.p. 70°. Sol. EtOH, Et_2O , ligroin. $\text{NaHg} \rightarrow$ p-hydrazotoluene. $\text{Sn} + \text{HCl} \rightarrow$ p-toluidine.

Zechmeister, Rom, *Ann.*, 1929, 468, 117.**1 : 2-Dimethylazulene** $\text{C}_{12}\text{H}_{12}$

MW, 156

Blue leaflets from EtOH. M.p. 58–9°.

Picrate: black needles from EtOH. M.p. 129–30°.

sym.-Trinitrobenzene add. comp.: brownish black needles from EtOH. M.p. 166–7°.

Plattner, Wyss, *Helv. Chim. Acta*, 1941, 24, 483.**1 : 3-Dimethylazulene.**

Blue cryst. M.p. 54°

Picrate: m.p. 164–6°.

sym.-Trinitrobenzene add. comp.: m.p. 164–6°.

Plattner, Fürst, Jirasek, *Helv. Chim. Acta*, 1947, 30, 1320.

1 : 4-Dimethylazulene.

Blue oil.

Picrate: black needles from EtOH. M.p. 142-3°.sym.-*Trinitrobenzene add. comp.*: black needles from EtOH. M.p. 177-8°.Plattner, Lemay, *Helv. Chim. Acta*, 1940, 23, 906.Plattner, Wyss, *ibid.*, 907.Plattner, Magyar, *Helv. Chim. Acta*, 1942, 25, 581.**2 : 6-Dimethylazulene.**

Violet cryst. M.p. 97°.

sym.-*Trinitrobenzene add. comp.*: m.p. 167°.Šorm, Tomášek, Vrba, *Collection of Czechoslovak Chemical Communications*, 1949, 14, 343.**4 : 6-Dimethylazulene.**

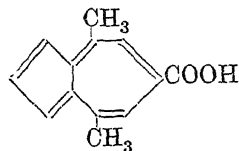
Violet oil.

sym.-*Trinitrobenzene add. comp.*: m.p. 143°.Šorm, Šormova, Šedivy, *Collection of Czechoslovak Chemical Communications*, 1947, 12, 554.**4 : 7-Dimethylazulene.**

Violet-blue oil.

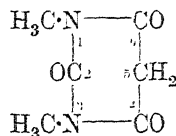
sym.-*Trinitrobenzene add. comp.*: m.p. 161-2°.Pommer, *Naturwiss.*, 1952, 39, 44.**4 : 8-Dimethylazulene.**

Blue leaflets from EtOH. M.p. 69-70°.

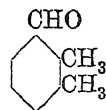
Picrate: black needles from EtOH. M.p. 157-8°.sym.-*Trinitrobenzene add. comp.*: reddish brown needles from EtOH. M.p. 179-80°.Plattner, Wyss, *Helv. Chim. Acta*, 1941, 24, 483.Plattner, Roniger, *Helv. Chim. Acta*, 1942, 25, 1077.**4 : 8-Dimethylazulene-6-carboxylic Acid** $C_{13}H_{12}O_2$

MW, 200

Cryst. M.p. 265°.

Me ester: $C_{14}H_{14}O_2$. MW, 214. Green plates. M.p. 66-5°.*Et ester*: $C_{15}H_{16}O_2$. MW, 228. Blue plates. M.p. 60-60.5°. sym.-*Trinitrobenzene add. comp.*: m.p. 92°. *Picrate*: m.p. 82-3°.sym.-*Trinitrobenzene add. comp.*: $2C_{13}H_{12}O_2$, $C_6H_5O_6N_3$. M.p. 215° decomp.Plattner, Roniger, *Helv. Chim. Acta*, 1942, 25, 590.**1 : 3-Dimethylbarbituric Acid (Malonyldimethylurea)** $C_6H_8O_5N_2$

MW, 156

Needles. M.p. 123°. Sol. H_2O , EtOH. Sublimes.Techow, *Ber.*, 1894, 27, 3084.Biltz, Hamburger, *Ber.*, 1916, 49, 650.Biltz, Wittek, *Ber.*, 1921, 54, 1037.**5 : 5-Dimethylbarbituric Acid (Dimethylmalonylurea).**Leaflets. M.p. 279° (265°). Sol. hot H_2O , EtOH. Sublimes.Fischer, Diltthey, *Ann.*, 1904, 335, 342, 364.Merck, D.R.P. 146,496, (*Chem. Zentr.*, 1903, II, 1483).**2 : 3-Dimethylbenzaldehyde** $C_9H_{10}O$

MW, 134

Oxidises very readily in air.

Oxime: m.p. 80-2°.*Semicarbazone*: leaflets. M.p. 222° (vac.).Brunner, Hofer, Stein, *Monatsh.*, 1933, 63, 93.**2 : 4-Dimethylbenzaldehyde.**M.p. -9°. B.p. 215-16°, 99°/10 mm. Dil. $HNO_3 \rightarrow$ 2 : 4-dimethylbenzoic acid.syn-*Oxime*: small needles from EtOH. M.p. 126°.anti-*Oxime*: prisms from ligroin. M.p. 84-5° (88°).*Semicarbazone*: m.p. 225-7°.*Phenylhydrazones*: leaflets from AcOH.Aq. M.p. 88°.Gattermann, *Ann.*, 1906, 347, 372.I.G., D.R.P. 482,837, (*Chem. Abstracts*, 1930, 24, 626).Hinkel, Ayling, Morgan, *J. Chem. Soc.*, 1932, 2797.**2 : 5-Dimethylbenzaldehyde.**

B.p. 220°/738 mm., 100°/10 mm. Oxidises rapidly on exposure to air. Forms bisulphite comp.

syn-*Oxime*: needles. M.p. 139° (135°).anti-*Oxime*: needles from EtOH.Aq. M.p. 64-5° (62-3°).*Semicarbazone*: needles. M.p. 217°.p-*Nitrophenylhydrazone*: red cryst. M.p. 182°.Gattermann, *Ann.*, 1912, 393, 219.Hinkel, Ayling, Morgan, *J. Chem. Soc.*, 1932, 2797.

2 : 6-Dimethylbenzaldehyde.

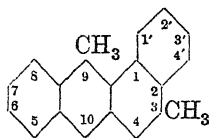
M.p. 11°. B.p. 226–8°/741.5 mm.

Semicarbazone: needles from C₆H₆. M.p. 158°.Lock, Schmidt, *J. prakt. Chem.*, 1934, 140, 229.**3 : 4-Dimethylbenzaldehyde.**

B.p. 225–6°.

Oxime: needles from ligroin. M.p. 69° (106°).*Semicarbazone*: needles. M.p. 224° (slow heat.), 227–8° (rapid heat.).*Phenylhydrazone*: cryst. from EtOH. M.p. 96° (90.5°).Gattermann, *Ann.*, 1906, 347, 368.Hinkel, Ayling, Morgan, *J. Chem. Soc.*, 1932, 2797.**3 : 5-Dimethylbenzaldehyde** (*Mesitylenic aldehyde*).

M.p. 9°. B.p. 220–2°. Ox. → 3 : 5-dimethylbenzoic acid. Oxidises rapidly in air.

Semicarbazone: m.p. 201–2°.Weiler, *Ber.*, 1900, 33, 469.Law, Perkin, *Trans. Faraday Soc.*, 1904, 1, 1.Konowaloff, *Chem. Zentr.*, 1899, I, 1074.**3 : 9-Dimethyl-1 : 2-benzanthracene**C₂₀H₁₆

MW, 256

Yellow plates from MeOH. M.p. 93°.

H₂SO₄ → crimson sol.*Picrate*: crimson needles from EtOH. M.p. 137–8°.sym.-*Trinitrobenzene add. comp.*: crimson needles from C₆H₆-ligroin. M.p. 145°.Fieser, Seligman, *J. Am. Chem. Soc.*, 1939, 61, 141.**4 : 9-Dimethyl-1 : 2-benzanthracene.**

Needles from MeOH. M.p. 75°.

Picrate: bronze needles from MeOH. M.p. 116°.sym.-*Trinitrobenzene add. comp.*: red needles from MeOH. M.p. 124–5°.Fieser, Jones, *J. Am. Chem. Soc.*, 1938, 60, 1943.**4 : 10-Dimethyl-1 : 2-benzanthracene.**

Pale yellow needles from MeOH. M.p. 114°.

Picrate: black needles. M.p. 162°.Fieser, Jones, *J. Am. Chem. Soc.*, 1938, 60, 1943.**5 : 6-Dimethyl-1 : 2-benzanthracene.**

Plates from EtOH. M.p. 187–8°.

Picrate: red needles from C₆H₆. M.p. 191–3°.Cook, Haslewood, *J. Chem. Soc.*, 1934, 432.**5 : 7-Dimethyl-1 : 2-benzanthracene.**

Thin tabular prisms from EtOH. M.p. 124.5–125°.

Picrate: cryst. from EtOH. M.p. 186–5–187.5°.Bachmann, Chemerda, *J. Org. Chem.*, 1941, 6, 36.Rapson, Shuttleworth, *J. Chem. Soc.*, 1940, 636.**5 : 8-Dimethyl-1 : 2-benzanthracene.**Needles from C₆H₆-EtOH. M.p. 131° (remelts at 134°).*Picrate*: red needles from EtOH. M.p. 175°.Fieser, Johnson, *J. Am. Chem. Soc.*, 1939, 61, 1652.Bachmann, Chemerda, *J. Org. Chem.*, 1941, 6, 36.**5 : 9-Dimethyl-1 : 2-benzanthracene.**Plates from C₆H₆-EtOH. M.p. 135°. Blue fluor. in UV. Carcinogenic.Newman, *J. Am. Chem. Soc.*, 1937, 59, 1005.**5 : 10-Dimethyl-1 : 2-benzanthracene.**Plates from C₆H₆-EtOH. M.p. 147°. Blue fluor. in UV. Carcinogenic.*Picrate*: reddish-black needles from C₆H₆. M.p. 174°.Fieser, Newman, *J. Am. Chem. Soc.*, 1936, 58, 2381.**6 : 7-Dimethyl-1 : 2-benzanthracene.**

Cryst. from AcOEt. M.p. 174°.

Picrate: m.p. 170°.Cook, *J. Chem. Soc.*, 1932, 471.**6 : 8-Dimethyl-1 : 2-benzanthracene.**I.G., B.P. 253,911, (*Chem. Abstracts*, 1927, 21, 2478).**8 : 10-Dimethyl-1 : 2-benzanthracene.**Needles from C₆H₆-EtOH. M.p. 146°.*Picrate*: red needles from EtOH or C₆H₆-ligroin. M.p. 166°.Fieser, Johnson, *J. Am. Chem. Soc.*, 1939, 61, 1653.**9 : 10-Dimethyl-1 : 2-benzanthracene.**Leaflets from Me₂CO-EtOH. M.p. 122–3°. Sol. C₆H₆. Mod. sol. Me₂CO. Bluish violet fluor. in UV. Highly carcinogenic.*Picrate*: black needles from EtOH. M.p. 112–3°.*Dipicrate*: red needles from EtOH. M.p. 102–6°.Bachmann, Chemerda, *J. Am. Chem. Soc.*, 1938, 60, 1024.Newman, *ibid.*, 1938, 1141.Sandin, Fieser, *J. Am. Chem. Soc.*, 1940, 62, 3103.

1' : 5-Dimethyl-1 : 2-benzanthracene.

Sol. benzene. Irregular plates from EtOH-Me₂CO, diamond-shaped plates from EtOH. M.p. 106-7°.

Picrate: maroon needles from abs. EtOH. M.p. 150-50.5°.

Bachmann, Safir, *J. Am. Chem. Soc.*, 1941, 63, 855.

1' : 10-Dimethyl-1 : 2-benzanthracene.

Leaflets from EtOH. M.p. 122-3° (remelts at 124-5°). H₂SO₄ → red sol.

Picrate: crimson needles from EtOH. M.p. 147-8°.

Fieser, Seligman, *J. Am. Chem. Soc.*, 1938, 60, 175.

2' : 6-Dimethyl-1 : 2-benzanthracene.

Cryst. from AcOH. M.p. 164°.

Picrate: m.p. 199-200°.

Cook, *J. Chem. Soc.*, 1932, 471.

2' : 7-Dimethyl-1 : 2-benzanthracene.

Cryst. from xylene. M.p. 236°.

Cook, *J. Chem. Soc.*, 1932, 471.

3' : 6-Dimethyl-1 : 2-benzanthracene.

Cryst. from AcOEt. M.p. 186-7°.

Cook, *J. Chem. Soc.*, 1932, 471.

3' : 7-Dimethyl-1 : 2-benzanthracene.

Cryst. from AcOEt. M.p. 189-90°.

Cook, *J. Chem. Soc.*, 1932, 471.

Dimethylbenzene-dicarboxylic Acid.

See Dimethylphthalic Acid, Dimethylisophthalic Acid and Dimethylterephthalic Acid.

Dimethylbenzhydrol.

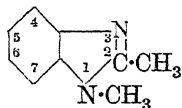
See Ditolylcarbinol.

Dimethylbenzil.

See Tolil.

Dimethylbenzilic Acid.

See Tolilic Acid.

1 : 2-Dimethylbenziminazole

C₉H₁₀N₂

MW, 146

Prisms from C₆H₆ or EtOH, m.p. 112°. Cryst. + 3H₂O from H₂O, m.p. 65°. B.p. 290°.

Methiodide: m.p. 254°.

Picrate: m.p. 238°.

Phillips, *J. Chem. Soc.*, 1929, 2825.

Fischer, *Ber.*, 1892, 25, 2838.

1 : 5-Dimethylbenziminazole (N-Methyl-p-toliminazole).

Needles. M.p. 95°. B.p. 301°/780 mm. Sol. EtOH, Et₂O, C₆H₆.

B, HCl, H₂O : m.p. anhyd. 214-15°.

Tartrate: needles. M.p. 187-8°.

Picrate: yellow leaflets from amyl alcohol. M.p. 254.5°.

Pinnow, Sämann, *Ber.*, 1899, 32, 2186.

Fischer, *Ber.*, 1893, 26, 195.

1 : 6-Dimethylbenziminazole (N-Methyl-m-toliminazole).

Yellow oil. B.p. 280°. Sol. EtOH, Et₂O, C₆H₆.

Fischer, Wreszinski, *Ber.*, 1892, 25, 2711.

2 : 6-Dimethylbenziminazole.

Cryst. from H₂O. M.p. 203°. B.p. 350°. Sol. EtOH, Et₂O. Mod. sol. hot H₂O.

Fischer, Rigaud, *Ber.*, 1902, 35, 1259.

Maron, Salzberg, *Ber.*, 1911, 44, 3002.

5 : 6-Dimethylbenziminazole.

Degradation product of Vitamin B₁₂. Cryst. from Et₂O. M.p. 205-6°.

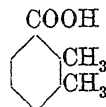
Picrate: cryst. from EtOH. M.p. 272-3° decomp.

Brink, Folkers, *J. Am. Chem. Soc.*, 1950, 72, 4442.

5 : 7-Dimethylbenziminazole (4 : 6-Dimethylbenziminazole).

Leaflets. M.p. 175°. Sol. EtOH, Et₂O.

Fischer, Rigaud, *Ber.*, 1901, 34, 4205.

2 : 3-Dimethylbenzoic Acid (vicinal o-Xylylic acid, hemellitic acid)

C₉H₁₀O₂

MW, 150

Prisms. M.p. 144°. Sol. hot EtOH. Prac. insol. H₂O. Volatile in steam. Alk. KMnO₄ → hemimellitic acid.

Chloride: C₉H₉OCl. MW, 168.5. B.p. 128°/22 mm.

Amide: C₉H₁₁ON. MW, 149. Needles. M.p. 155-6°.

Jacobsen, *Ber.*, 1886, 19, 2518.

Brunner, Hofer, Stein, *Monatsh.*, 1933, 63, 93.

2 : 4-Dimethylbenzoic Acid (unsym.-m-Xylylic acid).

Needles. M.p. 126-7°. B.p. 267°/727 mm. Sol. C₆H₆, Me₂CO, CHCl₃, toluene, hot EtOH. Spar. sol. hot H₂O. Sublimes. Ox. → methylterephthalic acid.

Me ester: C₁₀H₁₂O₂. MW, 164. B.p. 232-3°. *Chloride*: needles. M.p. 25.5°. B.p. 234-6°, 113-15°/15 mm.

Amide: needles. M.p. 179-81°. Sol. EtOH.

Nitrile: 4-cyano-m-xylene. C₉H₉N. MW,

131. M.p. 23-5°. B.p. 223°. Na + EtOH
→ 2 : 4-dimethylbenzylamine.

Anilide : needles from EtOH. M.p. 141°.

Perkin, Stone, *J. Chem. Soc.*, 1925, 2283.

Gattermann, Schmidt, *Ann.*, 1888, 244, 53.

2 : 5-Dimethylbenzoic Acid (*p-Xylylic acid*, *isoxylylic acid*).

Needles from EtOH. M.p. 132°. B.p. 268°. Sol. EtOH, Me₂CO, C₆H₆. Prac. insol. H₂O. Sublimes. Volatile in steam. Ox. → 4-methylisophthalic acid.

Amide : needles. M.p. 186°. Sol. EtOH.

Nitrile : 2-cyano-*p*-xylene. M.p. 13-14°. B.p. 223-6°/730 mm. Volatile in steam.

Anilide : m.p. 140°.

Schmid, Decker, *Ber.*, 1906, 39, 938.

Gattermann, *Ber.*, 1899, 32, 1118.

Gattermann, Schmidt, *Ann.*, 1888, 244, 53.

2 : 6-Dimethylbenzoic Acid (vicinal *m-Xylylic acid*).

Needles. M.p. 116°. Sol. Et₂O.

Chloride : b.p. 217°.

Amide : m.p. 139°.

Nitrile : 2-cyano-*m*-xylene. Prisms. M.p. 90-1°. Sol. EtOH, Et₂O.

Berger, Olivier, *Rec. trav. chim.*, 1927, 46, 600.

Hufferd, Noyes, *J. Am. Chem. Soc.*, 1921, 43, 929.

Noyes, *Am. Chem. J.*, 1898, 20, 790.

3 : 4-Dimethylbenzoic Acid (unsym. - *o-Xylylic acid*, *paraxylylic acid*).

Prisms. M.p. 166°. Sol. EtOH, C₆H₆. Spar. sol. hot H₂O. Sublimes. Ox. → methylterephthalic acid.

Amide : needles. M.p. 131°.

Nitrile : 4-cyano-*o*-xylene. M.p. 66°. B.p. 231-2°. Sol. EtOH, Et₂O. Volatile in steam.

Anilide : needles from EtOH. M.p. 104°.

Gattermann, Schmidt, *Ann.*, 1888, 244, 52.

Gattermann, *Ber.*, 1899, 32, 1118.

Frey, Horowitz, *J. prakt. Chem.*, 1891, 43, 122.

3 : 5-Dimethylbenzoic Acid (sym. - *m-Xylylic acid*, *mesitylenic acid*).

Cryst. from EtOH or H₂O. M.p. 170°. Sol. EtOH. Spar. sol. hot H₂O. Sublimes. Volatile in steam. $k = 4.8 \times 10^{-5}$ at 25°. Heat of comb. C_p 1085.2 Cal.

Et ester : C₁₁H₁₄O₂. MW, 178. B.p. 241°.

Chloride : b.p. 109.5°/10 mm.

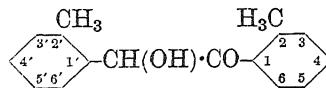
Amide : needles. M.p. 133°. Sol. EtOH, Et₂O.

Fischer, Windaus, *Ber.*, 1900, 33, 1973.

Geuther, Frölich, *Ann.*, 1880, 202, 310.

Fittig, *Ann.*, 1867, 141, 144.

2 : 2'-Dimethylbenzoin (*o-Toluoïn*)



C₁₆H₁₆O₂

MW, 240

Needles from EtOH.Aq. M.p. 79°. Sol. ord. org. solvents. Mod. sol. Et₂O.

Ekecrantz, Ahlqvist, *Chem. Zentr.*, 1908, II, 1689.

4 : 4'-Dimethylbenzoin (*p-Toluoïn*).

Yellow prisms from EtOH. M.p. 88-9°. Decomp. on dist. Sol. ord. org. solvents. Spar. sol. hot H₂O.

Acetyl : m.p. 100°.

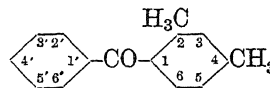
Benzoyl : m.p. 119°.

Hydrazone : m.p. 147-8°.

Gattermann, *Ann.*, 1906, 347, 364.

Ekecrantz, Ahlqvist, *Chem. Zentr.*, 1908, II, 1689.

2 : 4-Dimethylbenzophenone (*4-Benzoyl-m-xylene*)



C₁₅H₁₄O

MW, 210

B.p. 321-2° (360°), 186-90°/15 mm. Sol. EtOH, Et₂O, CHCl₃. Mod. sol. C₆H₆. D₄²⁰ 1.071. *syn-Oxime* : (*syn*-phenyl configuration). Prisms or leaflets. M.p. 126°. *Acetyl* : m.p. 91°.

anti-Oxime : (*anti*-phenyl configuration). Prisms from EtOH. M.p. 152°. *Acetyl* : m.p. 103°.

Meissel, *Ber.*, 1899, 32, 2421.

Elbs, *J. prakt. Chem.*, 1887, 35, 469.

Grignard, Bellet, Courtot, *Ann. chim.*, 1919, 12, 382.

2 : 5-Dimethylbenzophenone (*2-Benzoyl-p-xylene*).

Rhombic prisms from EtOH. M.p. 36°. B.p. 317°/744 mm. Sol. EtOH, Et₂O, CHCl₃, CS₂. Mod. sol. pet. ether, C₆H₆.

Oxime : m.p. 135-5.5°.

Elbs, Larsen, *Ber.*, 1884, 17, 2847.

Elbs, *J. prakt. Chem.*, 1887, 35, 473.

Comstock, *Am. Chem. J.*, 1896, 18, 552.

3 : 4-Dimethylbenzophenone (*4-Benzoyl-o-xylene*).

Needles. M.p. 47-8°. B.p. 340°/744 mm. Sol. EtOH, Et₂O, CHCl₃, CS₂, C₆H₆.

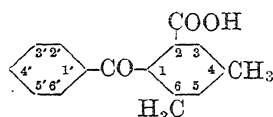
Elbs, *J. prakt. Chem.*, 1887, 35, 467.

2 : 2', 2 : 4', 3 : 4', 4 : 4'-Dimethylbenzophenone.

See Ditolyl Ketone.

4 : 6-Dimethylbenzophenone-2-carboxylic Acid 285

4 : 6-Dimethylbenzophenone-2-carboxylic Acid (2-Benzoyl-3 : 5-dimethylbenzoic acid)



$C_{16}H_{14}O_3$ MW, 254

Needles from C_6H_6 . M.p. 185° . Sol. Et_2O , Me_2CO , C_6H_6 , $CHCl_3$. Spar. sol. hot H_2O . $P_2O_5 \rightarrow$ 1 : 3-dimethylantraquinone.

Louise, *Ann. chim. phys.*, 1885, 6, 219.

2' : 4'-Dimethylbenzophenone-2-carboxylic Acid (2' : 4'-Dimethyl-o-benzoylbenzoic acid).

Needles. Sol. $EtOH$, $AcOH$. Spar. sol. hot H_2O . Insol. cold H_2O . Zn dust \rightarrow 1 : 3-dimethylantracene.

Amide : $C_{16}H_{15}O_2N$. MW, 253. Plates from toluene. M.p. $152-3^\circ$.

Meyer, *Ber.*, 1882, 15, 637.

3' : 4'-Dimethylbenzophenone-2-carboxylic Acid (3' : 4'-Dimethyl-o-benzoylbenzoic acid).

Prisms + $1H_2O$ from H_2O . M.p. anhyd. 167° ($161-2^\circ$). Mod. sol. H_2O . H_2SO_4 at $128^\circ \rightarrow$ 2 : 3-dimethylantracene.

Chloride : $C_{16}H_{13}O_2Cl$. MW, 272.5. Leaflets from Et_2O or C_6H_6 . M.p. $113-4^\circ$. Decomp. by H_2O .

Copisarow, Weizmann, *J. Chem. Soc.*, 1915, 107, 882.

2 : 6-Dimethylbenzophenone-4-carboxylic Acid (4-Benzoyl-3 : 5-dimethylbenzoic acid).

Cryst. from $EtOH$. M.p. 160° . Sol. Et_2O , Me_2CO , $CHCl_3$. Spar. sol. hot H_2O .

Louise, *Ann. chim. phys.*, 1885, 6, 223.

Dimethylbenzoquinone.

See Xyloquinone.

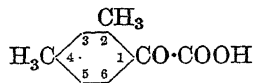
1 : 1-Dimethylbenzoylacetic Acid.

See 1-Benzoylisobutyric Acid.

Dimethylbenzoylbenzoic Acid.

See Dimethylbenzophenone-carboxylic Acid.

2 : 4-Dimethylbenzoylformic Acid (2 : 4-Dimethylphenylglyoxylic acid)



$C_{10}H_{10}O_3$ MW, 178

M.p. anhyd. 75° (85°). Decomp. at 200° . Sol. $EtOH$, Et_2O , C_6H_6 .

Et ester : $C_{12}H_{14}O_3$. MW, 206. M.p. 50° .

Nitrile : $C_{10}H_9ON$. MW, 159. Needles. M.p. 47° .

Bouveault, *Bull. soc. chim.*, 1897, 17, 363.

Claus, *J. prakt. Chem.*, 1891, 43, 141.

Söderbaum, *Ber.*, 1892, 25, 3464.

3 : 5-Dimethylbenzyl Alcohol

2 : 5-Dimethylbenzoylformic Acid (2 : 5-Dimethylphenylglyoxylic acid).

M.p. 75° . Decomp. above 200° . Sol. $EtOH$, Et_2O , C_6H_6 . Spar. sol. H_2O .

Et ester : b.p. $156^\circ/10$ mm.

Bouveault, *Bull. soc. chim.*, 1897, 17, 363.

Claus, *J. prakt. Chem.*, 1891, 43, 141.

Söderbaum, *Ber.*, 1892, 25, 3464.

3 : 4-Dimethylbenzoylformic Acid (3 : 4-Dimethylphenylglyoxylic acid).

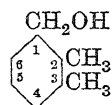
M.p. 92° . Sol. $EtOH$, Et_2O . Spar. sol. H_2O .

Buchka, *Irish, Ber.*, 1887, 20, 1766.

ω -Dimethylbenzyl Alcohol.

See Dimethylphenylcarbinol.

2 : 3-Dimethylbenzyl Alcohol



$C_9H_{12}O$ MW, 136

Needles from pentane. M.p. $65-66.5^\circ$. B.p. $126-33^\circ/23$ mm. Spar. sol. H_2O . Alk. $KMnO_4 \rightarrow$ 2 : 3-dimethylbenzoic acid.

Reichstein, Cohen, Ruth, Meldahl, *Helv. Chim. Acta*, 1936, 19, 415.

Smith, Spillane, *J. Am. Chem. Soc.*, 1940, 62, 2640.

2 : 4-Dimethylbenzyl Alcohol.

M.p. 22° . B.p. 232° , $151-2^\circ/44$ mm.

Et ether : $C_{11}H_{16}O$. MW, 164. B.p. $98-100^\circ/10$ mm.

Acetyl : b.p. $230-4^\circ$, $157^\circ/50$ mm.

Phenylurethane : m.p. $78-9^\circ$.

Hinrichsen, *Ber.*, 1888, 21, 3085.

Sommelet, *Compt. rend.*, 1913, 157, 1445.

Späth, *Monatsh.*, 1914, 35, 330.

2 : 5-Dimethylbenzyl Alcohol.

B.p. $232-4^\circ$, $142-3^\circ/37$ mm.

Acetyl : b.p. $242-3^\circ$, $138-41^\circ/28$ mm.

Benzoyl : b.p. $160-1^\circ/1$ mm. D_4^{25} 1.087. n_D^{20} 1.5618.

Phenylurethane : m.p. 86° .

Francesconi, Mundici, *Gazz. chim. ital.*, 1902, 32, 486.

Sommelet, *Compt. rend.*, 1913, 157, 1445.

Rueggeberg, Ginsburg, Frantz, *J. Am. Chem. Soc.*, 1945, 67, 2154.

3 : 4-Dimethylbenzyl Alcohol.

Needles. M.p. 63° .

Acetyl : b.p. $146-8^\circ/28$ mm.

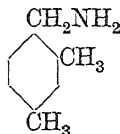
Sommelet, *Compt. rend.*, 1913, 157, 1445.

3 : 5-Dimethylbenzyl Alcohol ("Mesityl alcohol").

B.p. $218-21^\circ$.

Acetyl: b.p. 228–31°/745 mm. D_{16}^{25} 1.0903.
 Wispek, *Ber.*, 1883, 16, 1577.
 Law, *J. Chem. Soc.*, 1907, 91, 758.

2 : 4-Dimethylbenzylamine (ω -Amino-1 : 2 : 4-trimethylbenzene, 1- ω -amino- ψ -cumene)



$C_9H_{13}N$ MW, 135
 B.p. 218–19°. Sol. EtOH, Et₂O. Spar. sol. H₂O.
B, HCl: m.p. 212°.
B, HCl, HgCl₂: needles from H₂O. M.p. 205°.
B, HNO₃: m.p. 157–8°.
B₂, H₂PtCl₆: m.p. 226–7° decomp.
Picrate: m.p. 223° decomp.

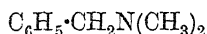
Hinrichsen, *Ber.*, 1888, 21, 3083.
 Curtius, Haager, *J. prakt. Chem.*, 1900, 62, 113.
 Herzberg, Lange, U.S.P. 1,873,402, (*Chem. Abstracts*, 1932, 26, 5965).

3 : 5-Dimethylbenzylamine (ω -Amino-1 : 3 : 5-trimethylbenzene, ω -aminomesitylene, ω -mesitylamine).

B.p. 221°. D_0^{20} 0.950. $n_D^{20.5}$ 1.53046. Combines energetically with CO₂.
B, HCl: m.p. 245°.
B₂, H₂PtCl₆: m.p. 204°.
Picrate: m.p. 225° decomp.

Konowalow, *Ber.*, 1895, 28, 1863.
 Landau, *Ber.*, 1892, 25, 3013.

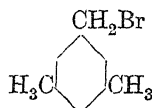
N-Dimethylbenzylamine



$C_9H_{13}N$ MW, 135
 B.p. 181° (183–4°), 66–7°/15 mm. Misc. with EtOH, Et₂O. Spar. sol. H₂O. Volatile in steam. $k = 1.05 \times 10^{-5}$ at 25°.
B₂, H₂PtCl₆: m.p. 192°.
Picrate: m.p. 93°.
Picrolonate: m.p. 151°.

Skita, Keil, *Ber.*, 1930, 63, 34.
 Sommelet, Guioth, *Compt. rend.*, 1922, 174, 687.
 Emde, *Ber.*, 1909, 42, 2591.
 King, McMillan, *J. Am. Chem. Soc.*, 1946, 68, 1468.

3 : 5-Dimethylbenzyl bromide (ω -Bromomesitylene)

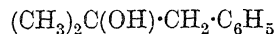


$C_9H_{11}Br$ MW, 199

Needles from Et₂O. M.p. 40°. B.p. 229–31°/740 mm., slight decomp., 118°/22 mm. Very sol. EtOH, Et₂O, CHCl₃.

Carré, *Bull. soc. chim.*, 1910, 7, 842.
 Weiler, *Ber.*, 1900, 33, 339 (Note).
 Kadesch, *J. Am. Chem. Soc.*, 1944, 66, 1207.

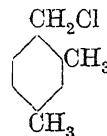
Dimethylbenzylcarbinol (*Phenyl-tert.-butyl alcohol*, β -hydroxyisobutylbenzene)



$C_{10}H_{14}O$ MW, 150
 Needles. M.p. 24°. B.p. 214–16°, 104–5°/17 mm. D_4^{16} 0.9790. n_D^{16} 1.5173.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1921, 29, 814.
 Auwers, Eisenlohr, *J. prakt. Chem.*, 1910, 82, 92.

2 : 4-Dimethylbenzyl chloride (1- ω -Chloro- ψ -cumene)



$C_9H_{11}Cl$ MW, 154.5
 B.p. 110°/20 mm. (103–4°/19 mm.), 116–8°/16 mm., 100–5°/14 mm.

Curtius, *J. prakt. Chem.*, 1912, 85, 143.
 Sommelet, *Compt. rend.*, 1913, 157, 1445.
 Bogert, Stamatoff, *Rec. trav. chim.*, 1933, 52, 584.
 Braun, Nelles, *Ber.*, 1934, 67, 1097.
 Hoch, *Compt. rend.*, 1931, 192, 1464.

2 : 5-Dimethylbenzyl chloride (2- ω -Chloro- ψ -cumene).

B.p. 120–1°/28 mm., 100–3°/12 mm., 85–6°/7 mm.

Sommelet, *Compt. rend.*, 1913, 157, 1445.
 Bardhan, Sengupta, *J. Chem. Soc.*, 1932, 2525.
 Braun, Nelles, *Ber.*, 1934, 67, 1096.

3 : 4-Dimethylbenzyl chloride (4- ω -Chloro- ψ -cumene).

B.p. 116–17°/24 mm.

Sommelet, *Compt. rend.*, 1913, 157, 1445.
 Braun, Nelles, *Ber.*, 1934, 67, 1098.

3 : 5-Dimethylbenzyl chloride (ω -Chloromesitylene).

B.p. 215–220°.

Robinet, *Ber.*, 1883, 16, 965.

1 : 1-Dimethyl-1 : 3-butadiene.

See 4-Methyl-1 : 3-pentadiene.

1 : 2-Dimethyl-1 : 3-butadiene.

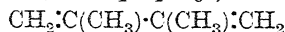
See 3-Methyl-1 : 3-pentadiene.

1 : 3-Dimethyl-1 : 3-butadiene.

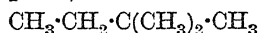
See 2-Methyl-1 : 3-pentadiene.

1 : 4-Dimethyl-1 : 3-butadiene.

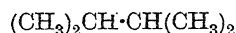
See Dipropenyl.

2 : 3-Dimethyl-1 : 3-butadiene (2 : 3-Dimethylerythrene, di-isopropenyl) C_6H_{10}

MW, 82

B.p. 69–70°. D_4^{20} 0.7264. n_D^{20} 1.437717. Polymerises on heating or on long standing in sunlight.Farmer, Warren, *J. Chem. Soc.*, 1931, 3233.Calvert, *Chem. Abstracts*, 1926, 20, 3685.Maximoff, U.S.P. 1,748,722, (*Chem. Abstracts*, 1930, 24, 1869).McCallum, Whitby, *Chem. Abstracts*, 1928, 22, 2079.Kogerman, *Chem. Abstracts*, 1935, 29, 3297.Allen, Bell, *Organic Syntheses*, 1942, XXII, 39.Newton, Coburn, *ibid.*, 40.**2 : 2-Dimethylbutane** (2-Ethylisobutane, tert.-butylethane, 1 : 1 : 1 : 2-tetramethylethane, neoheptane, triptane) C_6H_{14}

MW, 86

B.p. 49.4–49.5°/753 mm. D_4^{20} 0.6485. n_D^{20} 1.3688.Schmerling, Friedman, Ipatieff, *J. Am. Chem. Soc.*, 1940, 62, 2446.**2 : 3-Dimethylbutane** (sym.-Tetramethylethane, di-isopropyl) C_6H_{14}

MW, 86

B.p. 58°. D_4^{20} 0.66166, D_4^{20} 0.6612. n_D^{20} 1.3750. Heat of comb. C_p 999.2 Cal. $\text{CrO}_3 \rightarrow$ acetic acid + CO_2 .Kishner, Chonin, *Chem. Zentr.*, 1914, I, 1496.van Risseghem, *Bull. soc. chim. Belg.*, 1921, 30, 8.Cramer, Mulligan, *J. Am. Chem. Soc.*, 1936, 58, 373.**2 : 2-Dimethylbutane-1 : 1-dicarboxylic Acid.**

See tert.-Amylmalonic Acid.

2 : 2-Dimethylbutane-1 : 3-dicarboxylic Acid.

See 1 : 2 : 2-Trimethylglutaric Acid.

2 : 3-Dimethylbutane-1 : 3-dicarboxylic Acid.

See 1 : 1 : 2-Trimethylglutaric Acid.

Dimethylbutane-1 : 4-dicarboxylic Acid.

See Dimethyladipic Acid.

2 : 3-Dimethylbutane-2 : 3-dicarboxylic Acid.

See Tetramethylsuccinic Acid.

2 : 3-Dimethylbutane-1 : 3 : 3-tricarboxylic Acid.

See Isocamphoronic Acid.

2 : 3-Dimethylbutane-2 : 3 : 4-tricarboxylic Acid.

See Camphoronic Acid.

2 : 2-Dimethylbutanol-1.

See tert.-Amylcarbinol.

2 : 3-Dimethylbutanol-2.

See Dimethylisopropylcarbinol.

3 : 3-Dimethylbutanol-2.

See Methyl-tert.-butylcarbinol.

1 : 3-Dimethyl-2-butenol-1.

See 1 : 3 : 3-Trimethylallyl Alcohol.

Dimethyl- α -butenylcarbinol.

See 2-Methyl-3-hexenol-2.

Dimethyl- γ -butenylcarbinol.

See 5-Methyl-1-hexenol-5.

 γ -Dimethyl- γ -butenylfuran.

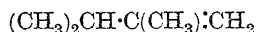
See Perillene.

Dimethylbutenyne.

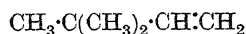
See Dimethylvinylacetylene.

1 : 3-Dimethyl- n -butylamine.See 1-Amino-1 : 3-dimethyl- n -butane.**2 : 2-Dimethyl- n -butylamine.**See 1-Amino-2 : 2-dimethyl- n -butane.**Dimethyl-tert.-butylbenzene**See tert.-Butyl- m -xylene.**Dimethylbutylcarbinol.**

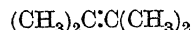
See 2-Methylhexanol-2.

2 : 3-Dimethyl-1-butylene ($\beta\gamma$ -Dimethyl- α -butene, 1-methyl-1-isopropylethylene) C_6H_{12}

MW, 84

B.p. 56°. Sol. EtOH, Et₂O. D_4^{20} 0.6803. n_D^{20} 1.3995.Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 751.Cramer, Glasebrook, *J. Am. Chem. Soc.*, 1939, 61, 230.**3 : 3-Dimethyl-1-butylene** (tert.-Butylethylene, $\gamma\gamma$ -dimethyl- α -butene) C_6H_{12}

MW, 84

B.p. 41–2°. D_4^{18} 0.6549. n_D^{20} 1.3763, n_D 1.37667. $\text{KMnO}_4\text{.Aq.} \rightarrow$ trimethylacetic acid.Fomin, Sochanski, *Ber.*, 1913, 46, 244, 1219.Nasarov, *Ber.*, 1936, 69, 18.Wibaut, Gitsels, *Rec. trav. chim.*, 1941, 60, 241.**2 : 3-Dimethyl-2-butylene** ($\beta\gamma$ -Dimethyl- β -butene, tetramethylethylene) C_6H_{12}

MW, 84

B.p. 72-3°. Sol. EtOH, Et₂O. D_4^{20} 0.7081. n_D^{20} 1.41153. Dil. HNO₃ → acetone.

Earl, *Chem. Abstracts*, 1929, 23, 815.

Ingold, Ingold, *J. Chem. Soc.*, 1931, 2367.

Schurman, Boord, *J. Am. Chem. Soc.*, 1933, 55, 4930.

Dimethyl-ψ-butylene Glycol.

See Pinacol.

1 : 1-Dimethylbutyric Acid (*Dimethylethylacetic acid*)

$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{C}(\text{CH}_3)_2 \cdot \text{COOH}$
C₆H₁₂O₂ MW, 116

M.p. -14°. B.p. 186-7°, 85°/13 mm. $k = 9.57 \times 10^{-6}$ at 25°.

Me ester: C₇H₁₄O₂. MW, 130. B.p. 125°/746 mm.

Et ester: C₈H₁₆O₂. MW, 144. B.p. 142°/746 mm.

p-Phenylphenacyl ester: C₂₀H₂₂O₃. MW, 310. M.p. 86.5°.

Chloride: C₆H₁₁OCl. MW, 134.5. B.p. 132°.

Amide: C₆H₁₃ON. MW, 115. Leaflets. M.p. 104°.

Anhydride: C₁₂H₂₂O₃. MW, 214. B.p. 227-8°.

Nitrile: C₆H₁₁N. MW, 97. B.p. 128-30°.

Gilman, Zoellner, *Rec. trav. chim.*, 1928, 47, 1058.

Corson, Thomas, Waugh, *J. Am. Chem. Soc.*, 1929, 51, 1950.

Reichstein, Rosenberg, Eberhardt, *Helv. Chim. Acta*, 1935, 18, 721.

1 : 2-Dimethylbutyric Acid (*Methylisopropylacetic acid*, 1 : 2 : 2-trimethylpropionic acid, 1-methylisovaleric acid).

$\text{CH}_3 \cdot \text{CH}(\text{CH}_3) \cdot \text{CH}(\text{CH}_3) \cdot \text{COOH}$
C₆H₁₂O₂ MW, 116

B.p. 189-91°, 90°/16 mm. D_4^{20} 0.9275. n_D^{20} 1.4146.

Et ester: b.p. 149°/745 mm.

p-Phenylphenacyl ester: m.p. 73.5°.

Chloride: b.p. 136-7°/751 mm. D_4^{20} 0.9795.

Amide: m.p. 129°. Sublimes.

p-Toluidide: m.p. 112.6°.

Gorski, *Chem. Zentr.*, 1913, I, 2022.

Sudborough, Davies, *J. Chem. Soc.*, 1909, 95, 978.

Neititzesco, Chicos, *Ber.*, 1935, 68, 1584.

2 : 2-Dimethylbutyric Acid.

See *tert.*-Butylacetic Acid.

Dimethylcaffolide.

See Apocaffeine and under Caffolide.

1 : 4-Dimethylcaproic Acid.

See 2-Methylhexane-5-carboxylic Acid.

Dimethylcarbamic Acid (*Dimethylaminoformic acid*)

(CH₃)₂N·COOH
C₃H₇O₂N MW, 89

Known only in the form of its derivatives.

Me ester: C₄H₉O₂N. MW, 103. B.p. 131°. Misc. with H₂O. D^{15} 1.012.

Et ester: dimethylurethane. C₅H₁₁O₂N. MW, 117. B.p. 147° (140°). D^{15} 0.9725.

Chloride: chloroformic dimethylamide. C₃H₆ONCl. MW, 107.5. M.p. -33°. B.p. 167°. Sol. Et₂O, CS₂, C₆H₆. D_4^{20} 1.1678. n_D^{20} 1.45196.

Amide: see *unsym.*-Dimethylurea.

Nitrile: see Dimethylcyanamide.

Schreiner, *J. prakt. Chem.*, 1880, 21, 126.

Franchimont, Klobbie, *Rec. trav. chim.*, 1889, 8, 299.

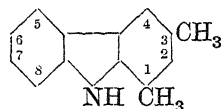
Hantzsch, Sauer, *Ann.*, 1898, 299, 85.

Bayer, D.R.P. 255,942, (*Chem. Zentr.*, 1913, I, 670).

Dimethylcarbanilide.

See Ditolylurea.

1 : 3-Dimethylcarbazole



C₁₄H₁₃N MW, 195

Cryst. powder from ligroin. Sol. EtOH, Et₂O, AcOH, C₆H₆. Conc. H₂SO₄ → green col.

Picrate: red needles from EtOH. M.p. 188.5°.

Deletra, Ullmann, *Ann.*, 1904, 332, 91.

2 : 4-Dimethylcarbazole.

M.p. 124-6°.

N-Nitroso: m.p. 135°.

v. Braun, Haensel, *Ber.*, 1926, 59, 2006.

2 : 6-Dimethylcarbazole.

Needles. M.p. 224°. Sol. EtOH, Et₂O, C₆H₆.

N-Nitroso: m.p. 113°.

Picrate: m.p. 162°.

Morgan, Walls, *J. Chem. Soc.*, 1930, 1502.

2 : 7-Dimethylcarbazole.

Needles. M.p. 283°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O.

Niementowski, *Ber.*, 1901, 34, 3335.

3 : 6-Dimethylcarbazole.

Needles. M.p. 219°. Sol. EtOH, Et₂O, CS₂, C₆H₆. Spar. sol. ligroin.

N-Acetyl: m.p. 129°.

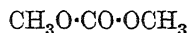
N-Nitroso: m.p. 106°.

Picrate: m.p. 192°.

Morgan, Walls, *J. Chem. Soc.*, 1930, 1502.

Oakeshott, Plant, *J. Chem. Soc.*, 1926, 1210.

Täuber, Loewenherz, *Ber.*, 1891, 24, 1035, 2598.

Dimethyl carbonate

$\text{C}_3\text{H}_6\text{O}_3$ MW, 90
M.p. 0-5°. B.p. 90-1°. Sol. EtOH, Et₂O.
Insol. H₂O. D_4^{20} 1.0702. n_D^{20} 1.3687. Heat of
comb. (liq.) 339.69 Cal.

Kling, Florentin, Jacob, *Compt. rend.*,
1920, 170, 111.
Hood, Murdock, *J. Phys. Chem.*, 1919, 23,
508.

Dimethylcarbostyryl.

See 2-Hydroxy-dimethylquinoline and Cytiso-
line.

3 : 3-Dimethyl-2-carboxymethylcyclopropane-carboxylic Acid.

See Homocaronic Acid.

Dimethyl-carboxypropenylcyclopropane-carboxylic Acid.

See Chrysanthemum-dicarboxylic Acid.

Dimethylcatechol.

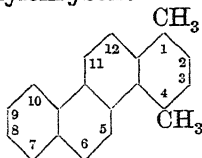
See Dihydroxyxylene.

Dimethyl-1-chloroethylcarbinol.

See 3-Chloro-tert.-amyl Alcohol.

Dimethylchrysazin.

See Dihydroxydimethylanthraquinone.

1 : 4-Dimethylchrysene

$\text{C}_{20}\text{H}_{16}$ MW, 256

Needles from C_6H_6 -pet. ether. M.p. 142°.
Picrate : red needles from EtOH. M.p. 141°.

Bachmann, Struve, *J. Org. Chem.*, 1940,
5, 422.

2 : 3-Dimethylchrysene.

Plates from C_6H_6 . M.p. 215°.

Fieser, Fieser, Hershberg, *J. Am. Chem.*
Soc., 1936, 58, 1467.

2 : 8-Dimethylchrysene.

Plates from C_6H_6 . M.p. 218°.

sym.-*Trinitrobenzene add. comp.* : yellow
needles from C_6H_6 . M.p. 195°.

Picrate : red needles from C_6H_6 . M.p. 171-2°.

Styphnate : orange needles from C_6H_6 . M.p.
204°.

Ramage, *J. Chem. Soc.*, 1938, 399.

4 : 5-Dimethylchrysene.

Plates from C_6H_6 -EtOH. M.p. 164°.

sym.-*Trinitrobenzene add. comp.* : orange
needles from C_6H_6 -EtOH. M.p. 131-2°.

Newman, *J. Am. Chem. Soc.*, 1940, 62,
2295.

6 : 12-Dimethylchrysene.

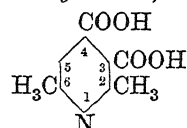
Prisms from C_6H_6 . M.p. 237°.

Dict. of Org. Comp.—II.

sym.-*Trinitrobenzene add. comp.* : reddish
orange needles from C_6H_6 . M.p. 222°.

Styphnate : orange needles from C_6H_6 . M.p.
207° decomp.

Lewis, Ramage, Robinson, *J. Chem. Soc.*,
1935, 1414.

2 : 6-Dimethylcinchomeronic Acid (2 : 6-Dimethylpyridine-3 : 4-dicarboxylic acid, 2 : 6-lutidine-3 : 4-dicarboxylic acid)

$\text{C}_9\text{H}_8\text{O}_4\text{N}$ MW, 195

Rhombic cryst. by evaporation of aq. sol.
M.p. (sealed tube) 275° decomp. (277°). Spar.
sol. most ord. org. solvents.

3-Me ester : $\text{C}_{10}\text{H}_{11}\text{O}_4\text{N}$. MW, 209. M.p.
198-9°.

4-Me ester : m.p. 165°.

Di-Me ester : $\text{C}_{11}\text{H}_{13}\text{O}_4\text{N}$. MW, 223. M.p.
48°.

3-Et ester : $\text{C}_{11}\text{H}_{13}\text{O}_4\text{N}$. MW, 223. M.p.
165° (161°).

4-Et ester : m.p. 151-2°.

Di-Et ester : $\text{C}_{13}\text{H}_{17}\text{O}_4\text{N}$. MW, 251. M.p.
16°. B.p. 163°/13 mm. *Hydrochloride* : m.p.
121°. *Picrate* : m.p. 101°.

4-Amide : $\text{C}_9\text{H}_{10}\text{O}_3\text{N}_2$. MW, 194. Needles.
M.p. 115°.

Diamide : $\text{C}_9\text{H}_{11}\text{O}_2\text{N}_3$. MW, 193. Needles.
M.p. 220° decomp. (rapid heat.).

Imide : $\text{C}_9\text{H}_8\text{O}_2\text{N}_2$. MW, 176. Needles. M.p.
230°.

Anhydride : $\text{C}_9\text{H}_7\text{O}_3\text{N}$. MW, 177. Needles.
M.p. 101°.

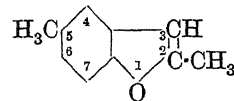
Mumm, Gottschaldt, *Ber.*, 1922, 55, 2064.

Dimethylcinchoninic Acid.

See Dimethylquinoline-4-carboxylic Acid.

Dimethylcitraconic Acid.

See Isopropylmaleic Acid.

2 : 5-Dimethylcoumarone (2 : 5-Dimethylbenzofuran)

$\text{C}_{10}\text{H}_{10}\text{O}$ MW, 146

B.p. 220° (212-13°), 96.8°/13.5 mm. Sol.
Et₂O. D_4^{20} 1.031. n_D^{20} 1.5534.

Auwers, *Ann.*, 1921, 422, 151.

Stoermer, *Ann.*, 1900, 312, 286.

2 : 6-Dimethylcoumarone.

B.p. 217-18°. Sol. Et₂O. D^{12} 1.051. n_D^{15}
1.554.

Picrate : m.p. 58-9°.

Stoermer, *Ann.*, 1900, 312, 286.

2 : 7-Dimethylcoumarone.

B.p. 215°/749 mm. Sol. Et₂O. D₄²⁰ 1.036.
n_D²⁰ 1.5546.

Auwers, *Ann.*, 1921, 422, 151.
Stoermer, *Ann.*, 1900, 312, 288.

3 : 5-Dimethylcoumarone.

B.p. 220-1°, 99°/15 mm. Sol. Et₂O. D₄²⁰ 1.036.
n_D²⁰ 1.550.

Picrate : m.p. 108°.

Auwers, *Ann.*, 1915, 408, 275.
Stoermer, *Ann.*, 1900, 312, 288.

3 : 6-Dimethylcoumarone.

B.p. 222°. D₄²⁰ 1.0456. n_D²⁰ 1.5505.

Picrate : m.p. 76°.

Stoermer, *Ann.*, 1900, 312, 290.
Fries, Fickewirth, *Ann.*, 1908, 362, 53.

3 : 7-Dimethylcoumarone.

B.p. 216-17°.

Picrate : m.p. 68°.

Stoermer, *Ann.*, 1900, 312, 290.

4 : 6-Dimethylcoumarone.

B.p. 219°, 128°/18 mm. Sol. Et₂O. D₄²⁰ 1.037.
n_D²¹ 1.5485.

Picrate : m.p. 61-2°.

Stoermer, *Ann.*, 1900, 312, 295.
Auwers, Krollpfeiffer, *Ber.*, 1914, 47, 2591.

4 : 7-Dimethylcoumarone.

B.p. 216°. Sol. Et₂O. D₄¹⁷ 1.041. n_D¹⁷ 1.549.

Picrate : m.p. 101°.

Stoermer, Schröder, *Ber.*, 1897, 30, 1709.
Stoermer, *Ann.*, 1900, 312, 295.

5 : 6-Dimethylcoumarone.

B.p. 221°. Sol. Et₂O. D₄¹⁵ 1.060. n_D¹⁵ 1.5515.

Picrate : m.p. 65.5°.

Stoermer, Schröder, *Ber.*, 1897, 30, 1709.
Stoermer, *Ann.*, 1900, 312, 295.

5 : 7-Dimethylcoumarone.

B.p. 222°, 90-2°/12 mm. Sol. Et₂O. D₄^{18.8} 1.0262.
n_D²⁰ 1.5358.

Picrate : m.p. 79°.

Stoermer, Schröder, *Ber.*, 1897, 30, 1709.

Stoermer, *Ann.*, 1900, 312, 295.

Stoermer, Göhl, *Ber.*, 1903, 36, 2877.

6 : 7-Dimethylcoumarone.

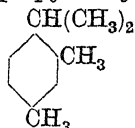
B.p. 218°. Sol. Et₂O. D₄²⁰ 1.038. n_D²⁰ 1.5478.

Picrate : m.p. 63°.

Stoermer, *Ann.*, 1900, 312, 297.

1 : 3-Dimethylcrotyl Alcohol.

See 1 : 3 : 3-Trimethylallyl Alcohol.

2 : 4-Dimethylcumene (2 : 4-Dimethyl-1-isopropylbenzene, 4-isopropyl-m-xylene)

C₁₁H₁₆

MW, 148

B.p. 194-5°, 77°/13 mm. n_D²⁵ 1.4998.

Uhlhorn, *Ber.*, 1890, 23, 2351.

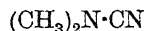
Nightingale, Carton, *J. Am. Chem. Soc.*, 1940, 62, 280.

3 : 4-Dimethylcumene (3 : 4-Dimethyl-1-isopropylbenzene, 4-isopropyl-o-xylene).

B.p. 198°/732 mm., 86-7°/16 mm. D₄¹⁵ 0.8740.
n_D¹⁵ 1.50001.

Klages, Sommer, *Ber.*, 1906, 39, 2311.

Nightingale, Carton, *J. Am. Chem. Soc.*, 1940, 62, 280.

Dimethylcyanamide (Dimethylcarbamic nitrile)

C₃H₆N₂

MW, 70

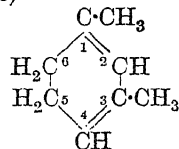
B.p. 163.5°, 98°/104 mm., 52°/14 mm. Sol. H₂O.

Traube, Engelhardt, *Ber.*, 1911, 44, 3149.

Diels, Gollmann, *Ber.*, 1911, 44, 3165.

1 : 1-Dimethylcyclobutane-2 : 4-dicarboxylic Acid.

See Norpinic Acid.

1 : 3-Dimethylcyclohexadiene-1 : 3 (Δ^{1,3}-Dihydro-m-xylene)

C₈H₁₂

MW, 108

Colourless liq. with odour of pinene. B.p. 135-6°. D₄²⁰ 0.8373. n_D²⁰ 1.4856. Orange sol. in conc. H₂SO₄. Oxidises and resinifies in air.

Midgley, Henne, *J. Am. Chem. Soc.*, 1929, 51, 1215.

Auwers, *Ber.*, 1913, 46, 2994.

Haworth, *J. Chem. Soc.*, 1913, 103, 1247.

1 : 4-Dimethylcyclohexadiene-1 : 3 (Δ^{1,3}-Dihydro-p-xylene).

B.p. 135-8°, 30°/13 mm. D₄²⁰ 0.830. n_D¹⁹ 1.47966. Rapidly polymerises in moist air. Neutral KMnO₄ → acetylacetone + acetone.

Auwers, Hinterseber, *Ber.*, 1915, 48, 1372.

Auwers, Roth, *Ann.*, 1915, 407, 156.

1 : 5-Dimethylcyclohexadiene-1 : 3 (Δ^{3,5}-Dihydro-m-xylene).

B.p. 127-32°/754 mm. D₄²⁰ 0.821. n_D²⁰ 1.471.

Auwers, Peters, *Ber.*, 1910, 43, 3118.

2 : 3-Dimethylcyclohexadiene-1 : 3 (Δ^{1,5}-Dihydro-o-xylene).

Colourless, oily liq. with odour of turpentine. B.p. 135.5°. D₄²⁰ 0.8521. n_D 1.4895. Orange sol.

in conc. H_2SO_4 . Absorbs O and polymerises.
Dil. $\text{HNO}_3 \longrightarrow o$ -toluic acid.

Meerwein, *Ann.*, 1914, 405, 148, 151.

Auwers, *Ber.*, 1913, 46, 2994.

Haworth, *J. Chem. Soc.*, 1913, 103, 1247.

2 : 5-Dimethylcyclohexadiene-1 : 3 ($\Delta^{2,4}$ -*Dihydro-p-xylene*).

B.p. 127° . D_{15}^{25} 0.8252. n_D^{25} 1.4631.

Mousseron, Winternitz, *Bull. soc. chim.*, 1945, 12, 70.

3 : 5-Dimethylcyclohexadiene-1 : 3 ($\Delta^{1,5}$ -*Dihydro-m-xylene*).

B.p. $130^\circ/745$ mm. D_4^{20} 0.8225. n_D^{20} 1.4675.
[α_D^{20} + 27.38°].

Zelinsky, Gorsky, *Ber.*, 1908, 41, 2631.

3 : 6-Dimethylcyclohexadiene-1 : 3 ($\Delta^{1,5}$ -*Dihydro-p-xylene*).

B.p. 133° . D_4^{20} 0.8223. n_D^{20} 1.4675.

Zelinsky, Gorsky, *Ber.*, 1908, 41, 2633.

5 : 5-Dimethylcyclohexadiene-1 : 3.

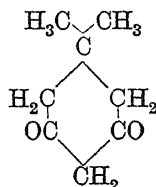
B.p. $111^\circ/770$ mm. D_4^{25} 0.81573. Decomposes rapidly in air. $\text{KMnO}_4 \longrightarrow$ 1 : 1-dimethylsuccinic acid.

Nitroschloride: needles from MeOH. M.p. $118.5\text{--}26^\circ$ decomp.

Crossley, Renouf, *J. Chem. Soc.*, 1908, 93, 636, 645.

Crossley, Le Sueur, *J. Chem. Soc.*, 1902, 81, 821.

1 : 1-Dimethylcyclohexandione-3 : 5 (5 : 5-Dimethyldihydroresorcinol, methone, dimedone)



$\text{C}_8\text{H}_{12}\text{O}_2$

MW, 140

Monoclinic needles or prisms. M.p. $148\text{--}9^\circ$. Sol. CHCl_3 , C_6H_6 . Spar. sol. ether, cold H_2O . Reacts acid (enol form): $k = 0.71 \times 10^{-5}$ at 25° . CrO_3 or $\text{HNO}_3 \longrightarrow$ 2 : 2-dimethylglutaric acid. Used for characterisation of carbonyl compounds.

Monoxime: cryst., m.p. 115° . Also exists in an amorphous form.

Dioxime: prisms + $2\text{H}_2\text{O}$. M.p. anhyd. 176° .

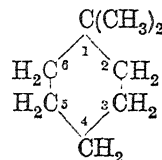
Kao, Yen, *Chem. Abstracts*, 1932, 26, 5924.

Vörlander, Gärtner, *Ann.*, 1899, 304, 8, 20.

Stobbe, *Ber.*, 1901, 34, 1955.

Shriner, Todd, *Organic Syntheses*, 1935, XV, 14.

1 : 1-Dimethylcyclohexane



C_8H_{16}

MW, 112

F.p. -33.5° . B.p. 120° . D_{15}^{15} 0.7864. n_D^{15} 1.4314. Conc. $\text{HNO}_3 \longrightarrow$ 2 : 2-dimethyladipic acid.

Chavanne, Miller, Cornet, *Bull. soc. chim. Belg.*, 1931, 40, 673.

Zelinsky, *Ber.*, 1923, 56, 1716.

Crossley, Renouf, *J. Chem. Soc.*, 1921, 119, 271.

Zelinsky, Packendorff, Chochlowa, *Ber.*, 1935, 68, 98.

Nametkin, Gabriadze, *J. Gen. Chem. U.S.S.R.*, 1943, 13, 560.

1 : 2-Dimethylcyclohexane (*Hexahydro-o-xylene*).

Cis.

M.p. -50.2° . B.p. 130° ($126.5^\circ/750$ mm.). D_4^{20} 0.79620.

Trans.

M.p. -90° . B.p. 124° . D_4^{20} 0.77601.

Miller, *Bull. soc. chim. Belg.*, 1932, 41, 217. Zelinsky, *Ber.*, 1924, 57, 50.

Eisenlohr, *Fortschritte der Chemie, Physik, und physikalischen Chemie*, 1925, 18, 547.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3330.

D'yakova, Lozovoi, Stepantstova, *Chem. Abstracts*, 1937, 31, 5771.

Nametkin, Gabriadze, *J. Gen. Chem. U.S.S.R.*, 1943, 13, 560.

1 : 3-Dimethylcyclohexane (*Hexahydro-m-xylene*).

Cis-(?)

B.p. 124.9° . D_4^{20} 0.78348. n_D^{20} 1.4269.

Trans-(?)

B.p. 120.4° . D_4^{20} 0.76628. n_D^{20} 1.4254.

Skita, *Z. angew. Chem.*, 1921, 34, 230.

Klepper, *Chem. Abstracts*, 1929, 23, 3897.

Adams, Marshall, *J. Am. Chem. Soc.*, 1928, 50, 1970.

Eisenlohr, *Fortschritte der Chemie, Physik, und physikalischen Chemie*, 1925, 18, 547.

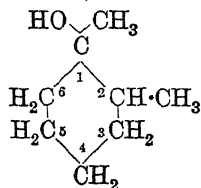
Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3330.

Pines, Ipatieff, *J. Am. Chem. Soc.*, 1939, 61, 1076.

Pitzer, Beckett, *J. Am. Chem. Soc.*, 1947, 69, 977.

1 : 4-Dimethylcyclohexane (*Hexahydro-p-xylene*).*Cis*-.F.p. -87° . B.p. 124.6° . D_4^{20} 0.7827.*Trans*-.F.p. -37° . B.p. 119° . D_4^{20} 0.76264.Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3330.Chavanne, Bode, *J. Am. Chem. Soc.*, 1930, 52, 1609.Eisenlohr, *Fortschritte der Chemie, Physik, und physikalischen Chemie*, 1925, 18, 550.Auwers, *Ann.*, 1920, 420, 98.**Dimethylcyclohexane-carboxylic Acid.**

See Dimethylhexahydrobenzoic Acid.

1 : 2-Dimethylcyclohexanol (1-*Hydroxy-1 : 2-dimethylcyclohexane*) $C_8H_{16}O$

MW, 128

Cis-.M.p. 23.2° . B.p. $82.8^{\circ}/25$ mm. D_4^{20} 0.9250. n_D^{20} 1.4625.*Trans*-.M.p. 13.2° . B.p. $74^{\circ}/25$ mm. D_4^{20} 0.9187. n_D^{20} 1.4590.Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3330.Chiurdoglu, *Bull. soc. chim. Belg.*, 1938, 47, 241.**1 : 3-Dimethylcyclohexanol** (1-*Hydroxy-1 : 3-dimethylcyclohexane*).*Cis*-.M.p. 27.5° . B.p. $84^{\circ}/25$ mm. D_4^{30} 0.9022. n_D^{20} 1.4575.*Trans*-.M.p. 14.5° . B.p. $77.6^{\circ}/25$ mm. D_4^{30} 0.8894. n_D^{20} 1.4507.Braun, Haensel, *Ber.*, 1926, 69, 1999.Chiurdoglu, *Bull. soc. chim. Belg.*, 1938, 47, 241.Skita, Faust, *Ber.*, 1939, 72, 1127.**1 : 4-Dimethylcyclohexanol** (1-*Hydroxy-1 : 4-dimethylcyclohexane*).*Cis*-.M.p. 24° . B.p. $83.8^{\circ}/25$ mm. n_D^{20} 1.4564.*Trans*-.M.p. 72.5° . B.p. $76^{\circ}/25$ mm.Auwers, Hinterseber, Treppmann, *Ann.*, 1915, 410, 277.Chiurdoglu, *Bull. soc. chim. Belg.*, 1938, 47, 241.**2 : 2-Dimethylcyclohexanol** (1-*Hydroxy-2 : 2-dimethylcyclohexane*).M.p. 8° . B.p. $177^{\circ}/13$ mm. D_4^{20} 0.9225. n_D^{20} 1.4648.*Phenylurethane* : m.p. 85° .Meerwein, *Ann.*, 1914, 405, 142.**2 : 3-Dimethylcyclohexanol** (1-*Hydroxy-2 : 3-dimethylcyclohexane*).B.p. $77-9^{\circ}/12$ mm. n_D^{18} 1.4662.Farmer, Sutton, *J. Chem. Soc.*, 1946, 10.**2 : 4-Dimethylcyclohexanol** (1-*Hydroxy-2 : 4-dimethylcyclohexane, hexahydro-m-4-xylene*).(1 $^{\circ}$) : 2 $^{\circ}$: 4 $^{\circ}$.B.p. $177-8^{\circ}$. D_4^{20} 0.900. n_D^{20} 1.4560.*Acetyl* : b.p. $198^{\circ}/765$ mm. D_4^{14} 0.9405. n_D^{14} 1.442.*Phenylurethane* : m.p. 96° . α -*Naphthylurethane* : m.p. $152.5-3.5^{\circ}$.Skita, *Ann.*, 1922, 427, 275.Godchot, Bedos, *Compt. rend.*, 1925, 180, 751.Ungnade, McLaren, *J. Am. Chem. Soc.*, 1944, 66, 118.**2 : 5-Dimethylcyclohexanol** (1-*Hydroxy-2 : 5-dimethylcyclohexane, hexahydro-p-xylene*).(1 $^{\circ}$) : 2 $^{\circ}$: 5 $^{\circ}$.B.p. $180^{\circ}, 74^{\circ}/14$ mm.*Phenylurethane* : m.p. 113° .(1 $^{\circ}$) : 2 $^{\circ}$: 5 $^{\circ}$.B.p. 179° .*Phenylurethane* : m.p. 117° . α -*Naphthylurethane* : m.p. $172-3.5^{\circ}$.Skita, *Ber.*, 1922, 55, 142; 1923, 56, 2234.Godchot, Bedos, *Bull. soc. chim.*, 1925, 37, 1646.Ungnade, McLaren, *J. Am. Chem. Soc.*, 1944, 66, 118.**2 : 6-Dimethylcyclohexanol** (1-*Hydroxy-2 : 6-dimethylcyclohexane, hexahydro-m-2-xylene*).(1 $^{\circ}$) : 2 $^{\circ}$: 6 $^{\circ}$.M.p. 47° . B.p. $171-3^{\circ}$.*Phenylurethane* : m.p. 134° .*Dinitrobenzoate* : m.p. $168-9^{\circ}$.(1 $^{\circ}$) : 2 $^{\circ}$: 6 $^{\circ}$.M.p. 40° . B.p. $172^{\circ}, 80^{\circ}/22$ mm.*Phenylurethane* : m.p. 158° .*Dinitrobenzoate* : m.p. $134-4.5^{\circ}$.(1 $^{\circ}$) : 2 $^{\circ}$: 6 $^{\circ}$.B.p. $172-3^{\circ}, 76^{\circ}/16$ mm. D_4^{20} 0.9263. n_D^{19} 1.4660.*Phenylurethane* : m.p. $102-3^{\circ}$.*Dinitrobenzoate* : m.p. 93° .Skita, *Ber.*, 1923, 56, 2242.Cornubert et al., *Bull. soc. chim.*, 1945, 12, 367.Carlin, *J. Am. Chem. Soc.*, 1945, 67, 928.Plattner, Furst, Hellerbach, *Helv. Chim. Acta*, 1947, 30, 100.

3 : 3-Dimethylcyclohexanol (1-Hydroxy-3 : 3-dimethylcyclohexane).

M.p. 11–12°. B.p. 185°/754 mm., 99.5°/35 mm. Sol. Et₂O. Insol. H₂O. D₄²⁰ 0.9128. n_D²⁰ 1.4606. Volatile in steam.

Acetyl : b.p. 194–5°/750 mm.

o-Nitrobenzoyl : m.p. 62°.

p-Nitrobenzoyl : m.p. 83°.

Chavanne, Miller, Cornet, *Bull. soc. chim. Belg.*, 1931, 40, 673.

Crossley, Renouf, *J. Chem. Soc.*, 1915, 107, 604.

Auwers, Lange, *Ann.*, 1913, 401, 324.

Zelinsky, Lepeshkin, *Chem. Abstracts*, 1913, 7, 3128.

Zelinsky, Packendorff, Chochlowa, *Ber.*, 1935, 68, 98.

3 : 4-Dimethylcyclohexanol (1-Hydroxy-3 : 4-dimethylcyclohexane, hexahydro-o-4-xyleneol).
B.p. 189°. D₄²⁰ 0.9073. n_D²⁰ 1.458.

Phenylurethane : three forms are described, probably geometrical isomerides. (1) M.p. 96–7°. (2) M.p. 119°. (3) M.p. 123.5–4.5°.

Auwers, *Ann.*, 1920, 420, 99.

Sabatier, Mailhe, *Compt. rend.*, 1906, 142, 553.

Ugnade, McLaren, *J. Am. Chem. Soc.*, 1944, 66, 118.

3 : 5-Dimethylcyclohexanol (1-Hydroxy-3 : 5-dimethylcyclohexane, hexahydro-m-5-xyleneol).

(1^c) : 3^c : 5^c.

M.p. 16°. B.p. 83–4°/17 mm. D₄²⁰ 0.898. n_D²⁰ 1.4550.

Phenylurethane : m.p. 109–10°.

α-Naphthylurethane : m.p. 141–3°.

Dinitrobenzoate : m.p. 77–8°.

(1^t) : 3^t : 5^t.

M.p. 39–40°. B.p. 79–80°/17 mm. D₄²⁰ 0.895. n_D²⁰ 1.4513.

Phenylurethane : m.p. 123.5–4.5°.

Dinitrobenzoate : m.p. 132–3°.

(1^s) : 3^s : 5^s.

B.p. 84°/17 mm. D₄²⁰ 0.905. n_D²⁰ 1.4572.

Dinitrobenzoate : m.p. 66–7°.

Auwers, Hinterseber, Treppmann, *Ann.*, 1915, 410, 257.

v. Braun, Anton, *Ber.*, 1927, 60, 2438.

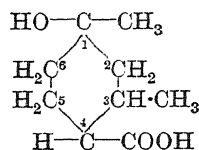
Skita, Faust, *Ber.*, 1939, 72, 1127.

Ugnade, Nightingale, *J. Am. Chem. Soc.*, 1944, 66, 1218.

4 : 4-Dimethylcyclohexanol (1-Hydroxy-4 : 4-dimethylcyclohexane).

M.p. 16°. B.p. 186°, 77°/10 mm. D₄²⁰ 0.9250. n_D²⁰ 1.4613.

Auwers, Lange, *Ann.*, 1913, 401, 313; 1915, 409, 164.

1 : 3-Dimethylcyclohexanol-4-carboxylic Acid (4-Hydroxy-2 : 4-dimethylhexahydrobenzoic acid)

C₉H₁₆O₃

MW, 172

Two acids known with –OH and –COOH groups in *trans*-position.

(i) Leaflets from H₂O. M.p. 160°. Sol. hot H₂O. Spar. sol. Et₂O. AgNO₃ → ppt.

(ii) Prisms from H₂O. M.p. 113°. Sol. hot H₂O. Spar. sol. Et₂O. No ppt. with AgNO₃.

Perkin, Yates, *J. Chem. Soc.*, 1901, 79, 345, 1376, 1381.

2 : 2-Dimethylcyclohexanol-5-carboxylic Acid (3-Hydroxy-4 : 4-dimethylhexahydrobenzoic acid).

Prisms from C₆H₆. M.p. 142–3°. Sol. EtOH, Et₂O. Mod. sol. C₆H₆. Spar. sol. H₂O. Almost insol. pet. ether. Boiling dil. acids → lactone.

Blanc, *Bull. soc. chim.*, 1899, 21, 849.

3 : 5-Dimethylcyclohexanol-1-carboxylic Acid (1-Hydroxy-3 : 5-dimethylhexahydrobenzoic acid).

Leaflets from pet. ether. M.p. 124–5°.

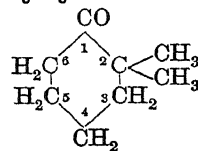
Auwers, Krollpfeiffer, *Ber.*, 1915, 48, 1394.

3 : 5-Dimethylcyclohexanol-4-carboxylic Acid (4-Hydroxy-2 : 6-dimethylhexahydrobenzoic acid).

Viscous oil. Sol. H₂O. Gives lactone on heating.

Et ester : C₁₁H₂₀O₃. MW, 200. B.p. 144–6°/16 mm.

Höchst, D.R.P. 148,207, (*Chem. Zentr.*, 1904, I, 486).

2 : 2-Dimethylcyclohexanone

C₈H₁₄O

MW, 126

B.p. 172°/757 mm., 64°/18 mm. D₄²⁰ 0.9145. n_D²⁰ 1.4486.

Semicarbazone : m.p. 200–1° (197–8°).

2 : 4-Dinitrophenylhydrazones : m.p. 140–2°.

Adamson, Marlow, Simonsen, *J. Chem. Soc.*, 1938, 774.

Auwers, Lange, *Ann.*, 1913, 401, 320.

Meerwein, *Ann.*, 1914, 405, 142.

Fischer, Wunderlich, *Ber.*, 1941, 74, 1544.

Johnson, Posvic, *J. Am. Chem. Soc.*, 1947, 69, 1361.

3-Dimethylcyclohexanone

2 : 3-Dimethylcyclohexanone.

B.p. 178–9°, 78°/24 mm. (84°/11 mm.). D_{20}^{20} 1.159. n_D^{20} 1.4505.

Semicarbazone : m.p. 203–4°.

Cornubert, Maurel, *Bull. soc. chim.*, 1931, 49, 1519.

Kötz, Blendermann, Mähner, Rosenbusch, *Ann.*, 1913, 400, 83.

2 : 4-Dimethylcyclohexanone.

Cis–.

B.p. 177°, 70–1°/16 mm. $D_{15.5}^{15.5}$ 0.910. $n_D^{15.5}$ 1.4493.

Oxime : m.p. 98–9° (95°).

Semicarbazone : m.p. 192–3°.

Trans–.

B.p. 171°. D_4^{16} 0.9004. n_D^{16} 1.4429.

Semicarbazone : m.p. 136°.

Skita, *Ann.*, 1922, 427, 276.

Godchot, Bedos, *Compt. rend.*, 1925, 180, 751.

Cornubert, Maurel, *Bull. soc. chim.*, 1931, 49, 1519.

2 : 5-Dimethylcyclohexanone.

dl–.

B.p. 171–3° (176°), 76–7°/27 mm. D_{20}^{20} 0.9025, D_{15}^{15} 0.906. n_D^{20} 1.4446, n_D^{15} 1.4480.

Oxime : needles from EtOH. M.p. 111° (108–9°).

Semicarbazone : two forms, probably geometrical isomerides. (1) M.p. 122°. (2) Leaflets from EtOH. M.p. 173° (175–6°).

d–.

B.p. 172–4°/750 mm., 51°/10 mm. $[\alpha]_D^{20}$ + 11.6°.

Oxime : m.p. 97–8°.

Semicarbazone : m.p. 176–7°.

Leser, *Bull. soc. chim.*, 1901, 25, 199.

Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, 93, 1970.

Godchot, Bedos, *Bull. soc. chim.*, 1925, 37, 1648.

Cornubert, Borrel, Bihan, *Bull. soc. chim.*, 1931, 49, 1387.

2 : 6-Dimethylcyclohexanone.

B.p. 170–1°, 62°/12 mm. D_4^{18} 0.9146. n_D^{18} 1.4508. Two forms of the derivatives, corresponding probably to *cis*- and *trans*-forms are described.

Oxime : (1) m.p. 79°. (2) M.p. 119°.

Semicarbazone : (1) m.p. 183°. (2) M.p. 197°.

Haller, *Compt. rend.*, 1913, 157, 179.

Ruzicka, Koolhaas, Wind, *Helv. Chim. Acta*, 1931, 14, 1164.

Cornubert, Borrel, Bihan, *Bull. soc. chim.*, 1931, 49, 1387.

Cornubert, Anziani, *Compt. rend.*, 1943, 217, 197.

294 2 : 5-Dimethylcyclohexanone-2-carboxylic Acid

3 : 3-Dimethylcyclohexanone.

B.p. 179°/748 mm., 72–3°/25 mm., 54°/8 mm. D_4^{15} 0.909. n_D^{17} 1.4482.

Semicarbazone : m.p. 219° (198°).

Chavanne, Miller, Cornet, *Bull. soc. chim. Belg.*, 1931, 40, 673.

Auwers, Lange, *Ann.*, 1913, 401, 325.

3 : 4-Dimethylcyclohexanone.

B.p. 187°. D_4^{20} 0.906. n_D^{20} 1.4507.

Oxime : b.p. 109–14°/5 mm.

Semicarbazone : m.p. 189°.

Auwers, *Ann.*, 1920, 420, 99.

Ugnade, McLaren, *J. Org. Chem.*, 1945, 10, 29.

3 : 5-Dimethylcyclohexanone.

Cis–.

B.p. 182–3°, 66.5°/18 mm. D_4^{20} 0.890. n_D^{20} 1.4407.

Oxime : m.p. 79°. B.p. 142–3°/4 mm.

Semicarbazone : m.p. 202–3°.

Trans–.

dl–.

B.p. 180–1°, 64°/15 mm. D_4^{20} 0.897. n_D^{21} 1.4475.

Oxime : b.p. 116–8°/14 mm.

Semicarbazone : m.p. 193–4°.

d–.

D_4^{20} 0.9083. $[\alpha]_D^{20}$ + 4.65°.

Semicarbazone : m.p. 193–4°.

l–.

B.p. 67–8°/16 mm. D_4^{20} 0.9074. $[\alpha]_D^{20}$ – 7.91°.

Semicarbazone : m.p. 189°.

v. Braun, Anton, *Ber.*, 1927, 60, 2438.

v. Braun, Haensel, *Ber.*, 1926, 59, 2005.

Skita, Faust, *Ber.*, 1939, 72, 1132.

Cornubert, André, Hartmann, *Compt. rend.*, 1946, 222, 1505.

4 : 4-Dimethylcyclohexanone.

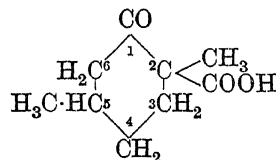
M.p. 38–40°. B.p. 73°/14 mm. D_4^{20} 0.932. n_D^{24} 1.4537.

Semicarbazone : m.p. 204°.

Auwers, Lange, *Ann.*, 1913, 401, 315.

Miller, Adams, *J. Am. Chem. Soc.*, 1936, 58, 787.

2 : 5-Dimethylcyclohexanone-2-carboxylic Acid



$C_9H_{14}O_3$

MW, 170

Et ester : $C_{11}H_{18}O_3$. MW, 198. B.p. 120–2°/12 mm. D_{19}^{19} 1.0189.

Kötz, Bieber, *Ann.*, 1907, 357, 198.

2 : 6-Dimethylcyclohexanone-2-carboxylic Acid

295

2 : 4-Dimethylcyclohexene

2 : 6 - Dimethylcyclohexanone - 2 - carb - oxylic Acid.

Et ester : b.p. 111–112°/15 mm.

Haworth, Barker, *J. Chem. Soc.*, 1939, 1301.

3 : 5-Dimethylcyclohexanone-2-carboxylic Acid.

Et ester : b.p. 103°/4 mm. D_4^{20} 1.021. n_D^{20} 1.4560. 2 : 4-Dinitrophenylhydrazone : m.p. 175°.

Adams *et al.*, *J. Am. Chem. Soc.*, 1942, 64, 2653.

4 : 5-Dimethylcyclohexanone-2-carboxylic Acid.

Et ester : b.p. 116°/10 mm. D_4^{20} 1.038. n_D^{20} 1.4771. 2 : 4-Dinitrophenylhydrazone : m.p. 146–7°.

Adams *et al.*, *J. Am. Chem. Soc.*, 1942, 64, 2653.

5 : 5-Dimethylcyclohexanone-2-carboxylic Acid.

Et ester : b.p. 125–8°/1 mm. D_4^{20} 1.020. n_D^{20} 1.4716. 2 : 4-Dinitrophenylhydrazone : m.p. 89°.

Adams *et al.*, *J. Am. Chem. Soc.*, 1942, 64, 2653.

6 : 6-Dimethylcyclohexanone-2-carboxylic Acid.

Et ester : b.p. 114–16°/14 mm.

Fischer, Wunderlich, *Ber.*, 1941, 74, 1544.

3 : 5-Dimethylcyclohexanone-3-carboxylic Acid.

Cryst. (containing H_2O) from H_2O . After drying in vacuum at 55°, m.p. 124–5°. Sol. EtOH, warm Et₂O, hot C₆H₆, hot H₂O. Almost insol. cold H₂O, CHCl₃, ligroin.

Oxime : cryst. from Et₂O. M.p. 155–6°.

Semicarbazone : microcryst. powder from MeOH. M.p. 203–5°.

Nitrile : cryst. from Et₂O. M.p. 92–4°.

Knoevenagel, Lange, *Ber.*, 1904, 37, 4062, 4071.

6 : 6-Dimethylcyclohexanone-3-carboxylic Acid.

Needles from H₂O. Leaflets from pet. ether. M.p. 89°. Sol. EtOH, Et₂O. Spar. sol. H₂O, pet. ether. Dil. HNO₃ → 1 : 1-dimethylglutaric acid + 1 : 1-dimethylsuccinic acid.

Oxime : cryst. from EtOH.Aq. M.p. 210° decomp.

Semicarbazone : cryst. from EtOH. M.p. 229° decomp.

Perkin, *J. Chem. Soc.*, 1898, 73, 848.

Blanc, *Bull. soc. chim.*, 1898, 73, 848.

2 : 3-Dimethylcyclohexanone-4-carboxylic Acid.

M.p. 132°.

Semicarbazone : m.p. 191°.

Chakravarti, *J. Indian Chem. Soc.*, 1944, 21, 319.

2 : 5-Dimethylcyclohexanone-4-carboxylic Acid.

M.p. 98–9°. B.p. 155°/4 mm.

Semicarbazone : m.p. 216° decomp.

Chakravarti, *J. Indian Chem. Soc.*, 1944, 21, 322.

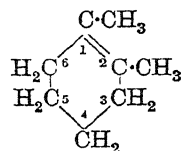
3 : 5-Dimethylcyclohexanone-4-carboxylic Acid.

Mixture of stereoisomerides. B.p. 169–74°/10 mm.

Et ester : b.p. 133°/12 mm., 125°/8 mm.

Merling, *Ber.*, 1905, 38, 981.

1 : 2 - Dimethylcyclohexene (Δ^1 -Tetrahydro-o-xylene)



C₈H₁₄

MW, 110

B.p. 135–6°. D_4^{20} 0.8260. n_D^{20} 1.4590.

Nitroschloride : m.p. 58–60°.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3331.

Meerwein, *Ann.*, 1914, 405, 150; 1918, 417, 268.

Wallach, *Ann.*, 1913, 396, 278.

Chiurdoglu, *Bull. soc. chim. Belg.*, 1938, 47, 241.

1 : 3 - Dimethylcyclohexene (Δ^1 -Tetrahydro-m-xylene).

B.p. 124–6°. D_4^{20} 0.8006. n_D^{20} 1.4487.

Ruzicka, Koolhaas, Wind, *Helv. Chim. Acta*, 1931, 14, 1165.

1 : 4 - Dimethylcyclohexene (Δ^1 -Tetrahydro-p-xylene).

B.p. 128–9° (124–6°/751 mm.). D_4^{20} 0.8005. n_D^{20} 1.4457.

Nitroschloride : m.p. 83–4°.

Auwers, Hinterseber, Treppmann, *Ann.*, 1915, 410, 269.

Wallach, *Ann.*, 1913, 396, 265.

Kazanskii, Glushnev, *Chem. Abstracts*, 1939, 33, 1279.

Zelinsky, Pawlow, *Ber.*, 1924, 57, 1069.

2 : 4 - Dimethylcyclohexene (Δ^3 -Tetrahydro-m-xylene).

d.

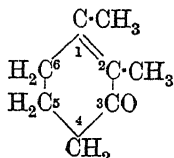
B.p. 126–7°. D_4^{20} 0.8015. n_D^{20} 1.4466. $[\alpha]_D^{20}$ + 95°, $[\alpha]_{5461}^{20}$ + 129°.

Nitroschloride : m.p. 118–19°.

dl-.

B.p. 124° (128°). D_4^{12} 0.8122. n_D^{12} 1.451.

Nitrolipericidide : m.p. 130-1°.

Signaigo, Cramer, *J. Am. Chem. Soc.*, 1933, 55, 3331.Wallach, *Ann.*, 1913, 396, 271.Auwers, Hinterseber, Treppmann, *Ann.*, 1915, 410, 269.Mousseron, Granger, *Compt. rend.*, 1938, 207, 366.**3 : 5-Dimethylcyclohexene** (Δ^4 -Tetrahydro-m-xylene).B.p. 124-5° (126-7°/746 mm.). D_4^{18} 0.8005 (0.8074). n_D^{18} 1.443 (1.4508 at 17°).Auwers, Peters, *Ber.*, 1910, 43, 3119.Auwers, Hinterseber, Treppmann, *Ann.*, 1915, 410, 267.**3 : 6-Dimethylcyclohexene.**B.p. 125-6°. D_{25}^{25} 0.804. n_D^{25} 1.4433.Mousseron, Winternitz, Jacquier, *Compt. rend.*, 1947, 224, 1062.**4 : 4-Dimethylcyclohexene.**B.p. 120-1°/767 mm. D_4^{16} 0.8056. n_D^{16} 1.445. $\text{KMnO}_4 \rightarrow$ 2 : 2-dimethyladipic acid.Auwers, Lange, *Ann.*, 1915, 409, 165.Hibbit, Linstead, *J. Chem. Soc.*, 1936, 474.**1 : 2-Dimethylcyclohexenone-3** (2 : 3-Dimethyl- Δ^2 -cyclohexenone) $\text{C}_8\text{H}_{12}\text{O}$

MW, 124

B.p. 118-9°/12 mm., (90-6°/14 mm.). $\text{KMnO}_4 \rightarrow$ 3-acetobutyric acid.

Semicarbazone : m.p. 225° decomp.

Bergmann, Weizmann, *J. Org. Chem.*, 1939, 4, 267.Kötz, Blendermann, Mähner, Rosenbusch, *Ann.*, 1913, 400, 83.Smith, Rouault, *J. Am. Chem. Soc.*, 1943, 65, 634.**1 : 4-Dimethylcyclohexenone-3** (3 : 6-Dimethyl- Δ^2 -cyclohexenone).B.p. 75°/19 mm. Volatile in steam. D_{18}^{18} 1.008. n_D^{18} 1.4805.

Semicarbazone : m.p. 138-9°.

Kötz, Blendermann, Mähner, Rosenbusch, *Ann.*, 1913, 400, 82.Mousseron, Winternitz, *Bull. soc. chim.*, 1945, 12, 71.**1 : 5-Dimethylcyclohexenone-3** (3 : 5-Dimethyl- Δ^2 -cyclohexenone).B.p. 208-9°, 134°/80 mm., 94°/17 mm. D^{20} 0.940. n_D^{20} 1.4819. Polymerises on boiling with 70% KOH to bis-dimethylcyclohexenone. Alk. $\text{KMnO}_4 \rightarrow$ 2-methyl-3-acetobutyric acid. Violet col. with FeCl_3 .

Semicarbazone : yellow cryst. from EtOH. M.p. 179-80°.

Thiosemicarbazone : decomp. at 195°.

Phenylhydrazone : m.p. 76-8°.

Knoevenagel, Klages, *Ann.*, 1894, 281, 111.Baeyer, Piccard, *Ann.*, 1915, 407, 341, 344.**1 : 6-Dimethylcyclohexenone-3.**

See Laurenone.

2 : 4-Dimethylcyclohexenone-3 (2 : 6-Dimethyl- Δ^2 -cyclohexenone).

Semicarbazone : cream col. prisms. M.p. 210-11°.

2 : 4-Dinitrophenylhydrazone : red needles. M.p. 153°.

Birch, *J. Chem. Soc.*, 1944, 435.**2 : 5-Dimethylcyclohexenone-3** (2 : 5-Dimethyl- Δ^2 -cyclohexenone).B.p. 189-90°. D^{22} 0.938. n_D^{22} 1.4753. Volatile in steam.

Oxime : two forms. (i) Cryst. from MeOH. M.p. 92-3°. (ii) Cryst. from EtOH. M.p. 169°.

Semicarbazone : cryst. from MeOH. M.p. 165°.

Wallach, *Ann.*, 1913, 396, 269; 397, 190.**4 : 6-Dimethylcyclohexenone-3** (4 : 6-Dimethyl- Δ^2 -cyclohexenone).

Semicarbazone : cream col. prisms. M.p. 175°.

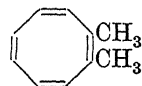
2 : 4-Dinitrophenylhydrazone : red needles. M.p. 152°.

Birch, *J. Chem. Soc.*, 1944, 435.**5 : 5-Dimethylcyclohexenone-3** (5 : 5-Dimethyl- Δ^2 -cyclohexenone).B.p. 88.5°/32 mm. $\text{H}_2\text{SO}_4 \rightarrow$ red col. which becomes violet and then disappears.

Semicarbazone : scales from MeOH. M.p. 195°.

Crossley, Renouf, *J. Chem. Soc.*, 1907, 91, 78.**1 : 5-Dimethylcyclohexenone-4** (2 : 4-Dimethyl- Δ^4 -cyclohexenone).B.p. 192-3° (194°). D^0 0.9539. Mod. sol. H_2O . $\text{KMnO}_4 \rightarrow$ 2-acetoisobutyric acid. Adds Br.

Oxime : m.p. 102°.

Béhal, *Compt. rend.*, 1901, 132, 342.**1 : 2-Dimethylcyclo-octatetraene** $\text{C}_{10}\text{H}_{12}$

MW, 132

Oil. B.p. 107°/96 mm. D_4^{25} 0.8950. n_D^{25} 1.5219.

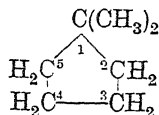
AgNO₃ add. comp.: cryst. from EtOH. M.p. 142.5–144.5°.

Maleic anhydride add. comp.: cryst. from C₆H₆-hexane. M.p. 184.5–185.5°.

Cope, Van Orden, *J. Am. Chem. Soc.*, 1952, 74, 175.

Cope, Campbell, *ibid.*, 179.

1 : 1-Dimethylcyclopentane



C₇H₁₄

MW, 98

F.p. –70°. B.p. 88°. D_4^{20} 0.7552. n_D^{20} 1.4139. Stable to oxidising agents.

Kishner, *Chem. Zentr.*, 1908, II, 1860; 1913, II, 2132.

Chavanne *et al.*, *Bull. soc. chim. Belg.*, 1930, 39, 402; 1931, 40, 611, 673.

1 : 2-Dimethylcyclopentane.

Cis.

M.p. –52.5°. B.p. 99.23°. D_4^{20} 0.77268.

Trans.

M.p. –119°. B.p. 91.78°. D_4^{20} 0.75137.

Chavanne, Devogel, *Bull. soc. chim. Belg.*, 1928, 37, 141.

Kishner, *Chem. Zentr.*, 1908, II, 1859.

Chiurdoglu, *Bull. soc. chim. Belg.*, 1938, 47, 363.

Nenitzesco, Vantu, *Bull. soc. chim.*, 1935, 2, 2209.

1 : 3-Dimethylcyclopentane.

d.

B.p. 91°. D_4^{18} 0.7497. n_D^{18} 1.4110. $[\alpha]_D +1.78^\circ$.

dl.

F.p. –134°. B.p. 91.5° (94°). D_4^{20} 0.7563 (0.7456). n_D^{20} 1.4144 (1.4076).

Zelinsky, *Ber.*, 1902, 35, 2678.

Chavanne, *Chem. Abstracts*, 1926, 20, 2664.

Puchkov, *Chem. Abstracts*, 1939, 33, 3766, 4968.

1 : 2-Dimethylcyclopentane-1 : 3-dicarboxylic Acid.

See Santenic Acid and Allosantenic Acid.

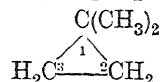
2 : 2-Dimethylcyclopentane-1 : 1 : 3-tricarboxylic Acid.

See Camphoic Acid.

3 : 4-Dimethylcyclopentene-2 : 4-dicarboxylic Acid.

See Isosantenic Acid.

1 : 1-Dimethylcyclopropane



C₅H₁₀

MW, 70

B.p. 21°. Sol. H₂SO₄ (2 vols. conc. acid + 1 vol. H₂O). D_4^{20} 0.660. n_D^{20} 1.366.

Gustavson, Popper, *J. prakt. Chem.*, 1898, 58, 458.

Whitmore, Popkin, Pfister, *J. Am. Chem. Soc.*, 1939, 61, 1616.

Whitmore, Zook, *J. Am. Chem. Soc.*, 1942, 64, 1783.

1 : 2-Dimethylcyclopropane.

Two stereoisomeric forms exist. (i) B.p. 29°. D_4^{20} 0.6769. n_D^{20} 1.3713. (ii) B.p. 37°. D_4^{20} 0.6928. n_D^{20} 1.3822. This form is more resistant to Br.

Baudrenghien, *Bull. soc. chim. Belg.*, 1929, 38, 172.

Zelinsky, Ujedinoff, *J. prakt. Chem.*, 1911, 84, 547.

1 : 1-Dimethylcyclopropane-2 : 3-dicarboxylic Acid.

See Caronic Acid.

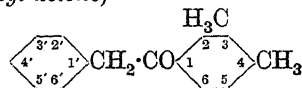
β : β -Dimethylcysteine.

See Penicillamine.

Dimethyldaidzein.

See under Daidzein.

2 : 4-Dimethyldeoxybenzoin (Benzyl 2 : 4-dimethylphenyl ketone)



C₁₆H₁₆O

MW, 224

B.p. 350°, 206–8°/22 mm. n_D^{23} 1.5839. Sol. Et₂O. Mod. sol. EtOH.

Semicarbazone : m.p. 196–8°.

Wege, *Ber.*, 1891, 24, 3541.

Buu-Hoi, *Bull. soc. chim.*, 1946, 117.

2 : 5-Dimethyldeoxybenzoin (Benzyl 2 : 5-dimethylphenyl ketone).

B.p. 220–30°/26 mm. Sol. Et₂O.

Oxime : m.p. 99°.

Phenylhydrazones : reddish cryst. M.p. 96°.

Wege, *Ber.*, 1891, 24, 3541.

3 : 4-Dimethyldeoxybenzoin (Benzyl 3 : 4-dimethylphenyl ketone).

Yellow leaflets. M.p. 95°. B.p. 210–20°/22 mm. Sol. Et₂O, ligroin.

Söllscher, *Ber.*, 1882, 15, 1681.

Wege, *Ber.*, 1891, 24, 3541.

4 : 4'-Dimethyldeoxybenzoin (p-Tolyl p-tolubenzyl ketone, p-tolyl p-xylyl ketone, deoxy-p-toluoin).

Needles from EtOH. M.p. 102° (98°). B.p. 202–10°/10 mm. Sol. C₆H₆.

Oxime: m.p. 128°.

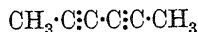
Stierlin, *Ber.*, 1889, 22, 383.

Buttenberg, *Ann.*, 1894, 279, 335.

Collet, *Bull. soc. chim.*, 1897, 17, 508.

Ramart-Lucas, Salmon-Legagneur, *Bull. soc. chim.*, 1932, 51, 1069.

Dimethyldiacetylene (2 : 4-*Hexadi-yne*)



C_8H_6

MW, 78

Cryst. M.p. 64° (67°, 68.5°). B.p. 129–30°.

Griner, *Ann. chim.*, 1902, 26, 354.

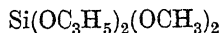
Macbeth, Stewart, *J. Chem. Soc.*, 1917, 111, 833.

Prévost, *Ann. chim.*, 1928, 10, 372.

Schlubach, Wolf, *Ann.*, 1950, 568, 141.

Armitage, Jones, Whiting, *J. Chem. Soc.*, 1951, 44.

Dimethyl diallyl orthosilicate



$\text{C}_8\text{H}_{16}\text{O}_4\text{Si}$

MW, 204

B.p. 94.7–95.0°/34 mm. n_D^{20} 1.4110.

Peppard, Brown, Johnson, *J. Am. Chem. Soc.*, 1946, 68, 70.

Dimethyldiazine.

See Dimethylpyrazine, Dimethylpyridazine and Dimethylpyrimidine.

2 : 2'-Dimethyldiazoaminobenzene (o-*Diazoaminotoluene*)



$\text{C}_{14}\text{H}_{15}\text{N}_3$

MW, 225

Orange cryst. M.p. 51°.

Hoff, *Ann.*, 1900, 311, 95.

Fischer, Wimmer, *Ber.*, 1887, 20, 1583.

Dwyer, Mellor, Trikojus, *Chem. Zentr.*, 1934, I, 2418.

2 : 4'-Dimethyldiazoaminobenzene (op'-*Diazoaminotoluene*).

Yellow needles. M.p. 120°. Sol. ligroin.

Mehner, *J. prakt. Chem.*, 1901, 65, 432.

Dwyer, *J. Soc. Chem. Ind.*, 1937, 56, 70T.

3 : 2'-Dimethyldiazoaminobenzene (mo'-*Diazoaminotoluene*).

Yellow cryst. M.p. 74°. Sol. ligroin.

Mehner, *J. prakt. Chem.*, 1901, 65, 444.

Dwyer, *J. Soc. Chem. Ind.*, 1937, 56, 70T.

3 : 3'-Dimethyldiazoaminobenzene (m-*Diazoaminotoluene*).

Yellow needles. M.p. 52°. Sol. most ord. org. solvents.

Mehner, *J. prakt. Chem.*, 1901, 65, 444.

3 : 4'-Dimethyldiazoaminobenzene (mp'-*Diazoaminotoluene*).

Yellow needles. M.p. 97°.

Mehner, *J. prakt. Chem.*, 1901, 65, 424.

4 : 4'-Dimethyldiazoaminobenzene (p-*Diazoaminotoluene*).

Reddish yellow cryst. M.p. 118° (116°).

Hoff, *Ann.*, 1900, 311, 92.

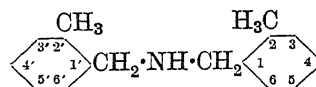
Dimethyldibenzoylhydrazine.

See Ditoluylylhydrazine.

Dimethyldibenzyl.

See 2 : 3-Diphenyl-*n*-butane and sym.-Ditolylethane.

2 : 2'-Dimethyldibenzylamine (o-*Dixylylamine*)



$\text{C}_{16}\text{H}_{19}\text{N}$

MW, 225

B.p. 190°/16 mm.

B, HCl: m.p. 202°.

N-Nitroso: m.p. 46–7°.

Picrate: m.p. 133°.

v. Braun, Blessing, Zobel, *Ber.*, 1923, 56, 1999.

Rupe, Bernstein, *Helv. Chim. Acta*, 1930, 13, 461.

3 : 3'-Dimethyldibenzylamine (m-*Dixylylamine*).

B.p. 189–91°/14 mm.

B, HCl: m.p. 199°.

*B, (COOH)*₂: m.p. 235°.

v. Braun, Blessing, Zobel, *Ber.*, 1923, 56, 1999.

Rupe, Bernstein, *Helv. Chim. Acta*, 1930, 13, 462.

4 : 4'-Dimethyldibenzylamine (p-*Dixylylamine*).

M.p. 32.5°. B.p. 220°/30 mm., 193°/13 mm.

B, HCl: leaflets. M.p. 272°. Spar. sol. H_2O .

*B, HNO*₃: m.p. 213°. Spar. sol. H_2O .

*B*₂, *H*₂*SO*₄: needles. M.p. 119°. Sol. H_2O .

N-Nitroso: m.p. 52°.

Picrate: m.p. 153°.

v. Braun, Blessing, Zobel, *Ber.*, 1923, 56, 2000.

Rupe, Bernstein, *Helv. Chim. Acta*, 1930, 13, 464.

α : α' -**Dimethyldibenzylamine.**

See 1 : 1'-Diphenyldiethylamine.

Dimethyldiethylmethane.

See 3 : 3-Dimethylpentane.

Dimethyldihydroresorcinol.

See 1 : 1-Dimethylcyclohexandione-3 : 5.

Dimethyldi-isopropylphenolphthalein.

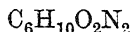
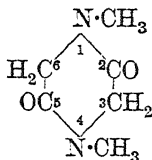
See Thymolphthalein.

Dimethyl Diketone.

See Diacetyl.

1 : 4-Dimethyl-2 : 5-diketopiperazine

(Cyclic anhydride or amide of sarcosine)



MW, 142

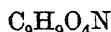
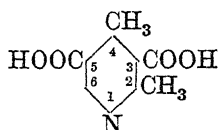
Plates or prisms from EtOH. M.p. 149°. Very sol. H_2O , Et_2O . Forms add. comps. with most primary and secondary amines.

Heimrod, *Ber.*, 1914, 47, 346.Maillard, *Compt. rend.*, 1892, 153, 1080.Mylius, *Ber.*, 1884, 17, 287.**3 : 6-Dimethyl-2 : 5-diketopiperazine**
(Cyclic anhydride or amide of alanine, lactimide).

dl-.

Needles or leaflets. M.p. 279° (271°). Sol. H_2O , AcOH. Insol. EtOH.

l-.

M.p. 272°. $[\alpha]_D^{20} + 29.1^\circ$ in EtOH.Aq.Shibata, Asahina, *Bull. Chem. Soc. Japan*, 1926, 1, 71.Kipping, Pope, *J. Chem. Soc.*, 1926, 494.**2 : 4-Dimethyldinicotinic Acid** (2 : 4-Dimethylpyridine-3 : 5-dicarboxylic acid, 2 : 4-lutidine-3 : 5-dicarboxylic acid)

MW, 195

Needles or prisms. M.p. 260° decomp. Sol. hot H_2O , hot EtOH. $k = 5.5 \times 10^{-3}$ at 25°.

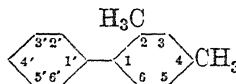
Wolff, *Ann.*, 1902, 322, 375.**2 : 6-Dimethyldinicotinic Acid** (2 : 6-Lutidine-3 : 5-dicarboxylic acid).

M.p. 316°. Spar. sol. EtOH, Et_2O , cold H_2O . $k = 3.4 \times 10^{-3}$ at 25°.

Et ester: $C_{11}H_{13}O_4N$. MW, 223. Needles from H_2O . M.p. 131°.

Di-Et ester: $C_{13}H_{17}O_4N$. MW, 251. Needles. M.p. 73°. B.p. 301-2°, 179-80°/16 mm. Sol. EtOH, Et_2O , C_6H_6 , ligroin. Picrate: m.p. 119°.

Di-hydrazide: m.p. 227-8°.

Skraup, *Ann.*, 1919, 419, 57.Meyer, Tropsch, *Monatsh.*, 1914, 35, 208.Knoevenagel, Fuchs, *Ber.*, 1902, 35, 1788.Claisen, *Ann.*, 1897, 297, 39.Singer, McElvain, *Organic Syntheses*, 1934, XIV, 30.**2 : 4-Dimethyldiphenyl** (4-Phenyl-m-xylene)

MW, 182

B.p. 270-6°, 144-5°/20 mm.

Jacobson, *Ann.*, 1922, 427, 216.**2 : 6-Dimethyldiphenyl** (2-Phenyl-m-xylene).

B.p. 260-5°.

Jacobson, *Ann.*, 1922, 427, 213.**3 : 4-Dimethyldiphenyl** (4-Phenyl-o-xylene).

B.p. 281-3°.

Ghigi, *Ber.*, 1938, 71, 687.**3 : 5-Dimethyldiphenyl** (5-Phenyl-m-xylene).

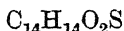
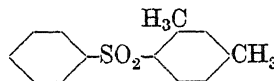
B.p. 273-6°.

Hey, Jackson, *J. Chem. Soc.*, 1934, 648.**Dimethyldiphenyl.**

See also Ditolyl.

Dimethyldiphenyl sulphide.

See Ditolyl sulphide and under Thioxylenol.

2 : 4-Dimethyldiphenyl sulphone

MW, 246

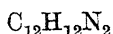
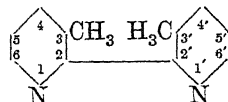
Cryst. from EtOH. M.p. 87°.

Steinkopf, Hübner, *J. prakt. Chem.*, 1934, 141, 193.**Dimethyldiphenyl sulphone.**

See also Ditolyl sulphone.

Dimethyldiphenyl sulfoxide.

See Ditolyl sulfoxide.

3 : 3'-Dimethyl-2 : 2'-dipyridyl

MW, 184

B.p. 293-8°.

Di-picrate: m.p. 188-9°.

Case, *J. Am. Chem. Soc.*, 1946, 68, 2574.**4 : 4'-Dimethyl-2 : 2'-dipyridyl.**

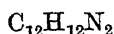
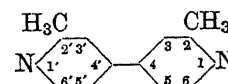
M.p. 171-2°.

Case, *J. Am. Chem. Soc.*, 1946, 68, 2574.**6 : 6'-Dimethyl-2 : 2'-dipyridyl.**

Cryst. from petrol. M.p. 89-90°.

 $HgCl_2$ comp.: m.p. 237-8°.

Picrate: m.p. 170-1°.

Burstall, *J. Chem. Soc.*, 1938, 1669.**2 : 2'-Dimethyl-4 : 4'-dipyridyl**

MW, 184

Needles from ligroin. Plates + 4H₂O from H₂O. M.p. 37–8°, anhyd. 84°. B.p. 303–6°. Readily sol. EtOH, Et₂O, C₆H₆, CHCl₃.

B,2*H*AuCl₄: yellow needles from H₂O. M.p. 209–10° decomp.

B,2*H*Cl,6*H*gCl₂: tablets from HCl. M.p. 220° decomp.

Picrate: yellow tablets from H₂O. M.p. 240° decomp.

Heuser, Stoehr, *J. prakt. Chem.*, 1890, 42, 430; 1891, 44, 404.

3 : 3'-Dimethyl-4 : 4'-dipyridyl.

Plates from EtOH.Aq. or ligroin. M.p. 125°. B.p. about 301°. Readily sol. EtOH, Et₂O, CHCl₃. Sol. C₆H₆. Spar. sol. H₂O.

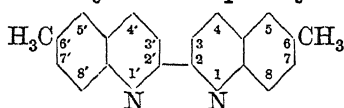
B,2*H*AuCl₄: pale yellow leaflets from dil. HCl. M.p. 263° decomp.

B,2*H*Cl,4*H*gCl₂: cryst. from dil. HCl. M.p. 221–2°.

Picrate: yellow needles from H₂O. M.p. 230° decomp.

Stoehr, Wagner, *J. prakt. Chem.*, 1893, 48, 2.

6 : 6'-Dimethyl-2 : 2'-diquinolyl



C₂₀H₁₆N₂ MW, 284

Needles from C₆H₆. M.p. 203°. Very sol. CHCl₃. Mod. sol. EtOH, Me₂CO, pet. ether.

Ethiodide: needles from EtOH. M.p. 277–8° decomp.

Picrate: yellow needles from AcOH. M.p. 282–3° decomp.

Conolly, *J. Chem. Soc.*, 1925, 127, 2084.

7 : 7'-Dimethyl-2 : 2'-diquinolyl.

Needles from CCl₄. M.p. 208–9°. Sol. EtOH, AcOEt, CHCl₃.

Ethiodide: yellow needles from EtOH. M.p. 274–5° decomp.

Picrate: yellow needles from EtOH. M.p. 285–6° decomp.

Conolly, *J. Chem. Soc.*, 1925, 127, 2084.

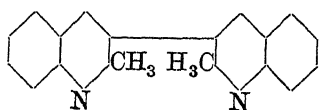
8 : 8'-Dimethyl-2 : 2'-diquinolyl.

Needles from CCl₄. M.p. 147°. Sol. EtOH, AcOEt, C₆H₆, CHCl₃.

Picrate: yellow needles from AcOEt. M.p. 264–5°.

Conolly, *J. Chem. Soc.*, 1925, 127, 2085.

2 : 2'-Dimethyl-3 : 3'-diquinolyl



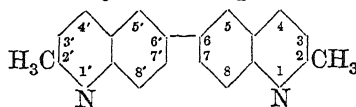
C₂₀H₁₆N₂

MW, 284

Needles + 2H₂O from EtOH.Aq. M.p. 104–5°, anhyd. 144°.

Eliasberg, Friedländer, *Ber.*, 1892, 25, 1757.

2 : 2'-Dimethyl-6 : 6'-diquinolyl



C₂₀H₁₆N₂

MW, 284

Needles from EtOH. M.p. 208–9°. B.p. above 360° with slight decomp. Sol. Me₂CO, C₆H₆, CHCl₃. Spar. sol. H₂O, Et₂O, pet. ether.

Picrate: orange red needles from EtOH. M.p. about 230° decomp.

Paternò, *Gazz. chim. ital.*, 1914, 44, 246.

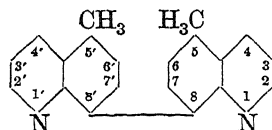
Hinz, *Ann.*, 1887, 242, 326.

8 : 8'-Dimethyl-6 : 6'-diquinolyl.

Needles from EtOH. M.p. 188°. Sol. Et₂O, C₆H₆, CHCl₃. Spar. sol. ligroin.

Ruttan, *Chem. Zentr.*, 1893, II, 52.

5 : 5'-Dimethyl-8 : 8'-diquinolyl



C₂₀H₁₆N₂

MW, 284

Yellow needles and leaflets from EtOH. M.p. 215°. Sol. C₆H₆, CHCl₃. Insol. H₂O, Et₂O.

B,2*H*Cl: needles. M.p. about 320°.

B,2*H*NO₃: yellow needles. Decomp. at 210°.

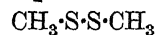
Niementowski, Seifert, *Ber.*, 1905, 38, 765.

7 : 7'-Dimethyl-8 : 8'-diquinolyl.

M.p. 213–5°. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

Ward, Waring, *J. Am. Chem. Soc.*, 1932, 54, 1697.

Dimethyl disulphide



C₂H₆S₂

MW, 94

M.p. –98°. B.p. 109–5° (116–18°). D₄²⁰ 1.0647. n_D²⁰ 1.5260. Cl → (CH₃)₂S₂Cl₂.

Cahours, *Ann.*, 1847, 61, 92.

Ferrario, Vinay, *Bull. soc. chim.*, 1910, 7, 524.

Dimethyl disulphide dicarboxylic Acid.

See Disulphidoacetic Acid.

Dimethyldithiocarbamic Acid



C₃H₇NS₂

MW, 121

Free acid very unstable. Rapidly oxidised to tetramethylthiuram disulphide. The salts are employed as rubber vulcanisation accelerators.

Na salt, 2½H₂O : anhydrous at 130°.

Me ester: $(\text{CH}_3)_2\text{N}\cdot\text{CSS}\cdot\text{CH}_3$. $\text{C}_4\text{H}_9\text{NS}_2$. MW, 135. Cryst. from EtOH.Aq. M.p. 47° . B.p. 243° . Sol. EtOH. Insol. H_2O . Volatile in steam.

Et ester: dimethyldithiourethane. $(\text{CH}_3)_2\text{N}\cdot\text{CSS}\cdot\text{C}_2\text{H}_5$. $\text{C}_5\text{H}_{11}\text{NS}_2$. MW, 149. M.p. 2° . B.p. 252° . Sol. EtOH. D_4^{15} 1.1258. n_D^{19} 1.5953.

Clifford, Lichty, *J. Am. Chem. Soc.*, 1932, 54, 1164.

Hutin, *Chem. Zentr.*, 1918, I, 1213.

v. Braun, *Ber.*, 1902, 35, 3370.

Delépine, *Bull. soc. chim.*, 1892, 7, 989; 1902, 27, 591.

Levi, *Chem. Abstracts*, 1932, 26, 116.

Kuznetsov, Logunova, *Chem. Abstracts*, 1935, 29, 7952.

Dimethyldithiourethane.

See under Dimethyldithiocarbamic Acid.

Dimethylenedioxybenzil.

See Piperil.

Dimethylenedioxybenzoin.

See Piperoin.

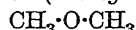
Dimethyleneimine.

See Ethyleneimine.

N-Dimethylethanolamine.

See 2-Dimethylaminoethyl Alcohol.

Dimethyl Ether (Methyl ether)



$\text{C}_2\text{H}_6\text{O}$ MW, 46

F.p. -138.5° . B.p. -23.6° . 1 vol. H_2O diss. 37 vols. of the gas at 18° . Heat of comb. C_p 344.2 Cal., C_v 343.1 Cal. Decomp. at red heat. Forms add. comps. with halogens and hydrogen halides at low temps.

$\text{C}_2\text{H}_6\text{O}\cdot\text{HCl}$: m.p. -97.1° .

$\text{C}_2\text{H}_6\text{O}\cdot 4\text{HCl}$: m.p. -102.8° .

$\text{C}_2\text{H}_6\text{O}\cdot\text{HBr}$: m.p. -13° .

$\text{C}_2\text{H}_6\text{O}\cdot\text{HI}$: m.p. -22° .

Birk, Nitzschmann, *Chem. Abstracts*, 1930, 24, 2106 (*Review*), 5719.

I.G., B.P. 313,426, (*Chem. Abstracts*, 1930, 24, 1119).

Senderens, *Compt. rend.*, 1931, 192, 1335.

Dimethyl Ether dicarboxylic Acid.

See Diglycollic Acid.

Dimethyl-2-ethoxyethylamine.

See 2-Dimethylaminodiethyl Ether.

Dimethylethylacetic Acid.

See 1 : 1-Dimethylbutyric Acid.

Dimethylethylamine



$\text{C}_4\text{H}_{11}\text{N}$ MW, 73

B.p. 37.5° .

$\text{B}\cdot\text{HCl}$: cryst. M.p. $221-2^\circ$. Sol. H_2O , EtOH. Insol. Et_2O .

$\text{B}\cdot\text{HBr}$: cryst. M.p. $196-7^\circ$ (sintering). Sol. H_2O , EtOH, CHCl_3 . Insol. Et_2O .

$\text{B}\cdot\text{HI}$: cryst. M.p. $108-9^\circ$ (sintering). Sol. H_2O , EtOH, CHCl_3 . Insol. Et_2O .

$\text{B}\cdot\text{HAuCl}_4$: m.p. $208-9^\circ$ (sintering).

Picrate: m.p. 193° (195°).

Eschweiler, *Ber.*, 1905, 38, 881.

Schlegel, *Ber.*, 1931, 64, 1740.

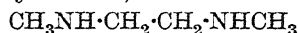
Dimethylethylcarbinol.

See tert.-Amyl Alcohol.

Dimethylethylene.

See 2-Butylene and Isobutylene.

sym.-Dimethylethylenediamine (*Ethylene-sym.-dimethyldiamine*)



$\text{C}_4\text{H}_{12}\text{N}_2$ MW, 88

B.p. 120° . D_4^{15} 0.828.

$\text{B}\cdot 2\text{HCl}$: m.p. 231° ($235-6^\circ$ decomp.). Sol. H_2O .

$\text{B}\cdot 2\text{HBr}$: m.p. 179° (not sharp).

$\text{B}\cdot \text{H}_2\text{PtCl}_6\cdot 4\text{H}_2\text{O}$: m.p. 209° decomp.

$\text{B}\cdot \text{H}_2\text{AuCl}_5$: orange yellow cryst. M.p. 238° .

Picrate: m.p. 215° .

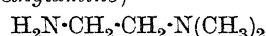
Johnson, Bailey, *J. Am. Chem. Soc.*, 1917, 38, 2143.

v. Braun, Heider, Müller, *Ber.*, 1918, 51, 739.

Gibbs, *J. Am. Chem. Soc.*, 1906, 28, 1413.

Kermack, Wight, *J. Chem. Soc.*, 1935, 1425.

unsym.-Dimethylethylenediamine (β -*Dimethylaminoethylamine*)



$\text{C}_4\text{H}_{12}\text{N}_2$ MW, 88

B.p. 107° .

Phenylthioureido: m.p. 83° .

α -*Naphthylureido*: m.p. 149° .

Baltzly, Buck, Ide, *J. Am. Chem. Soc.*, 1942, 64, 2232.

Turner, *J. Am. Chem. Soc.*, 1946, 68, 1607.

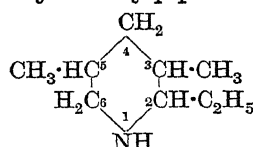
Dimethylethylene Glycol.

See ψ -Butylene Glycol and Isobutylene Glycol.

Dimethylethylene oxide.

See β -Butylene oxide.

3 : 5-Dimethyl-2-ethylpiperidine



$\text{C}_9\text{H}_{19}\text{N}$ MW, 141

B.p. $176-7^\circ$. D_4^{20} 0.8474. Spar. sol. H_2O .

Dürkopf, Göttisch, *Ber.*, 1890, 23, 685, 1111.

1 : 2-Dimethyl-3-ethylpiperidine.

B.p. $175-80^\circ$. D_4^{18} 0.8494. Spar. sol. H_2O .

$\text{B}\cdot\text{HAuCl}_4$: cryst. from H_2O . M.p. $125-8^\circ$.

B_2, H_2PtCl_6 : orange plates from EtOH.
M.p. 154–5°.

Picrate: cryst. from H_2O . M.p. 162–3°.

Ladenburg, Brandt, *Ann.*, 1899, 304, 85.
Lipp, Widmann, *Ann.*, 1915, 409, 110.

2 : 6-Dimethyl-4-ethylpiperidine.

B.p. 165–7°/725 mm.

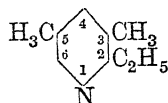
Jaekle, *Ann.*, 1888, 246, 45.

Dimethylethylpropylmethane.

See 3 : 3-Dimethyl-*n*-hexane.

3 : 5-Dimethyl-2-ethylpyridine (2-Ethyl-

3 : 5-lutidine)



$C_9H_{13}N$

MW, 135

B.p. 198–9°/764 mm. Sol. H_2O . Volatile in steam.

$B, HgAuCl_4$: yellow cryst. from dil. HCl. M.p. 81–2°.

$B, HCl, 3HgCl_2$: needles from dil. HCl. M.p. 117–9°.

B_2, H_2PtCl_6 : orange-yellow prisms. M.p. 189°.

Picrate: yellow plates. M.p. 152°.

Hesekiel, *Ber.*, 1885, 18, 3097.

Tschitschibabin, Oparina, *J. prakt. Chem.*, 1924, 107, 154.

2 : 6-Dimethyl-4-ethylpyridine (4-Ethyl-2 : 6-lutidine).

B.p. 186°. D_4^{20} 0.916. Prac. insol. hot H_2O .

B_2, H_2PtCl_6 : m.p. 210–11°.

Picrate: needles from H_2O . M.p. 119–20°.

Englemann, *Ann.*, 1885, 231, 44.

3 : 5-Dimethyl-4-ethylpyridine (4-Ethyl-3 : 5-lutidine).

B.p. 216–7°. Spar. sol. H_2O .

$B, HgAuCl_4$: yellow needles from dil. HCl. M.p. 138–40°.

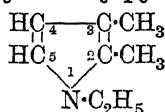
B_2, H_2PtCl_6 : m.p. above 270°.

$B, HCl, HgCl_2$: m.p. 158–9°.

Dürkopf, Göttisch, *Ber.*, 1890, 23, 685, 692.

Tschitschibabin, Oparina, *J. prakt. Chem.*, 1924, 107, 154.

2 : 3-Dimethyl-1-ethylpyrrole



$C_8H_{13}N$

MW, 123

B.p. 59°/11 mm. Does not form a *picrate*.

Piloty, Wilke, *Ber.*, 1913, 46, 1601.

2 : 5-Dimethyl-1-ethylpyrrole.

B.p. 102°/79 mm.

Hazlewood, Hughes, Lions, *Chem. Zentr.*, 1938, I, 2876.

3 : 4-Dimethyl-2-ethylpyrrole.

B.p. 77–8°/10 mm.

Picrate: m.p. 122–5°.

Fischer, Pützer, *Ber.*, 1928, 61, 1071.

Piloty, Hirsch, *Ann.*, 1913, 395, 67.

3 : 5-Dimethyl-2-ethylpyrrole.

B.p. 187–8°, 93–5°/20 mm.

Fischer, Walach, *Ann.*, 1926, 447, 42.

1 : 2-Dimethyl-3-ethylpyrrole.

B.p. 59–61°/10 mm. Does not form a *cryst. picrate*.

Piloty, Wilke, Blömer, *Ann.*, 1915, 407, 39.

2 : 4-Dimethyl-3-ethylpyrrole.

See Cryptopyrrole.

2 : 5-Dimethyl-3-ethylpyrrole.

B.p. 187–8°, 121°/63 mm., 112°/42 mm., 93–4°/21 mm. Sol. EtOH, Et_2O , C_6H_6 , AcOH, Py. Insol. H_2O . Does not form a *cryst. picrate*.

Knorr, Hess, *Ber.*, 1911, 44, 2763.

Hess, Wissing, Suchier, *Ber.*, 1915, 48, 1878.

2 : 3-Dimethyl-4-ethylpyrrole.

See Hæmopyrrole.

1 : 2-Dimethyl-5-ethylpyrrole.

B.p. 186–7°.

Lukeš, *Chem. Abstracts*, 1932, 26, 4328.

2 : 3-Dimethyl-5-ethylpyrrole.

Yellow oil.

Fischer, Bartholomäus, *Ber.*, 1912, 45, 1984.

2 : 4-Dimethyl-3-ethylpyrrolidine.

See Cryptopyrrolidine.

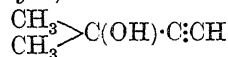
2 : 4-Dimethyl-3-ethylpyrroline.

See Cryptopyrroline.

Dimethyl-ethylstyrene.

See Methyl-phenyl-2-pentene.

Dimethylethynylcarbinol (3-Hydroxy-3-methyl-1-butyne)



C_5H_8O

MW, 84

F.p. –3.5 to –3.0°. B.p. 103–5°, 60°/120 mm. D_4^{20} 0.8618. n_D^{20} 1.4207.

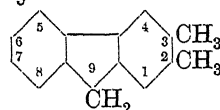
Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, 60, 2882.

Coffman, *Organic Syntheses*, 1940, XX, 40.

Kreimeier, U.S.P. 2,106,180, (*Chem. Abstracts*, 1938, 32, 2547).

Hurd, McPhee, *J. Am. Chem. Soc.*, 1947, 69, 239.

2 : 3-Dimethylfluorene



$C_{15}H_{14}$

MW, 194

Plates from MeOH. M.p. 125–6°.

Alder, Rickert, *Ber.*, 1938, **71**, 386.

Lothrop, Coffman, *J. Am. Chem. Soc.*, 1941, **63**, 2564.

2 : 5-Dimethylfluorene.

M.p. 58–9°.

Mascarelli, Longo, *Gazz. chim. ital.*, 1941, **71**, 389.

2 : 6-Dimethylfluorene.

M.p. 66–7°.

Longo, *Chem. Abstracts*, 1939, **33**, 6286.

2 : 7-Dimethylfluorene.

Leaflets. M.p. 114–5°. $\text{H}_2\text{SO}_4 \rightarrow$ green sol.

Longo, *Chem. Zentr.*, 1938, **II**, 2929.

3 : 4-Dimethylfluorene.

Cryst. from EtOH. M.p. 100°.

Ritchie, *Chem. Abstracts*, 1947, **41**, 3095.

3 : 6-Dimethylfluorene.

M.p. 130–1°.

Chardonnens, Wurmli, *Helv. Chim. Acta*, 1946, **29**, 922.

3 : 7-Dimethylfluorene.

Needles. M.p. 66–7°.

Longo, *Chem. Zentr.*, 1938, **II**, 2929.

4 : 6-Dimethylfluorene.

Needles. M.p. 81–2°.

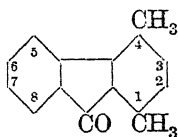
Longo, *Chem. Zentr.*, 1938, **II**, 2929.

9 : 9-Dimethylfluorene.

M.p. 95–6°.

Anchel, Blatt, *J. Am. Chem. Soc.*, 1941, **63**, 1948.

1 : 4-Dimethylfluorenone



$\text{C}_{15}\text{H}_{12}\text{O}$

MW, 208

Yellow needles from Et_2O . M.p. 108°.

Schaarschmidt, Herzenberg, *Ber.*, 1920, **63**, 1396.

2 : 3-Dimethylfluorenone.

M.p. 109–10°.

Fujise, *Ber.*, 1938, **71**, 2468.

Lothrop, Coffman, *J. Am. Chem. Soc.*, 1941, **63**, 2564.

3 : 4-Dimethylfluorenone.

Yellow needles. M.p. 117°.

Ritchie, *Chem. Abstracts*, 1947, **41**, 3095.

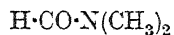
3 : 6-Dimethylfluorenone.

M.p. 118°.

Oxime : m.p. 189–91°.

Chardonnens, Wurmli, *Helv. Chim. Acta*, 1946, **29**, 922.

Dimethylformamide (Formyldimethylamine)



$\text{C}_3\text{H}_7\text{ON}$

MW, 73

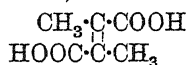
M.p. –61°. B.p. 153°, 76°/39 mm. D_4^{25} 0.9484. n_D^{25} 1.42938.

Mitchell, Reid, *J. Am. Chem. Soc.*, 1931, **53**, 1881.

Ruhoff, Reid, *J. Am. Chem. Soc.*, 1937, **59**, 401.

Brown, *J. appl. Chem.*, 1951, **1**, Suppl. 2, 159.

Dimethylfumaric Acid (trans-2-Butylene-2 : 3-dicarboxylic acid)



$\text{C}_6\text{H}_8\text{O}_4$

MW, 144

Needles from H_2O . M.p. 241°. Sol. EtOH, hot H_2O . Insol. C_6H_6 , ligroin, CHCl_3 . Heat \rightarrow dimethylmaleic anhydride. $k = 29.3 \times 10^{-4}$ at 25°.

Me ester : $\text{C}_7\text{H}_{10}\text{O}_4$. MW, 158. M.p. 81°.

Di-Me ester : $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 95°/12 mm.

Et ester : $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. 118°/1 mm.

Di-Et ester : $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 111–12°/12 mm. D_4^{25} 1.024.

Dichloride : $\text{C}_6\text{H}_6\text{O}_2\text{Cl}_2$. MW, 181. B.p. 79.5°/22 mm.

Dianilide : m.p. 267°.

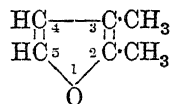
Fittig, Kettner, *Ann.*, 1899, **304**, 158.

Auwers, *Ber.*, 1932, **65**, 831.

Lutz, Taylor, *J. Am. Chem. Soc.*, 1933, **55**, 1585.

Couper, Kibler, Lutz, *J. Am. Chem. Soc.*, 1941, **63**, 2.

2 : 3-Dimethylfuran



$\text{C}_6\text{H}_8\text{O}$

MW, 96

B.p. 87°/720 mm., 42°/115 mm. Pine splinter test \rightarrow green \rightarrow reddish violet col.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, **16**, 33.

2 : 4-Dimethylfuran.

B.p. 93°/720 mm.

Gilman, Burthner, *Rec. trav. chim.*, 1931, **51**, 672.

2 : 5-Dimethylfuran.

B.p. 93–4°. Sol. most ord. org. solvents. Insol. H_2O . D_4^{20} 0.888. n_D^{20} 1.4363. Resinified by conc. min. acids.

Auwers, *Ann.*, 1915, **408**, 271.

Hurd, Edwards, Roach, *J. Am. Chem. Soc.*, 1944, **66**, 2013.

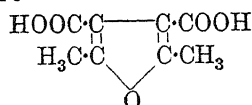
3 : 4-Dimethylfuran.

B.p. 94°/720 mm., 49°/125 mm. Pine splinter test → reddish violet → blue col.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 28.

Dimethylfuran-carboxylic Acid.

See Dimethylpyromucic Acid, Dimethyl-β-furoic Acid and Pyrotritaric Acid.

2 : 5-Dimethylfuran-3 : 4-dicarboxylic Acid (*Carboxypyrotritaric acid, carbuvinic acid*)

$C_8H_8O_5$

MW, 184

Cryst. + $\frac{1}{2}H_2O$ from H_2O . M.p. 231°. Sol. EtOH. Mod. sol. hot H_2O . Spar. sol. Et_2O . Insol. $CHCl_3$, CS_2 .

Me ester: $C_9H_{10}O_5$. MW, 198. M.p. 129°.

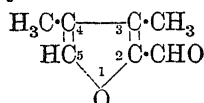
Di-Me ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 63-4°. B.p. 266°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 .

Et ester: $C_{10}H_{12}O_5$. MW, 212. Leaflets. M.p. 83°. Sol. EtOH, Et_2O .

Di-Et ester: $C_{12}H_{16}O_5$. MW, 240. B.p. 275-6°/735 mm.

Trefil'ev, *Chem. Abstracts*, 1929, 23, 3926 (*Review, Bibl.*).

Gilman, Burthner, *Rec. trav. chim.*, 1932, 51, 668.

3 : 4-Dimethylfurfural

$C_7H_8O_2$

MW, 124

B.p. 84°/11 mm.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 37.

3 : 5-Dimethylfurfural.

B.p. 78°/13 mm.

Semicarbazone: m.p. 220-1°.

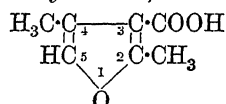
Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, 14, 1279.

4 : 5-Dimethylfurfural.

B.p. 87°/11 mm.

Semicarbazone: m.p. 220.5-1.5°.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 33.

2 : 4-Dimethyl-β-furoic Acid (2 : 4-Dimethylfuran-3-carboxylic acid)

$C_7H_8O_3$

MW, 140

Needles from H_2O . M.p. 122°. Sol. EtOH, Et_2O , hot H_2O . Volatile in steam. $k = 2.79 \times 10^{-5}$.

Et ester: $C_9H_{12}O_3$. MW, 168. B.p. 97°/10 mm.

Anschütz, *Ann.*, 1890, 259, 153.

Gilman, Burthner, *Rec. trav. chim.*, 1932, 51, 671.

Feist, *Ber.*, 1902, 35, 1551.

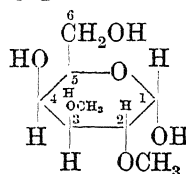
4 : 5-Dimethyl-β-furoic Acid (4 : 5-Dimethylfuran-3-carboxylic acid).

Cryst. from pet. ether. M.p. 130-1°. Pine splinter test → faint green col.

Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 32.

Dimethylfuroic Acid.

See Dimethylpyromucic Acid, Dimethyl-β-furoic Acid and Pyrotritaric Acid.

2 : 3-Dimethylgalactose

$C_8H_{16}O_6$

MW, 208

Glassy solid. $[\alpha]_D^{25} + 11.3^\circ$ in $CHCl_3$. Phenylhydrazine → 3-methylgalactosazone, cryst. from pet. ether. M.p. 176-9°.

Methylgalactoside: $C_9H_{18}O_6$. MW, 222.

α-.

Syrup. $n_D^{25} 1.4720$. $[\alpha]_D^{25} + 173.7^\circ$ in $CHCl_3$. 4 : 6-Dinitrate : prisms from EtOH. M.p. 88-90°. $[\alpha]_D^{25} + 100^\circ$ in $CHCl_3$. 4 : 6-Benzylidene deriv. : prisms from Et_2O . M.p. 123-4°. $[\alpha]_D^{25} + 174^\circ$ in $CHCl_3$.

β-.

4 : 6-Benzylidene deriv. : needles from Et_2O -pet. ether. M.p. 148°. $[\alpha]_D^{25} + 18^\circ$ in $CHCl_3$.

Robertson, Lamb, *J. Chem. Soc.*, 1934, 1322.

2 : 4-Dimethylgalactose.

Cryst. + $1H_2O$ from EtOH- Me_2CO - Et_2O . M.p. 103°. $[\alpha]_D^{25} + 122^\circ$ initial, + 86° final, in H_2O .

Methylgalactoside:

α-.

Cryst. from Me_2CO -pet. ether. M.p. 105°. $[\alpha]_D^{25} + 142^\circ$ in H_2O .

β-.

Cryst. from Me_2CO - Et_2O . M.p. 165-6°. $[\alpha]_D^{25} 0^\circ$ in H_2O .

Smith, *J. Chem. Soc.*, 1939, 1736.

2 : 6-Dimethylgalactose.

Needles from AcOEt. M.p. 106-8° (128-30°). $[\alpha]_D^{25} + 47^\circ$ initial, + 87.5° final, in H_2O . Phenylhydrazine → 6-methylgalactosazone, m.p. 204-5°.

Methylgalactoside : α -.3 : 4-*Dinitrate* : needles from pet. ether. M.p. 50-1°. $[\alpha]_D^{20} + 161^\circ$ in CHCl_3 . β -.Needles from Et_2O . M.p. 73-5°. $[\alpha]_D^{17} - 23.3^\circ$ in CHCl_3 . 3 : 4-*Acetone deriv.* : needles from pet. ether. M.p. 56-7°. $[\alpha]_D - 4.5^\circ$ in CHCl_3 . 3 : 4-*Dinitrate* : needles from MeOH. M.p. 88°. $[\alpha]_D^{17} + 3.5^\circ$ in CHCl_3 .Oldham, Bell, *J. Am. Chem. Soc.*, 1938, 60, 324.Bell, *J. Chem. Soc.*, 1945, 692.

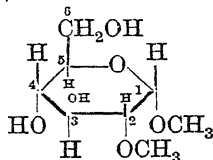
3 : 4-Dimethylgalactose.

Needles from AcOEt. M.p. 164-6°. $[\alpha]_D^{20} + 95^\circ$ initial, $+ 117^\circ$ final, in H_2O .*Methylgalactoside* :Needles from $\text{CCl}_4\text{-CHCl}_3$. M.p. 102-3°. $[\alpha]_D^{20} - 9.1^\circ$ in CHCl_3 . 2 : 6-*Dinitrate* : plates from MeOH.Aq. M.p. 75-6°. $[\alpha]_D^{21} - 13.3^\circ$ in CHCl_3 .Bacon, Bell, *J. Chem. Soc.*, 1939, 1869.

4 : 6-Dimethylgalactose.

Osazone : yellow needles from EtOH.Aq. M.p. 158°. $[\alpha]_D^{20} - 25^\circ$ in EtOH.Percival, Somerville, *J. Chem. Soc.*, 1937, 1618.

1 : 2-Dimethylglucose (2-Methylglucose methylglucoside)

 $\text{C}_8\text{H}_{16}\text{O}_6$

MW, 208

Needles $+ \frac{1}{2}\text{H}_2\text{O}$ from AcOEt. M.p. 95-7°. $[\alpha]_D^{17} - 24^\circ$ in EtOH.3 : 4-*Triacetyl* : cryst. from H_2O . M.p. 74-5°. $[\alpha]_D^{19} + 6.3^\circ$ in CHCl_3 , $+ 5.9^\circ$ in EtOH.Brigl, Schinle, *Ber.*, 1929, 62, 1721.

2 : 3-Dimethylglucose.

Two forms. Equivalent mixture melts between 70° and 105° . α -.Spherical aggregates from EtOH- Et_2O . M.p. 85-7°. $[\alpha]_D + 82^\circ$ initial, $+ 48.3^\circ$ final, in Me_2CO . β -.Prisms from EtOH- Et_2O . M.p. 108-10°. $[\alpha]_D^{20} + 10.6^\circ$ initial, $+ 64.4^\circ$ final in H_2O ; $+ 6.5^\circ$ initial, $+ 51^\circ$ final in Me_2CO . α -*Methylglucoside* : $\text{C}_9\text{H}_{18}\text{O}_6$. MW, 222. Cryst. from C_6H_6 . M.p. 80-2°. $[\alpha]_D^{20} + 143^\circ$ in H_2O . *Benzylidene deriv.* : prisms from pet. ether. M.p. 122-3°. $[\alpha]_D^{20} + 97^\circ$ in Me_2CO .

Dict. of Org. Comp.—II.

Acetone deriv. : b.p. $142-3^\circ/12$ mm. $[\alpha]_D^{19} - 19^\circ$ in MeOH.Irvine, Scott, *J. Chem. Soc.*, 1913, 103, 582.Macdonald, *ibid.*, 1904.

2 : 6-Dimethylglucose.

Glassy solid. $[\alpha]_D^{20} + 59.8^\circ$ initial, $+ 63.3^\circ$ final. β -*Methylglucoside* : needles from Et_2O -hexane. M.p. 50-2°. $[\alpha]_D^{20} - 43.5^\circ$ in CHCl_3 . *Benzylidene deriv.* : cryst. from EtOH. M.p. 132-5°. 3 : 4-*Dinitrate* : cryst. from MeOH. M.p. 74-6°. $[\alpha]_D^{20} - 13.7^\circ$ in CHCl_3 . 3 : 4-*Di-p-toluenesulphonyl* : needles from EtOH. M.p. 156-8°. $[\alpha]_D^{18} - 8.2^\circ$ in CHCl_3 .Bell, Synge, *J. Chem. Soc.*, 1938, 836.Freudenberg, Hull, *Ber.*, 1941, 74, 237.

3 : 4-Dimethylglucose.

M.p. 113° . $[\alpha]_D^{11} + 64.9^\circ$ initial, $+ 94.8^\circ$ final, in H_2O . $[\alpha]_D^{11} + 94.5^\circ$ initial, $+ 99.5^\circ$ final, in EtOH. β -*Methylglucoside* : m.p. 79-80°. B.p. $165-9^\circ/0.3$ mm. $[\alpha]_D^{18} - 11.9^\circ$ in CHCl_3 .Dewar, Fort, *J. Chem. Soc.*, 1944, 492.

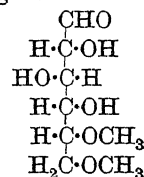
3 : 6-Dimethylglucose.

Needles from AcOEt. M.p. $113-6^\circ$. $[\alpha]_D^{18} + 102.5^\circ$ initial, $+ 61.5^\circ$ final, in H_2O . β -*Methylglucoside* : syrup. $[\alpha]_D^{18} + 55^\circ$ in MeOH, $+ 63^\circ$ in CHCl_3 . 2 : 4-*Dibenzoyl* : needles from MeOH. M.p. $155-6^\circ$. $[\alpha]_D^{19} - 11.7^\circ$ in CHCl_3 . 2 : 4-*Di-p-toluenesulphonyl* : cryst. from EtOH. M.p. $158-60^\circ$. $[\alpha]_D^{18} - 23^\circ$ in CHCl_3 .Bell, *J. Chem. Soc.*, 1935, 176.

4 : 6-Dimethylglucose.

Needles from AcOEt. M.p. $156-7^\circ$. $[\alpha]_D^{18} + 108^\circ$ initial, $+ 66^\circ$ final, in H_2O .*Methylglucoside* : α -. $n_D^{18.5} 1.4715$. $[\alpha]_D^{20} + 157^\circ$ in CHCl_3 . 2 : 3-*Di-p-toluenesulphonyl* : cryst. from MeOH. M.p. 113° . $[\alpha]_D^{18} + 55.5^\circ$ in CHCl_3 . β -.Needles from Et_2O . M.p. 50-2°. B.p. $130-60^\circ/0.4$ mm. $[\alpha]_D^{18} - 29^\circ$ in CHCl_3 . 2 : 3-*Dinitrate* : needles from pet. ether. M.p. $54-7^\circ$. $[\alpha]_D^{18} - 13.4^\circ$ in CHCl_3 . 2 : 3-*Di-p-toluenesulphonyl* : cryst. from EtOH. M.p. $146-9^\circ$. $[\alpha]_D^{20} - 14.8^\circ$ in CHCl_3 .Bell, Lorber, *J. Chem. Soc.*, 1940, 455.Bell, Synge, *J. Chem. Soc.*, 1937, 1716.

5 : 6-Dimethylglucose

 $\text{C}_8\text{H}_{16}\text{O}_6$ MW, 208
20

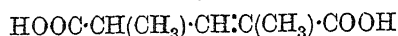
Oil. Reduces Fehling's and Schiff's. $[\alpha]_D^{25} + 4^\circ$ in H_2O . $\text{KIO}_3 \rightarrow$ glyceric acid di-Me ether.

p-Bromophenylosazone: yellow needles from EtOH. M.p. 155–6°.

Acetone deriv.: rods from pet. ether. M.p. 56°. B.p. 105–10°/0.15 mm. $[\alpha]_D^{20} - 13^\circ$ in H_2O .

Salmon, Powell, *J. Am. Chem. Soc.*, 1939, 61, 3507.

1 : 3-Dimethylglutaconic Acid (1-Methyl-1-butylene-1 : 3-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Cis-.

M.p. 118°.

Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. B.p. 176°/76 mm.

Trans-.

dl-.

M.p. 147°. Sol. EtOH, hot H_2O . $k = 1.29 \times 10^{-4}$ at 25°.

Me-Et ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. 174–6°/81 mm.

Di-Et ester: b.p. 179°/80 mm.

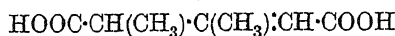
l-.

M.p. 132.5–133°.

McCombie, Packer, Thorpe, *J. Chem. Soc.*, 1931, 547.

Thorpe, Wood, *J. Chem. Soc.*, 1903, 103, 276, 1758.

2 : 3-Dimethylglutaconic Acid (2-Methyl-1-butylene-1 : 3-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Cis-.

M.p. 103°. B.p. 126–30°/13 mm.

Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. B.p. 142°/20 mm., 128°/13 mm. $D_4^{20} 1.024$.

Trans-.

M.p. 148° (rapid heat.).

Di-Et ester: b.p. 141°/21 mm., 125°/12 mm. $D_4^{20} 1.031$.

Et ester nitrile: $\text{C}_9\text{H}_{13}\text{O}_2\text{N}$. MW, 167. B.p. 139°/18 mm.

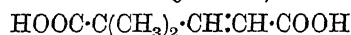
Mononitrile: $\text{HOOC}\cdot\text{CH}(\text{CH}_3)\cdot\text{C}(\text{CH}_3)_2\cdot\text{CH}\cdot\text{CN}$. $\text{C}_7\text{H}_9\text{O}_2\text{N}$. MW, 139. M.p. 191.5–192°. Sublimes.

Bland, Thorpe, *J. Chem. Soc.*, 1912, 101, 1563.

Auwers, Ottens, *Ber.*, 1924, 57, 441.

Feist, Brewer, *Ann.*, 1922, 428, 68.

3 : 3-Dimethylglutaconic Acid (3-Methyl-1-butylene-1 : 3-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Cis-.

Needles. M.p. 135–7°. Sol. H_2O , EtOH, Et_2O .

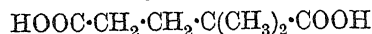
Trans-.

Needles. M.p. 172° (rapid heat.). Sol. EtOH, AcOH. Spar. sol. H_2O , CHCl_3 .

Di-Et ester: b.p. 195–7°/200 mm.

Perkin, Smith, *J. Chem. Soc.*, 1903, 83, 16.

1 : 1-Dimethylglutaric Acid (3-Methyl-butane-1 : 3-dicarboxylic acid)



$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

Needles from C_6H_6 -ligroin. M.p. 85° (90°). Sol. H_2O , EtOH, CHCl_3 , AcOH.

Di-Me ester: $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 215–16°.

Di-Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. 235–6°.

Dichloride: $\text{C}_7\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 197. B.p. 135–7°/35 mm.

Diamide: $\text{C}_7\text{H}_{14}\text{O}_2\text{N}_2$. MW, 158. M.p. 169–72°.

Anhydride: $\text{C}_7\text{H}_{10}\text{O}_3$. MW, 142. M.p. 38°.

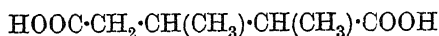
Imide: $\text{C}_7\text{H}_{11}\text{O}_2\text{N}$. MW, 141. M.p. 150°. B.p. 262–5°.

Monoanilide: m.p. 145–6°.

Tiemann, *Ber.*, 1897, 30, 254; 1900, 33, 2942.

Bardhan, Banerji, Bose, *J. Chem. Soc.*, 1935, 1127.

1 : 2-Dimethylglutaric Acid (2-Methyl-butane-1 : 3-dicarboxylic acid)



$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

Needles. M.p. 87° (84–5°). Sol. H_2O , EtOH, Et_2O , CHCl_3 , AcOH. Insol. pet. ether.

Imide: needles from H_2O . M.p. 113°.

Thorpe, Young, *J. Chem. Soc.*, 1903, 83, 357.

1 : 3-Dimethylglutaric Acid ($\alpha\alpha'$ -Dimethylglutaric acid, pentane-2 : 4-dicarboxylic acid)



$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

dl-.

M.p. 79–80°. Sol. H_2O , EtOH, Et_2O , Me_2CO , AcOEt. Spar. sol. pet. ether. $[\alpha]_D^{20} + 39.8^\circ$ in H_2O .

Anhydride: m.p. 41.5–42.5°. $[\alpha]_D + 69.6^\circ$ in C_6H_6 .

l-.

Needles from H_2O . M.p. 79.5–80°. $[\alpha]_D^{20} - 39.8^\circ$ in H_2O .

Anhydride: $\text{C}_7\text{H}_{10}\text{O}_3$. MW, 142. M.p. 41.5–42.5°. $[\alpha]_D^{18} - 69.6^\circ$ in C_6H_6 .

dl- (*Trans*)-.

Prisms. M.p. 141° (143–5°). Sol. EtOH, Et_2O , AcOH. Mod. sol. H_2O . Insol. ligroin.

k (first) = 5.8×10^{-5} at 25° ; (second) = 1.5×10^{-6} at 100° . Volatile in steam.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. 231° . D_4^{20} 0.977.

Anhydride: m.p. $33-4^\circ$.

Meso- (Cis)-.

Cryst. M.p. $127-8^\circ$. Sol. EtOH, Et₂O, AcOH. Mod. sol. H₂O. k (first) = 5.2×10^{-5} at 25° ; (second) = 1.6×10^{-6} at 100° . Volatile in steam.

Di-Et ester: b.p. 231° . D_4^{20} 0.980.

Anhydride: $C_7H_{10}O_3$. MW, 142. M.p. 95° .

Imide: $C_7H_{11}O_2N$. MW, 141. M.p. $173-4^\circ$.

Möller, *Ber.*, 1910, **43**, 3251.

Thorpe, Wood, *J. Chem. Soc.*, 1913, 103, 280.

Auwers, Thorpe, *Ann.*, 1895, **285**, 310.

Auwers, Ottens, *Ber.*, 1924, **57**, 440.

2 : 2-Dimethylglutaric Acid



$C_7H_{12}O_4$ MW, 160

Needles from C_6H_6 . M.p. $103-4^\circ$. Sol. H₂O, EtOH, Et₂O. Insol. ligroin. $k = 2.206$ (2.00×10^{-4} at 25°).

Di-Me ester: $C_9H_{16}O_4$. MW, 188. B.p. $103-4^\circ/15$ mm. D_{20}^{20} 1.0385.

Mono-Et ester: b.p. $146-51^\circ/3$ mm.

Di-Et ester: $C_{11}H_{20}O_4$. MW, 216. B.p. $241-3^\circ$, $127-8^\circ/15$ mm. D_{20}^{20} 0.9929.

Et ester nitrile: $C_9H_{15}O_2N$. MW, 169. B.p. 244° .

Monoamide: $C_7H_{13}O_3N$. MW, 159. M.p. 146° . B.p. 268° .

Anhydride: $C_7H_{10}O_3$. MW, 142. M.p. 124° .

Imide: $C_7H_{11}O_2N$. MW, 141. Needles from H₂O. M.p. 147° .

Walker, Wood, *J. Chem. Soc.*, 1906, 89, 599.

Thorpe, Wood, *J. Chem. Soc.*, 1913, 103, 1592.

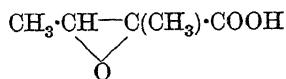
1 : 2-Dimethylglyceric Acid.

See Angliceric Acid and Tiglyceric Acid.

1 : 3-Dimethylglycerol.

See Pentantriol-2 : 3 : 4.

1 : 2-Dimethylglycidic Acid (*Anhydro-dimethylglyceric acid, oxytiglic acid*)



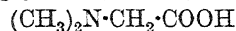
$C_5H_8O_3$ MW, 116

Needles. M.p. 62° . Sol. H₂O, EtOH, Et₂O. H₂O at $100^\circ \rightarrow$ dimethylglyceric acid.

Et ester: $C_7H_{12}O_3$. MW, 144. B.p. $177-8^\circ$. D_0^{20} 1.0377.

Melikoff, Petrenko-Kritschenko, *Ann.*, 1890, **257**, 122.

Dimethylglycine (*Dimethylaminoacetic acid*)



$C_4H_9O_2N$ MW, 103

M.p. $157-60^\circ$. Sol. H₂O, EtOH, Et₂O. Hygroscopic. k (acid) = 1.3×10^{-10} at 25° ; k (base) = 9.8×10^{-13} at 25° .

B,HCl: m.p. $189-90^\circ$.

Me ester: $C_5H_{11}O_2N$. MW, 117. B.p. 135° , $51^\circ/30$ mm. Sol. H₂O, EtOH, Et₂O.

Et ester: $C_6H_{13}O_2N$. MW, 131. B.p. 150° . Sol. H₂O.

Trichloro-tert.-butyl ester: $C_8H_{14}O_2NCl_3$. MW, 262.5. *B,HCl*: m.p. 220° .

Benzyl ester: $C_{11}H_{15}O_2N$. MW, 193. *B,HCl*: m.p. 116° .

Dimethylamide: $C_6H_{14}ON_2$. MW, 130. B.p. $99-100^\circ/34$ mm.

Nitrile: $C_4H_8N_2$. MW, 84. B.p. $137-8^\circ$. D_0^{20} 0.865.

Löb, *Biochem. Z.*, 1918, **51**, 123.

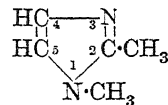
Eschweiler, *Ann.*, 1894, **279**, 44.

Clarke, Gillespie, Weishauss, *J. Am. Chem. Soc.*, 1933, **55**, 4579.

Dimethylglyoxal.

See Diacetyl.

1 : 2-Dimethylglyoxaline (1 : 2-Dimethyl-iminazole)



$C_5H_8N_2$ MW, 96

B.p. 206° . Sol. H₂O, EtOH, Et₂O. D^{21} 1.0051.

B,HAuCl₄: orange needles. M.p. 215° .

Picrate: m.p. $179-80^\circ$.

Oddo, Mingora, *Gazz. chim. ital.*, 1928, **58**, 584.

Sarasin, Wegmann, *Helv. Chim. Acta*, 1924, **7**, 721.

Sonn, Hotes, Sieg, *Ber.*, 1924, **57**, 956.

1 : 4-Dimethylglyoxaline (1 : 4-Dimethyl-iminazole).

B.p. $198-200^\circ$.

B,HCl: m.p. $168-9^\circ$.

B,HNO₃: m.p. $103-4^\circ$.

B,HAuCl₄: m.p. $220-5^\circ$.

B₂H₂PtCl₆: decomp. at 233° .

2 : 4-Dinitrophenyl chloride: m.p. 227° .

Linneweh, Keil, Hoppe-Seyler, *Z. physiol. Chem.*, 1929, **183**, 11.

Pyman, *J. Chem. Soc.*, 1922, **121**, 2621.

1 : 5-Dimethylglyoxaline (1 : 5-Dimethyl-iminazole).

B.p. $220-2^\circ$.

B,HCl: m.p. $194-5^\circ$.

B,HNO₃: m.p. $128-9^\circ$.

2 : 4-Dinitrophenyl chloride: m.p. 253° .

Pyman, *J. Chem. Soc.*, 1922, **121**, 2621.

2 : 4-Dimethylglyoxaline (2 : 4-Dimethyl-*iminazole*).

M.p. 92° (vac.). B.p. 118–20°/0.02 mm.
B, HCl: hygroscopic needles from EtOH-Et₂O. M.p. 205°.

B, HNO₃: prisms from EtOH. M.p. 133–4°.

Picrate: m.p. 143° (vac.).

Picrolonate: m.p. 263° decomp.

Weidenhagen, Herrmann, *Ber.*, 1935, **68**, 1960.

4 : 5-Dimethylglyoxaline (4 : 5-Dimethyl-*iminazole*).

Plates. M.p. 120°. Sol. Et₂O. Mod. sol. hot EtOH.

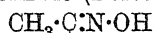
B, HCl: m.p. 305° decomp.

B, H₂AuCl₄: m.p. 174°.

N-Benzoyl: plates from ligroin. M.p. 74–5°.

Fargher, Pyman, *J. Chem. Soc.*, 1919, **115**, 232.

Weidenhagen, Herrmann, Wegner, *Ber.*, 1937, **70**, 575.

Dimethylglyoxime (*Diacetyl dioxime*)

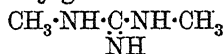
C₄H₈O₂N₂ MW, 116

Cryst. from EtOH.Aq. M.p. 234.5°. Sol. EtOH, Et₂O. Insol. H₂O. Forms derivs. with Ni, Cu, Co, etc. (metal glyoximines). Used for detection and estimation of Ni.

Dibenzoyl: needles. M.p. 225°.

Slotta, Jacobi, *Z. anal. Chem.*, 1931, **83**, 1 (*Bibl.*).

Ponzio, *Gazz. chim. ital.*, 1921, **51**, ii, 213.

sym.-Dimethylguanidine

C₃H₉N₃ MW, 87

k = 1.95 × 10⁻⁴ at 25°.

B, HNO₃: m.p. 68°.

B₂, H₂SO₄: m.p. 264–5° decomp.

B, H₂AuCl₄: prisms. M.p. 122°.

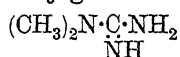
B₂, H₂PtCl₆: m.p. 197°.

Picrate: m.p. 178°.

Picrolonate: m.p. 260–2°.

Davis, Elderfield, *J. Am. Chem. Soc.*, 1932, **54**, 1503.

Schenck, Kirchhof, *Z. physiol. Chem.*, 1926, **153**, 150.

unsym.-Dimethylguanidine

C₃H₉N₃ MW, 87

Strong base.

B, HNO₃: m.p. 141°.

B₂, H₂SO₄: m.p. 285–7° decomp.

B, H₂AuCl₄: m.p. 248° decomp.

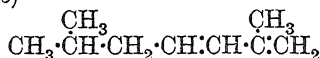
B₂, H₂PtCl₆: m.p. 225°.

Picrate: m.p. 230° (224°).

Picrolonate: m.p. 275–8°.

Phillips, Clarke, *J. Am. Chem. Soc.*, 1923, **45**, 1756.

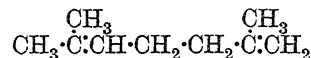
Werner, Bell, *J. Chem. Soc.*, 1922, **121**, 1790.

2 : 6-Dimethyl-1 : 3-heptadiene (*Isogeraniolene*)

C₉H₁₆ MW, 124

B.p. 140–2° (143–5°), 31°/7 mm. D₄⁰ 0.7648, D₂₂⁰ 0.7923. *n*_D²⁰ 1.46202, *n*_D²⁵ 1.4606.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, **39**, 1436.

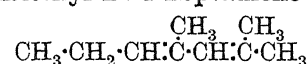
2 : 6-Dimethyl-1 : 5-heptadiene (*Geraniolene*)

C₉H₁₆ MW, 124

F.p. – 70°. B.p. 165–70° (140–2°). D₄¹¹ 0.7750, D₂₂⁰ 0.7626. *n*_D¹¹ 1.4407, *n*_D²² 1.44361. HBr → 2 : 6-dibromo-2 : 6-dimethylheptane.

Escourrou, *Bull. soc. chim.*, 1926, **39**, 1250.

Birch, *J. Chem. Soc.*, 1944, 430.

2 : 4-Dimethyl-2 : 4-heptadiene

C₉H₁₆ MW, 124

B.p. 137–9°/750 mm. D₄⁴ 0.7750. *n*_D⁴ 1.4587.

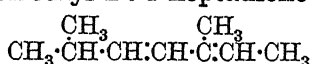
Jacquemain, *Compt. rend.*, 1942, **215**, 179.

2 : 6-Dimethyl-2 : 4-heptadiene

C₉H₁₆ MW, 124

B.p. 139–43°/752 mm. D₀⁰ 0.7482.

Kishner, *Chem. Abstracts*, 1912, **7**, 3965.

3 : 6-Dimethyl-2 : 4-heptadiene

C₉H₁₆ MW, 124

B.p. 144–6°. D₀⁰ 0.7853. *n*_D¹⁴ 1.46335.

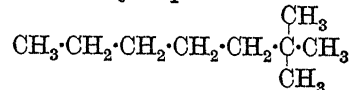
Abelmann, *Ber.*, 1910, **43**, 1587.

2 : 6-Dimethyl-1 : 3-heptadiene-1-carboxylic Acid.

See Isogeranic Acid.

2 : 6-Dimethyl-2 : 5-heptadienone-4.

See Phorone.

2 : 2-Dimethylheptane

C₉H₂₀ MW, 128

B.p. 130.4°. n_D^{20} 1.4035. D_4^{20} 0.7105.

Marker, Oakwood, *J. Am. Chem. Soc.*, 1938, 60, 2598.

2 : 3-Dimethylheptane

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{H}_3\text{C}}{\underset{|}{\text{CH}}} \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
 M.p. — 116.7°. B.p. 140.7°. n_D^{20} 1.4085.
 D_4^{20} 0.7235.

Whitmore, Southgate, *J. Am. Chem. Soc.*, 1938, 60, 2573.

2 : 4-Dimethylheptane

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
 B.p. 130°/749 mm. D_{20}^{20} 0.7128. n_D^{20} 1.4023.
 Tuot, *Compt. rend.*, 1933, 197, 1434.

2 : 5-Dimethylheptane

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
dl.
 B.p. 135–6°. D_{20}^{20} 0.7147. n_D^{20} 1.4033.
d.
 B.p. 134°. D_4^{27} 0.713. $[\alpha]_D^{27} + 4.2^\circ$.
 Tuot, *Compt. rend.*, 1933, 197, 1434.
 Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1.

2 : 6-Dimethylheptane

$$\text{CH}_3 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
 F.p. — 102.95°. B.p. 135.2°. D_{20}^{20} 0.7089. n_D^{20} 1.4007.

White, Rose, Calingaert, Soroos, *Chem. Abstracts*, 1939, 33, 4577.

3 : 3-Dimethylheptane

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} \cdot \text{CH}_2 \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
 B.p. 137.2°. D_4^{20} 0.7254. n_D^{20} 1.4087.
 Marker, Oakwood, *J. Am. Chem. Soc.*, 1938, 60, 2598.
 Noller, *J. Am. Chem. Soc.*, 1929, 51, 598.

3 : 4-Dimethylheptane

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \overset{\text{H}_3\text{C}}{\underset{|}{\text{CH}}} \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_3$$

 C_9H_{20} MW, 128
 B.p. 140.1°. D 0.7314. n 1.4108.
 Henne, Chanan, *J. Am. Chem. Soc.*, 1944, 66, 392.

2 : 2-Dimethylheptanol-1 (1-Hydroxy-2 : 2-dimethylheptane, 2 : 2-dimethyl-n-heptyl alcohol)

$$\text{CH}_3 \cdot [\text{CH}_2]_4 \cdot \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} \cdot \text{CH}_2 \cdot \text{OH}$$

 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144
 B.p. 88–9°/15 mm. n_D^{20} 1.4339.
 Whitmore, Badertschev, *J. Am. Chem. Soc.*, 1933, 55, 1565.

2 : 2-Dimethylheptanol-3 (3-Hydroxy-2 : 2-dimethylheptane, n-butyl-tert.-butylcarbinol)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} \cdot \text{CH}_3$$

 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144
 B.p. 71°/15 mm. n_D^{20} 1.4329.
 Phenylurethane : m.p. 64.5–65.5°.

Whitmore, Popkin, Whitaker, Mattil, Zech, *J. Am. Chem. Soc.*, 1938, 60, 2459.

Whitmore, *Rec. trav. chim.*, 1938, 57, 562.

2 : 2-Dimethylheptanol-4 (4-Hydroxy-2 : 2-dimethylheptane)

$$\text{CH}_3 \cdot [\text{CH}_2]_2 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}} \cdot \text{CH}_3$$

 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144
 B.p. 85°/29 mm. n_D^{20} 1.4260.
 Phenylurethane : m.p. 82°.

Whitmore, Popkin, Whitaker, Mattil, Zech, *J. Am. Chem. Soc.*, 1938, 60, 2463.

Whitmore, Forster, *J. Am. Chem. Soc.*, 1942, 64, 2966.

2 : 3-Dimethylheptanol-3 (3-Hydroxy-2 : 3-dimethylheptane, methylisopropylbutylcarbinol)

$$\text{CH}_3 \cdot [\text{CH}_2]_3 \cdot \overset{\text{CH}_3}{\underset{\text{CH}_3}{\text{C}}}(\text{OH}) \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144
 B.p. 75–8°/16 mm., 56–7°/5 mm., 42°/2 mm.
 D_4^{20} 0.8395. n_D^{20} 1.4355.

Whitmore, Evers, *J. Am. Chem. Soc.*, 1933, 55, 813.

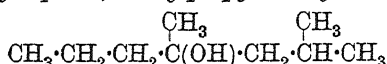
Whitmore, Southgate, *J. Am. Chem. Soc.*, 1938, 60, 2572.

2 : 3-Dimethylheptanol-6 (2-Hydroxy-5 : 6-dimethylheptane, 5 : 6-dimethylheptanol-2, dihydrothujaketol)

$$\text{CH}_3 \cdot \text{CH}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \overset{\text{H}_3\text{C}}{\underset{|}{\text{CH}}} \cdot \overset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

 $\text{C}_9\text{H}_{20}\text{O}$ MW, 144
 B.p. 191.5–192.5°. D^{18} 0.835.
 Wallach, Challenger, *Ann.*, 1911, 381, 82.

2 : 4-Dimethylheptanol-4 (4-Hydroxy-2 : 4-dimethylheptane, methylpropylisobutylcarbinol)



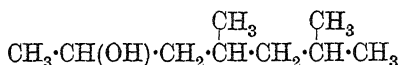
$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 170–1°/750 mm., 79°/26 mm. D_{20}^{20} 0.8230. n_D^{20} 1.4292.

Bodroux, Taboury, *Bull. soc. chim.*, 1909, 5, 813.

Meyer, Tuot, *Compt. rend.*, 1933, 196, 1231.

2 : 4-Dimethylheptanol-6 (2-Hydroxy-4 : 6-dimethylheptane, 4 : 6-dimethylheptanol-2)

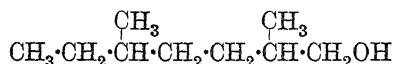


$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 194–5°. D_0 0.8801.

Guerbet, *Bull. soc. chim.*, 1912, 11, 279.

2 : 5-Dimethylheptanol-1 (1-Hydroxy-2 : 5-dimethylheptane, 2 : 5-dimethyl-n-heptyl alcohol)



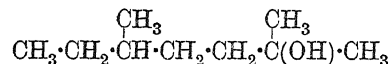
$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

d.

B.p. 102°/18 mm. D_4^{27} 0.823. $[\alpha]_D^{27} + 2.21^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1.

2 : 5-Dimethylheptanol-2 (2-Hydroxy-2 : 5-dimethylheptane)



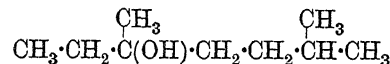
$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

d.

B.p. 75°/15 mm. D_4^{25} 0.830. $[\alpha]_D^{25} + 3.69^\circ$.

Levene, Marker, *J. Biol. Chem.*, 1931, 91, 405.

2 : 5-Dimethylheptanol-5 (3-Hydroxy-3 : 6-dimethylheptane, 3 : 6-dimethylheptanol-3, methyl-ethylisoamylcarbinol)

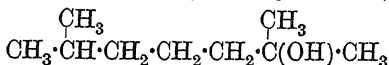


$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 172–4°. Sol. ord. org. solvents. D_0^{16} 0.8286. n_D^{16} 1.43256.

Clarke, Briggs, *J. Am. Chem. Soc.*, 1912, 34, 58.

2 : 6-Dimethylheptanol-2 (2-Hydroxy-2 : 6-dimethylheptane, dimethylisohexylcarbinol)



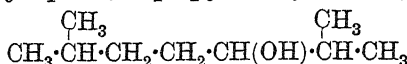
$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 176–7°, 48°/7 mm. D_0^{30} 0.8187. n_D^{30} 1.4242.

Kishner, *Chem. Zentr.*, 1913, II, 2130.

Pastureau, Zamenhof, *Bull. soc. chim.*, 1926, 39, 1435.

2 : 6-Dimethylheptanol-3 (3-Hydroxy-2 : 6-dimethylheptane, isopropylisoamylcarbinol)



$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 173–8° (175°), 88°/25 mm. D_4^{20} 0.8212. n_D^{20} 1.42461 (1.4275).

Thoms, Kahre, *Chem. Abstracts*, 1925, 19, 2474.

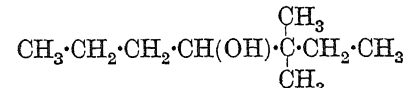
Michiels, *Chem. Abstracts*, 1912, 6, 1611.

Tuot, *Compt. rend.*, 1936, 202, 1339.

2 : 6-Dimethylheptanol-4.

See Di-isobutylcarbinol.

3 : 3-Dimethylheptanol-4 (4-Hydroxy-3 : 3-dimethylheptane, n-propyl-tert.-amylcarbinol)



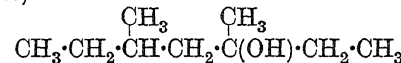
$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 177–8°.

3 : 5-Dinitrobenzoyl : m.p. 71.5–72.5°.

Conant, Webb, Mendum, *J. Am. Chem. Soc.*, 1929, 51, 1250.

3 : 5-Dimethylheptanol-3 (3-Hydroxy-3 : 5-dimethylheptane, methyl-ethyl - active - amyl - carbinol)



$\text{C}_9\text{H}_{20}\text{O}$ MW, 144

B.p. 95–7°/50 mm. D_4^{25} 0.8177. n_D^{25} 1.4251.

Davies, Dixon, Jones, *J. Chem. Soc.*, 1930, 472.

3 : 5-Dimethylheptanol-4.

See Di-sec.-butylcarbinol.

2 : 6-Dimethylheptanone-3.

See Isopropyl isoamyl Ketone.

2 : 6-Dimethylheptanone-4.

See Di-isobutyl Ketone.

3 : 5-Dimethylheptanone-4.

See Di-sec.-butyl Ketone.

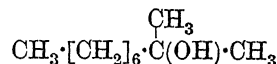
4 : 6-Dimethyl-1-heptenol-4.

See Methylisobutylallylcarbinol.

Dimethyl-n-heptyl Alcohol.

See 2 : 2-Dimethylheptanol-1 and 2 : 5-Dimethylheptanol-1.

Dimethylheptylcarbinol (2-Methylnonan-2-ol)



$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158

B.p. 96–8°/13.5 mm.

Houben, *Ber.*, 1902, 35, 3589.

2 : 5-Dimethyl-1 : 3-hexadiene (2-Methyl-4-isopropyl-1 : 3-butadiene)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} \cdot \text{CH} : \text{CH} \cdot \text{C} : \text{CH}_2 \end{array}$$

C_8H_{14} MW, 110
Liq. at -80° . B.p. $116-18^\circ$. D_4^{20} 0.7412. n_D^{20} 1.45024.

Krestinsky, *Ber.*, 1922, 55, 2765.**2 : 5-Dimethyl-1 : 5-hexadiene** (Diisobutenyl)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_2 \cdot \text{C} : \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C} : \text{CH}_2 \end{array}$$

C_8H_{14} MW, 110
M.p. -75.6° . B.p. $115-7^\circ$. D 0.7423. n 1.4293.

Krestinsky, *Chem. Abstracts*, 1913, 7, 3964.
Faworski, Schibajew, *Chem. Zentr.*, 1923, III, 668.Schales, *Ber.*, 1937, 70, 119.Henne, Chanan, Turk, *J. Am. Chem. Soc.*, 1941, 63, 3474.**3 : 3-Dimethyl-1 : 5-hexadiene**

$$\text{CH}_2 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{C}(\text{CH}_3)_2 \cdot \text{CH} : \text{CH}_2$$

C_8H_{14} MW, 110
B.p. 101.6° . D 0.7249. n 1.4160.

Henne, Chanan, *J. Am. Chem. Soc.*, 1944, 66, 392.**3 : 4-Dimethyl-1 : 5-hexadiene**

$$\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_2 \cdot \text{CH} \cdot \text{CH} \cdot \text{CH} \cdot \text{CH} : \text{CH}_2 \end{array}$$

C_8H_{14} MW, 110
B.p. 101.8° . D 0.7304. n 1.4211.

Henne, Chanan, Turk, *J. Am. Chem. Soc.*, 1941, 63, 3474.**2 : 5-Dimethyl-2 : 3-hexadiene** (1 : 1-Dimethyl-3-isopropylallene)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} \cdot \text{CH} : \text{C} : \text{CH}_3 \end{array}$$

C_8H_{14} MW, 110
Solid at -80° . Liq. at -23° . B.p. $119-23^\circ$. D_4^{20} 0.7637. n_D^{20} 1.45054.

Krestinsky, *Ber.*, 1922, 55, 2769.**2 : 4-Dimethyl-2 : 4-hexadiene**

$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} : \text{C} \cdot \text{CH} : \text{C} \cdot \text{CH}_3 \end{array}$$

C_8H_{14} MW, 110
B.p. $114-15^\circ$. D_4^{165} 0.7635. n_D^{165} 1.45457.

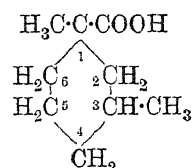
Abelmann, *Ber.*, 1910, 43, 1586.**2 : 5-Dimethyl-2 : 4-hexadiene** (Di-isocrotyl)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{C} : \text{CH} \cdot \text{CH} : \text{C} \cdot \text{CH}_3 \end{array}$$

C_8H_{14} MW, 110

M.p. 6° (11° , 14.5°). B.p. $134.6^\circ/750$ mm., $75^\circ/100$ mm. D_4^{18} 0.7646. $n_D^{19.5}$ 1.4796. Stable when pure.Prévost, *Compt. rend.*, 1927, 184, 1460.Krestinsky, *Ber.*, 1922, 55, 2758.**3 : 4-Dimethyl-2 : 4-hexadiene**

$$\text{CH}_3 \cdot \text{CH} : \text{C}(\text{CH}_3) \cdot \text{C}(\text{CH}_3) : \text{CH} \cdot \text{CH}_3$$

C_8H_{14} MW, 110
B.p. $132-4^\circ$, $71-3^\circ/100$ mm. D_4^{19} 0.7832. n_D^{21} 1.4630.

Macallum, Whitby, *Chem. Abstracts*, 1928, 22, 2080.**1 : 3-Dimethylhexahydrobenzoic Acid** (1 : 3-Dimethylcyclohexane-carboxylic acid)
 $\text{C}_9\text{H}_{16}\text{O}_2$ MW, 156
Cis-.
dl-.
M.p. 44° . B.p. $140^\circ/13$ mm.*Amide* : $\text{C}_9\text{H}_{17}\text{ON}$. MW, 155. M.p. 84.5° .*Cis-trans*-.
dl-.
M.p. 90° .*Chloride* : $\text{C}_9\text{H}_{15}\text{OCl}$. MW, 174.5. B.p. $98^\circ/14$ mm.*Amide* : m.p. 73° .Godchot, Cauquil, *Compt. rend.*, 1938, 206, 297.**1 : 4-Dimethylhexahydrobenzoic Acid** (1 : 4-Dimethylcyclohexane-carboxylic acid).B.p. $135^\circ/14$ mm.*Amide* : cryst. from C_6H_6 . M.p. $127-8^\circ$.Godchot, Cauquil, *Compt. rend.*, 1937, 204, 733.**2 : 4-Dimethylhexahydrobenzoic Acid** (2 : 4-Dimethylcyclohexane-carboxylic acid).

Two racemic forms known.

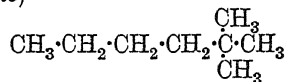
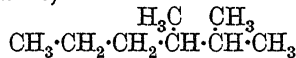
(i) Needles from dil. AcOH. M.p. $76-8^\circ$ (75°). B.p. $250-55^\circ$. Sol. EtOH, C_6H_6 , hot pet. ether.*Amide* : needles from EtOH. M.p. 190° . Mod. sol. EtOH. Spar. sol. H_2O , pet. ether.*Anilide* : needles from EtOH-pet. ether. M.p. 180° .(ii) B.p. $250-52^\circ$.*Amide* : needles from H_2O . M.p. $140-42^\circ$. Mod. sol. H_2O .Bentley, Perkin, *J. Chem. Soc.*, 1897, 71, 173.Lees, Perkin, *J. Chem. Soc.*, 1901, 79, 356.

2 : 6 - Dimethylhexahydrobenzoic Acid
(2 : 6-Dimethylcyclohexane-carboxylic acid).Cryst. from ligroin or C_6H_6 . M.p. 72° . B.p. $250-52^\circ$. Readily sol. C_6H_6 , ligroin.Noyes, *Am. Chem. J.*, 1899, 22, 1.**3 : 4 - Dimethylhexahydrobenzoic Acid**
(3 : 4-Dimethylcyclohexane-carboxylic acid).B.p. $251^\circ/748$ mm.Et ester : $C_{11}H_{20}O_2$. MW, 184. B.p. $224^\circ/758$ mm.Chloride : b.p. $110^\circ/25$ mm.Anilide : prisms from pet. ether. M.p. 115° .Bentley, Perkin, *J. Chem. Soc.*, 1897, 71, 170.**3 : 5 - Dimethylhexahydrobenzoic Acid**
(3 : 5-Dimethylcyclohexane-carboxylic acid).(i) Mixture of stereoisomerides. B.p. $139^\circ/15$ mm. D_4^{20} 0.9785. n_D^{20} 1.4577.(ii) M.p. 65° .Amide : m.p. $140-1^\circ$.(iii) M.p. 67° . B.p. $135^\circ/11$ mm.Amide : m.p. $159-60^\circ$.Zelinsky, *Ber.*, 1902, 35, 2689.**3 : 4-Dimethylhexandione-2 : 5.**

See 2 : 3-Diacetobutane.

2 : 5-Dimethylhexandione-3 : 4.

See Di-isobutyryl.

2 : 2 - Dimethyl - n - hexane (Trimethyl - n - butylmethane) C_8H_{18} MW, 114F.p. -121° . B.p. $106-7^\circ$. D_4^{20} 0.6967. n_D^{20} 1.3931.Noller, *J. Am. Chem. Soc.*, 1929, 51, 598.Liberman et al., *Chem. Abstracts*, 1944, 38, 5198.**2 : 3-Dimethyl-n-hexane** (Methylpropylisobutylmethane) C_8H_{18} MW, 114

l-.

B.p. $113-4^\circ$. $[\alpha]_D^{25} - 0.92^\circ$.

dl-.

B.p. 115.8° . D_4^{20} 0.7121. n_D^{20} 1.4015.Clarke, *J. Am. Chem. Soc.*, 1911, 33, 529.Levene, Marker, *J. Biol. Chem.*, 1933, 100, 769.**2 : 4 - Dimethyl - n - hexane** (Methylethylisobutylmethane) C_8H_{18} MW, 114

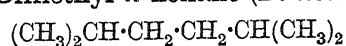
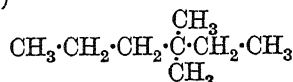
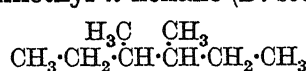
d-.

B.p. $111-12^\circ$. D_4^{30} 0.696. $[\alpha]_D^{30} + 2.99^\circ$.

l-.

B.p. $110-11^\circ$. D_4^{21} 0.703. $[\alpha]_D^{21} - 10.85^\circ$.

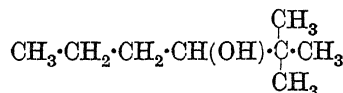
dl-.

B.p. 110° . D_{15}^{15} 0.7083. n_{15}^{25} 1.3986.Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1; 1931, 91, 405.**2 : 5-Dimethyl-n-hexane** (Di-isobutyl) C_8H_{18} MW, 114F.p. -91° . B.p. 108.5° ($108-110^\circ$). D_{15}^{15} 0.6991. n_D^{20} 1.3935 (1.3930). $CrO_3 \rightarrow$ acetic acid.Pope, Dykstra, Edgar, *J. Am. Chem. Soc.*, 1929, 51, 2204.Lewis, Fleming, *Chem. Abstracts*, 1927, 21, 889.Gazopoulos, *Chem. Abstracts*, 1934, 28, 4726.Zalkind, Smagina, *Chem. Zentr.*, 1937, I, 4490.**3 : 3-Dimethyl-n-hexane** (Dimethylethylpropylmethane) C_8H_{18} MW, 114B.p. $111-12^\circ$. D_4^{20} 0.7107. n_D^{30} 1.4008.Noller, *J. Am. Chem. Soc.*, 1929, 51, 598.Marker, Oakwood, *J. Am. Chem. Soc.*, 1938, 60, 2598.**3 : 4-Dimethyl-n-hexane** (Di-sec-butyl) C_8H_{18} MW, 114B.p. 118.7° . D_4^{25} 0.7165. n_D^{25} 1.4038.Clarke, *J. Am. Chem. Soc.*, 1911, 33, 520.**2 : 3-Dimethylhexane-2 : 6-dicarboxylic Acid.**

See 1 : 1 : 2-Trimethylpimelic Acid.

Dimethylhexanol-1.

See Dimethyl-n-hexyl Alcohol.

2 : 2-Dimethylhexanol-3 (Propyl-tert.-butylcarbinol, 3-hydroxy-2 : 2-dimethylhexane) $C_8H_{18}O$ MW, 130B.p. $155-7^\circ$. n_D^{20} 1.4275.Phenylurethane : m.p. $70-1^\circ$. α -Naphthylurethane : m.p. $113-14^\circ$.Haller, Bauer, *Compt. rend.*, 1910, 150, 586.Whitmore, *Rec. trav. chim.*, 1938, 57, 562.Greenwood, Whitmore, Crooks, *J. Am. Chem. Soc.*, 1938, 60, 2029.

2 : 3-Dimethylhexanol-2 (2-Hydroxy-2 : 3-dimethylhexane)
$$\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{C}(\text{OH}) \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
B.p. 159.6° (150-1°), 68-9°/15 mm., 42-3°/6 mm. D_4^{20} 0.8365. n_D^{20} 1.4335. Insol. H_2O .

Phenylurethane : m.p. 74°.

Clarke, *J. Am. Chem. Soc.*, 1911, 33, 529.Huston et al., *J. Org. Chem.*, 1941, 6, 252.**2 : 3-Dimethylhexanol-3** (Methylpropylisopropylcarbinol, 3-hydroxy-2 : 3-dimethylhexane)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
B.p. 158-158.2°. Insol. H_2O .

Phenylurethane : m.p. 90.5°.

Clarke, *J. Am. Chem. Soc.*, 1911, 33, 528.**2 : 4-Dimethylhexanol-2** (2-Hydroxy-2 : 4-dimethylhexane, dimethyl-active-amylcarbinol)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130

l.

B.p. 64°/20 mm. D_4^{21} 0.827. $[\alpha]_D^{21} - 5.74^\circ$.

dl.

B.p. 150.2°/748 mm., 66-9°/10 mm. D_4^{20} 0.8099. n_D^{20} 1.4232.Levene, Marker, *J. Biol. Chem.*, 1931, 91, 405.Huston et al., *J. Org. Chem.*, 1941, 6, 252.**2 : 4-Dimethylhexanol-3** (Isopropyl-sec-butylcarbinol)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
B.p. 81.9°/50 mm. n_D^{20} 1.4325.

Young, Roberts, *J. Am. Chem. Soc.*, 1945, 67, 1040.**2 : 4-Dimethylhexanol-4** (Methylethylisobutylcarbinol, 3-hydroxy-3 : 5-dimethylhexane)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
Oil. B.p. 158°, 62-3°/22 mm. n_D^{21} 1.4268.

Phenylurethane : m.p. 62-3°.

Clarke, *J. Am. Chem. Soc.*, 1908, 30, 1147.Meyr, Tuot, *Compt. rend.*, 1933, 196, 1231.Cymerman, Heilbron, Jones, *J. Chem. Soc.*, 1945, 90.**2 : 5-Dimethylhexanol-2** (Dimethylisoamylcarbinol, 2-hydroxy-2 : 5-dimethylhexane)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130

B.p. 154-5°, 73-5°/20 mm. D_4^{20} 0.8228. n_D^{20} 1.42085. Insol. H_2O .Dupont, *Compt. rend.*, 1913, 156, 1624.Huston et al., *J. Org. Chem.*, 1941, 6, 252.**2 : 5-Dimethylhexanol-3** (Isopropylisobutylcarbinol, 3-hydroxy-2 : 5-dimethylhexane)
$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} \cdot \text{CH}_2 \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
B.p. 157-8° (160-3°), 64°/15 mm. D_4^{20} 0.8212. n_D^{20} 1.42461.

Michiels, *Chem. Abstracts*, 1912, 6, 1611.Favorsky, *Chem. Abstracts*, 1913, 7, 986.**3 : 4-Dimethylhexanol-2** (2-Hydroxy-3 : 4-dimethylhexane)
$$\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{CH} \cdot \text{CH}(\text{OH}) \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{18}\text{O} \end{array}$$

MW, 130
B.p. 164-7°. D_4^{15} 0.840. n_D^{15} 1.4325.

Allophanate : m.p. 182°.

Cologne, *Bull. soc. chim.*, 1931, 49, 445.**2 : 5-Dimethyl-3-hexanolone-4.**

See Isobutyroin.

Dimethylhexanone.

See Isopropyl isobutyl Ketone and Ethyl tert.-amyl Ketone.

4 : 5-Dimethyl-1-hexenol-4.

See Methylisopropylallylcarbinol.

2 : 4-Dimethyl-2-hexenol-4

$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH}_2 \cdot \text{C}(\text{OH}) \cdot \text{CH} \cdot \text{C} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{16}\text{O} \end{array}$$

MW, 128
B.p. 48-50°/3-6 mm. D_4^0 0.8747, D_4^{17} 0.8600. n_D^{17} 1.4460.

Pastureau, Bernard, *Compt. rend.*, 1924, 179, 183.Jacquemain, *Compt. rend.*, 1934, 198, 482.**2 : 5-Dimethyl-2-hexenol-4**

$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{CH} \cdot \text{CH}(\text{OH}) \cdot \text{CH} \cdot \text{C} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{16}\text{O} \end{array}$$

MW, 128
B.p. 161-3°. D_4^{20} 0.8444. n_D^{20} 1.44493.

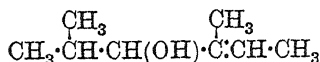
Acetyl: b.p. 177-80°. D_4^{20} 0.8270. n_D^{20} 1.43288.Krestinsky, *Ber.*, 1922, 55, 2763.**2 : 5-Dimethyl-2-hexenol-5**

$$\begin{array}{c} \text{CH}_3 \quad \text{CH}_3 \\ | \quad | \\ \text{CH}_3 \cdot \text{C}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH} \cdot \text{C} \cdot \text{CH}_3 \\ \text{C}_8\text{H}_{16}\text{O} \end{array}$$

MW, 128
B.p. 165°.

Henry, *Compt. rend.*, 1906, 143, 500.

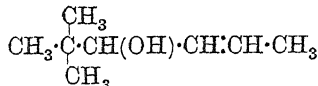
3 : 5-Dimethyl-2-hexenol-4

C₈H₁₈O MW, 128B.p. 86-8°/42 mm., 66-71°/19 mm. D₄²⁰ 0.8727, D₄¹⁰ 0.8643. n_D²⁰ 1.45214.

Acetyl : b.p. 103-6°/57 mm.

Abelmann, *Ber.*, 1910, 43, 1581.

5 : 5-Dimethyl-2-hexenol-4 (tert.-Butylpropenylcarbinol)

C₈H₁₆O MW, 128d-. B.p. 75-6°/36 mm. D₄²⁵ 0.8308. n_D²⁵ 1.4369. [α]_D²⁵ + 15°.

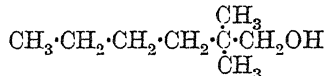
dl-.

B.p. 73-6°/35 mm.

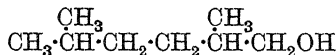
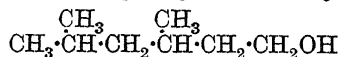
Mulliken, Wakeman, Gerry, *J. Am. Chem. Soc.*, 1935, 57, 1606.Stevens, *ibid.*, 1114.

Dimethyl-1-hexenylcarbinol.

See 2-Methyl-3-octenol-2.

2 : 2-Dimethyl-*n*-hexyl Alcohol (2 : 2-Dimethylhexanol-1, 1-hydroxy-2 : 2-dimethylhexane)C₈H₁₈O MW, 130B.p. 95°/29 mm., 80-2°/14 mm. n_D²⁰ 1.4304.

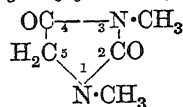
Phenylurethane : m.p. 52°.

Blondeau, *Bull. soc. chim.*, 1928, 43, 345.2 : 5-Dimethyl-*n*-hexyl Alcohol (2 : 5-Dimethylhexanol-1, 1-hydroxy-2 : 5-dimethylhexane)C₈H₁₈O MW, 130B.p. 179-80°, 77-8°/4 mm. D₄¹⁷ 0.9197. n_D¹⁷ 1.5095.Prévost, *Ann. chim.*, 1928, 10, 431.3 : 5-Dimethyl-*n*-hexyl Alcohol (3 : 5-Dimethylhexanol-1, 1-hydroxy-3 : 5-dimethylhexane)C₈H₁₈O MW, 130d-. B.p. 105°/45 mm. D₄³⁰ 0.815. [α]_D³⁰ + 1.46°.Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1.

Dimethylhexylcarbinol.

See 2-Methyl-sec.-*n*-octyl Alcohol.

1 : 3-Dimethylhydantoin (1 : 3-Dimethyl-2 : 4-diketotetrahydroglyoxaline)

C₅H₈O₂N₂ MW, 128Leaflets from Et₂O. M.p. 44-5°. B.p. 262°, 174°/34 mm., 150°/20 mm. Hygroscopic.

4-Oxime : cryst. from EtOH. M.p. 230-3°.

Biltz, Slotta, *J. prakt. Chem.*, 1926, 113, 254.Biltz, Heyn, *Ber.*, 1912, 45, 1666.

1 : 5-Dimethylhydantoin (1 : 5-Dimethyl-2 : 4-diketotetrahydroglyoxaline).

Needles from EtOH. M.p. 120-1°. Sol. H₂O, EtOH, AcOH, CHCl₃, Me₂CO. Spar. sol. Et₂O. Prac. insol. ligroin.Gabriel, *Ann.*, 1906, 348, 75.

5 : 5-Dimethylhydantoin (5 : 5-Dimethyl-2 : 4-diketotetrahydroglyoxaline, acetonylurea).

Prisms from EtOH. M.p. 175°. Sol. H₂O, EtOH, Me₂CO, AcOH, AcOEt. Spar. sol. C₆H₆, CHCl₃, MeOH. Prac. insol. Et₂O, pet. ether. Sublimes.

3-N-Acetyl : m.p. 192°.

1 : 3-N-Diacetyl : m.p. 186-7°.

Biltz, Slotta, *J. prakt. Chem.*, 1926, 113, 240, 243.Bergs, D.R.P. 566,094, (*Chem. Abstracts*, 1933, 27, 1001).Slotta, Behnisch, Szyska, *Ber.*, 1934, 67, 1532.Bucherer, Steiner, *J. prakt. Chem.*, 1934, 140, 291.

1 : 1-Dimethylhydracrylic Acid.

See Hydroxypivalic Acid.

sym.-Dimethylhydrazine (Hydrazomethane)

C₂H₈N₂ MW, 60Fuming liq. B.p. 81°. Sol. H₂O, EtOH, Et₂O. Hygroscopic. D₄²⁰ 0.8274. n_D²⁰ 1.4209. Reduces Fehling's. HNO₂ → azomethane.

B,2HCl : m.p. 168° decomp. (170°).

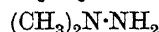
B, H₂SO₄ : m.p. 120°.

Oxalate : m.p. 119°.

Picrate : m.p. 147-50°.

Schlenk, D.R.P. 292,310, (*Chem. Zentr.*, 1916, II, 114).Emmett, Harkness, *J. Am. Chem. Soc.*, 1932, 54, 539.

unsym.-Dimethylhydrazine

C₂H₈N₂ MW, 60Liq. with ammoniacal odour. B.p. 63°. Very hygroscopic. Sol. H₂O, EtOH, Et₂O. D₄²² 0.7914. n_D²² 1.40753. HNO₂ → dimethylamine + N₂O.

B.HCl: cryst. from EtOH. M.p. 81–2°.

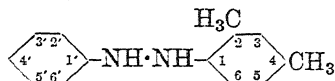
B₂H₂SO₄: m.p. 105°.

Oxalate: m.p. 142–3°.

Backer, *Rec. trav. chim.*, 1912, 31, 150.

Hatt, *Organic Syntheses*, 1936, XVI, 22.

2 : 4-Dimethylhydrazobenzene



$C_{14}H_{16}N_2$

MW, 212

Needles from ligroin. M.p. 78–9° (99–100° rapid heat.). Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

Jacobson, *Ber.*, 1895, 28, 2558.

3 : 5-Dimethylhydrazobenzene.

Needles. M.p. 78–9°.

Jacobson, *Ann.*, 1922, 427, 210.

2 : 2'-Dimethylhydrazobenzene (o-Hydr-azotoluene, oo'-ditolylhydrazine).

Leaflets from EtOH. M.p. 165°. Sol. EtOH, Et₂O, C₆H₆. Oxidises readily to 2 : 2'-dimethylazobenzene.

N-Monobenzoyl: m.p. 124°.

Elbs, Kopp, *Z. Elektrochem.*, 1898–99, 5, 110.

Piguet, U.S.P. 1,225,052, (*Chem. Abstracts*, 1917, 11, 1932).

Varma, Rao, *J. Indian Chem. Soc.*, 1929, 6, 915.

du Pont, U.S.P. 1,998, 488, (*Chem. Zentr.*, 1935, II, 2126).

3 : 3'-Dimethylhydrazobenzene (m-Hydr-azotoluene, mm'-ditolylhydrazine).

Cryst. from pet. ether. M.p. 38°. Sol. EtOH. Oxidises rapidly in air. Acids → 2 : 2'-dimethylbenzidine.

Rassow, Rülke, *J. prakt. Chem.*, 1902, 65, 120.

Gonze, *Bull. soc. chim. Belg.*, 1934, 43, 483.

3 : 4'-Dimethylhydrazobenzene (mp'-Ditolylhydrazine).

Plates from ligroin. M.p. 74°.

Jacobson, *Ber.*, 1895, 28, 2538.

4 : 4'-Dimethylhydrazobenzene (p-Hydr-azotoluene, pp'-ditolylhydrazine).

Plates from EtOH–Et₂O. M.p. 133–4°. Sol. EtOH, Et₂O, C₆H₆. Oxidises readily to 4 : 4'-dimethylazobenzene.

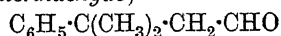
N-Monobenzoyl: m.p. 189° (186.5°).

N:N-Dibenzoyl: m.p. 188°.

Elbs, Kopp, *Z. Elektrochem.*, 1898–99, 5, 110.

Rassow, Rülke, *J. prakt. Chem.*, 1902, 65, 108.

β : β - Dimethylhydrocinnamaldehyde (2-Phenylisovaleraldehyde)



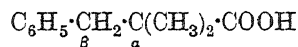
$C_{11}H_{14}O$

MW, 162

B.p. 86.5–87.5°/3 mm. n_D^{20} 1.5107.

Winstein, Seubold, *J. Am. Chem. Soc.*, 1947, 69, 2916.

α : α - Dimethylhydrocinnamic Acid (Phenyl-pivalic acid, 1 : 1-dimethyl-2-phenylpropionic acid)



$C_{11}H_{14}O_2$

MW, 178

Cryst. mass. M.p. 57°. B.p. 172–4°/19 mm. *Me ester*: $C_{12}H_{16}O_2$. MW, 192. B.p. 121–2°/23 mm.

Et ester: $C_{13}H_{18}O_2$. MW, 206. B.p. 136–8°/13 mm.

Isobutyl ester: $C_{15}H_{22}O_2$. MW, 234. B.p. 148–50°/18 mm.

Isoamyl ester: $C_{16}H_{24}O_2$. MW, 248. B.p. 156–7°/19 mm.

Chloride: $C_{11}H_{13}OCl$. MW, 196.5. Cryst. M.p. 5°. B.p. 125–6°/15 mm.

Amide: $C_{11}H_{15}ON$. MW, 177. Needles from pet. ether. M.p. 62–3°.

Haller, Bauer, *Ann. chim.*, 1918, 9, 19.

α : β - Dimethylhydrocinnamic Acid (1-Methyl-2-phenylbutyric acid, 1 : 2-dimethyl-2-phenylpropionic acid).

Leaflets from AcOH.Aq. M.p. 132–3.5°. B.p. 160–3°/12 mm.

Et ester: b.p. 133°/13 mm.

Chloride: b.p. 117–20°/12 mm.

Ruzicka, Ehmman, Parodi-Delfino, *Helv. Chim. Acta*, 1932, 15, 144.

β : β - Dimethylhydrocinnamic Acid (2-Methyl-2-phenylbutyric acid, 2-phenylisovaleric acid, 2 : 2-dimethyl-2-phenylpropionic acid).

Prisms from pet. ether. M.p. 59–60°. B.p. 167°/10 mm.

Me ester: b.p. 120°/11 mm.

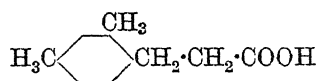
Anilide: cryst. from MeOH.Aq. M.p. 122–3°.

Hoffman, *J. Am. Chem. Soc.*, 1929, 51, 2545.

Whitmore et al., *J. Am. Chem. Soc.*, 1943, 65, 1469.

Saboor, *J. Chem. Soc.*, 1945, 922.

2 : 4-Dimethylhydrocinnamic Acid



$C_{11}H_{14}O_2$

MW, 178

Plates from EtOH. Needles from C₆H₆. M.p. 106° (111.5°).

Chloride: b.p. 132°/9 mm. n_D^{19} 1.5282.

Amide: $C_{11}H_{15}ON$. MW, 177. Prisms or needles. M.p. 107°.

Nitrile: $C_{11}H_{13}N$. MW, 159. B.p. 264–7°.

Clemo, Haworth, Walton, *J. Chem. Soc.*, 1929, 2375.

Wagner-Jauregg, Arnold, Huter, *Ber.*, 1942, 75, 1293.

2 : 5-Dimethylhydrocinnamic Acid.

Needles from pet. ether. M.p. 45–6°. B.p. 165–78°/10 mm.

Chloride: b.p. 127–8°/10 mm.

Plattner, Wyss, *Helv. Chim. Acta*, 1941, 24, 490.

3 : 5-Dimethylhydrocinnamic Acid.

Cryst. from C_6H_6 . M.p. 45–6.5°. B.p. 168–78°/13 mm.

Amide: m.p. 118°.

Buchner, Schottenhammer, *Ber.*, 1920, 53, 872.

Kadesch, *J. Am. Chem. Soc.*, 1944, 66, 1207.

Dimethylhydroquinone.

See Dihydroxyxylene.

Dimethyl-2-hydroxyethylamine.

See 2-Dimethylaminoethyl Alcohol.

ON-Dimethylhydroxylamine.

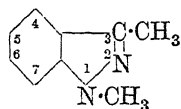
See under *N*-Methylhydroxylamine.

Dimethyl-hydroxyphenylcarbinol.

See Hydroxyisopropylphenol.

Dimethyliminazole.

See Dimethylglyoxaline.

1 : 3-Dimethylindazole

$C_9H_{10}N_2$

MW, 146

Plates. M.p. 36.5°. Volatile in steam.

Fischer, Tafel, *Ann.*, 1885, 227, 336.

1 : 5-Dimethylindazole.

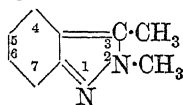
Needles. M.p. 62–3°. B.p. 255–65°. Sol. MeOH, Et_2O , Me_2CO , AcOH.

HgCl₂ comp.: needles from H_2O . M.p. 172–3°.

AgNO₃ comp.: m.p. 157–8°.

Picrate: needles from H_2O . M.p. 159–60°.

Auwers, Schwegler, *Ber.*, 1920, 53, 1230.

2 : 3-Dimethylindazole

$C_9H_{10}N_2$

MW, 146

Leaflets. M.p. 79–80°. B.p. 286°, 155°/15 mm. Sol. EtOH, Et_2O , hot H_2O , ligroin. Volatile in steam.

Picrate: yellow needles from EtOH. M.p. 224–5°.

Fischer, Tafel, *Ann.*, 1885, 227, 322.

Auwers, Duisberg, *Ber.*, 1920, 53, 1182.

Alberti, *Gazz. chim. ital.*, 1937, 67, 238.

2 : 5-Dimethylindazole.

Prisms from pet. ether. M.p. 76–7°. B.p. 270°. Sol. MeOH, Et_2O , Me_2CO , AcOH, C_6H_6 .

HgCl₂ comp.: prisms. M.p. about 220°.

AgNO₃ comp.: needles from H_2O . M.p. 125°.

Picrate: yellow needles from H_2O . M.p. 197–8°.

Auwers, Schwegler, *Ber.*, 1920, 53, 1229.

5 : 7-Dimethylindazole.

Needles from H_2O . M.p. 133–4°. Sol. EtOH, dil. HCl.

1-*N*-Acetyl: m.p. 72°.

2-*N*-Acetyl: needles from EtOH. M.p. 116–7°.

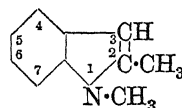
1-*N*-Benzoyl: needles from ligroin. M.p. 98°.

2-*N*-Benzoyl: needles from ligroin. M.p. 111–2°.

Picrate: yellow needles from MeOH. M.p. 171–2°.

Bamberger, *Ann.*, 1899, 305, 310.

Auwers, Ernecke, Wolter, *Ann.*, 1930, 478, 164.

1 : 2-Dimethylindole

$C_{10}H_{11}N$

MW, 145

Needles from ligroin. M.p. 56°. Sol. EtOH, Et_2O , C_6H_6 , conc. HCl. Spar. sol. hot H_2O .

Picrate: m.p. 125°.

Styphnate: m.p. 153°.

Degen, *Ann.*, 1886, 236, 153.

Hosheno, *Chem. Abstracts*, 1933, 27, 291.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.

1 : 3-Dimethylindole (N-Methylskatole).

B.p. 257–60° (225–32°), 119–20°/7 mm.

Picrate: m.p. 145°.

Styphnate: m.p. 133°.

Keimatsu, Inoue, *Chem. Abstracts*, 1925, 19, 2493.

Janetzky, Verkade, Lieste, *Rec. trav. chim.*, 1945, 64, 193.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.

1 : 4-Dimethylindole.

B.p. 73–5°/0.2 mm.

Picrate: m.p. 187°.

Styphnate: m.p. 158°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.

1 : 5-Dimethylindole.

B.p. 262° (242–5°), 138°/17 mm., 60–5°/1 mm. D_4^{20} 1.0242. Volatile in steam.

Picrate: m.p. 151°.

Styphnate: m.p. 144°.

v. Braun, Kruber, *Ber.*, 1912, 45, 2986.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.

1 : 6-Dimethylindole.

B.p. 68–73°/0.2 mm.

Picrate : m.p. 148°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**1 : 7-Dimethylindole.**

M.p. 78°. B.p. 80–3°/1 mm.

Picrate : m.p. 154.5°.

Styphnate : m.p. 150°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**2 : 3-Dimethylindole (2-Methylskatole).**Leaflets from ligroin. M.p. 107–9°. B.p. 285°/750 mm. Sol. EtOH, Et₂O, conc. HCl. Spar. sol. hot H₂O, cold ligroin. Volatile in steam.

N-Nitroso : yellow needles. M.p. 61–2°.

Picrate : brown needles from EtOH. M.p. 157°.

Styphnate : m.p. 159°.

sym.-Trinitrobenzene add. comp. : red needles. M.p. 175°.

2:4:6-Trinitrotoluene add. comp. : red needles. M.p. 118°.

Fischer, *Ann.*, 1886, 236, 128.I.C.I., B.P. 330,332, (*Chem. Zentr.*, 1930, II, 2055).Oddo, *Gazz. chim. ital.*, 1933, 63, 236.Snyder, Smith, *J. Am. Chem. Soc.*, 1943, 65, 2452.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**2 : 4-Dimethylindole.**

B.p. 94–6°/0.5 mm.

Picrate : m.p. 164.5°.

Styphnate : m.p. 167°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**2 : 5-Dimethylindole.**M.p. 114–15°. B.p. 188°/40 mm. Sol. EtOH, Et₂O, AcOH, C₆H₆. Prac. insol. H₂O.Picrate : red needles from C₆H₆. M.p. 159°.

Styphnate : m.p. 149°.

Raschen, *Ann.*, 1887, 239, 227.I.C.I., B.P. 330,332, (*Chem. Zentr.*, 1930, II, 2055).Salway, *J. Chem. Soc.*, 1913, 103, 1990.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**2 : 6-Dimethylindole.**

Silvery leaflets. M.p. 88.5° (52°). B.p. 273°, 153°/11 mm.

Picrate : m.p. 138.5°.

Styphnate : m.p. 146°.

Dennstedt, *Ber.*, 1891, 24, 2562.König, Becker, *J. prakt. Chem.*, 1912, 85, 379.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**2 : 7-Dimethylindole.**

Cryst. from ligroin. M.p. 35–7°. B.p. 146–8°/10 mm., 129–31°/2 mm.

Picrate : m.p. 156.5°.

Styphnate : m.p. 149°.

I.C.I., B.P. 330,332, (*Chem. Zentr.*, 1930, II, 2055).Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**3 : 5-Dimethylindole (5-Methylskatole).**

Needles from pet. ether. M.p. 74.5–75°. B.p. 277–8°, 170–3°/25 mm.

Picrate : m.p. 179–80°.

Styphnate : m.p. 184°.

Mendlik, Wibaut, *Rec. trav. chim.*, 1931, 50, 109.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**3 : 6-Dimethylindole (6-Methylskatole).**

Cryst. from pet. ether. M.p. 116–17°. Sublimes.

Picrate : m.p. 179–80°.

Mendlik, Wibaut, *Rec. trav. chim.*, 1931, 50, 110.**3 : 7-Dimethylindole (7-Methylskatole).**

M.p. 56°. B.p. 281–2°, 80–95°/0.5 mm.

Picrate : red needles. M.p. 165°.

Styphnate : m.p. 152°.

Mendlik, Wibaut, *Rec. trav. chim.*, 1931, 50, 109.Cornforth, Robinson, *J. Chem. Soc.*, 1942, 680.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**4 : 6-Dimethylindole.**

B.p. 90–5°/0.4 mm.

Picrate : m.p. 169°.

Styphnate : m.p. 168.5°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**4 : 7-Dimethylindole.**

Needles from pet. ether. M.p. 101–2°.

Picrate : m.p. 177°.

Styphnate : m.p. 173°.

Plancher, *Ber.*, 1902, 35, 2607.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**5 : 6-Dimethylindole.**

M.p. 64°. B.p. 85°/0.5 mm.

Picrate : m.p. 154.5°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**5 : 7-Dimethylindole.**

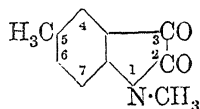
B.p. 80–4°/0.5 mm.

Picrate : m.p. 183°.

Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.

6 : 7-Dimethylindole.

M.p. 70°.

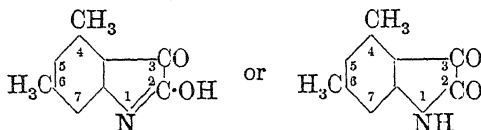
Picrate : m.p. 164°.*Styphnate* : m.p. 162°.Marion, Oldfield, *Can. J. Research*, 1947, 25B, 1.**1 : 5-Dimethylisatin** $C_{10}H_9O_2N$

MW, 175

Red needles. M.p. 148°.

Hegel, *Ann.*, 1886, 232, 217.**1 : 7-Dimethylisatin.**

Dark red prisms from EtOH. M.p. 171-2° (157°).

Heller, *Ber.*, 1926, 59, 709.**4 : 6-Dimethylisatin** $C_{10}H_9O_2N$

MW, 175

Yellow needles from xylene. M.p. 238-9° (Orange prisms. M.p. 240°).

Acetyl deriv. : yellow needles from ligroin. M.p. 151°.*3-Oxime* : yellow cryst. from AcOH. M.p. 220-1°.*3-Phenylhydrazone* : yellow needles from EtOH.Aq. M.p. 238-9°.I.G., B.P. 308,740, (*Chem. Zentr.*, 1930, II, 2185).**4 : 7-Dimethylisatin.**

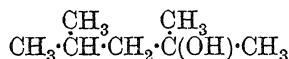
Orange red needles from AcOH. M.p. 267°.

I.G., B.P. 308,740, (*Chem. Zentr.*, 1930, II, 2185).**5 : 6-Dimethylisatin.**

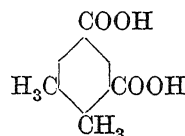
Orange needles from EtOH. M.p. 214-5°.

Kranzlein, *Ber.*, 1937, 70, 1781.**5 : 7-Dimethylisatin.**Red needles from AcOH. M.p. 242°. Spar. sol. hot H_2O . Alkalis \rightarrow violet black sol. becoming yellow.*O-Me* : $C_{11}H_{11}O_2N$. MW, 189. M.p. 137°.*O-Benzoyl* : red cryst. from Et_2O . M.p. 118-9°.*3-Oxime* : yellow needles from EtOH. M.p. 229-30°.*3-Phenylhydrazone* : orange needles from AcOH. M.p. 274°.I.G., B.P. 308,740, (*Chem. Zentr.*, 1930, II, 2186).Hantzsch, *Ber.*, 1923, 56, 2110.**6 : 7-Dimethylisatin.**

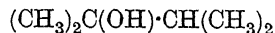
Orange red prisms. M.p. 252°.

Columbara, U.S.P. 1,856,210, (*Chem. Abstracts*, 1932, 26, 3523).**Dimethylisoamylcarbinol.***See* 2 : 5-Dimethylhexanol-2.**Dimethyl-isobutenylcyclopropane-carboxylic Acid.***See* Chrysanthemum-monocarboxylic Acid.**Dimethylisobutylcarbinol (2 : 4-Dimethylpentanol-2)** $C_7H_{16}O$

MW, 116

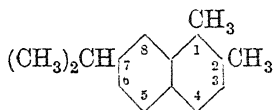
B.p. 133°. D_4^{20} 0.8103. n_D^{20} 1.4172. Sol. most ord. org. solvents. Insol. H_2O . $CrO_3 \rightarrow$ acetic and isobutyric acids.*Et ether* : $C_9H_{20}O$. MW, 144. B.p. 140-2°. D_0^0 0.7964.de Graef, *Bull. soc. chim. Belg.*, 1931, 40, 315.**Dimethylisohexylcarbinol.***See* 2 : 6-Dimethylheptanol-2.**4 : 5-Dimethylisophthalic Acid** $C_{10}H_{10}O_4$

MW, 194

Prisms from Me_2CO . M.p. 335.5°.Jannasch, Werter, *Ber.*, 1895, 28, 531.**4 : 6-Dimethylisophthalic Acid.**Needles from H_2O . M.p. 266° (above 320°). Sol. hot EtOH. Spar. sol. hot H_2O . Sublimes without melting.*Di-Me ester* : $C_{12}H_{14}O_4$. MW, 222. Needles from MeOH. M.p. 76°.Schnapauff, *Ber.*, 1886, 19, 2509.Philippi, Seka, Froeschl, *Ann.*, 1922, 428, 304.**Dimethylisopropylallene.***See* 2 : 5-Dimethyl-2 : 3-hexadiene.**1 : 4-Dimethyl-7-isopropylazulene.***See* Guaiazulene.**Dimethylisopropylbenzene.***See* Dimethylcumene.**Dimethylisopropylcarbinol (2:3-Dimethylbutanol-2)** $C_6H_{14}O$

MW, 102

Liq. with odour of camphor. M.p. -14°. B.p. 117-18°/740 mm. D_0^0 0.8387. n_D^{25} 1.4151.*3 : 5-Dinitrobenzoyl* : m.p. 111°.*Phenylurethane* : m.p. 65-6°.Lindner, *Monatsh.*, 1911, 32, 419.

**1 : 4-Dimethyl-4-isopropylcyclohexan-
one-3.***See* Homomenthone.**1 : 2-Dimethyl-5-isopropylcyclopenten-
one-3.***See* Isothujone.**Dimethylisopropylethylene.***See* 2 : 4-Dimethyl-2-pentene.**1 : 2-Dimethyl-7-isopropyl-naphthalene** $C_{15}H_{18}$

MW, 198

B.p. 149–51°/9 mm.

Picrate : yellow needles from EtOH. M.p. 92–3·5°.*sym.-Trinitrobenzene add. comp.* : yellow needles from EtOH. M.p. 108–10°.Bradfield, Hedge, Rao, Simonsen, Gillam,
J. Chem. Soc., 1936, 674.**1 : 3-Dimethyl-7-isopropyl-naphthalene.***Picrate* : orange yellow needles from EtOH. M.p. 113–14°.*sym.-Trinitrobenzene add. comp.* : yellow needles. M.p. 141–2°.Bradfield, Hedge, Rao, Simonsen, Gillam,
J. Chem. Soc., 1936, 675.**1 : 4-Dimethyl-6-isopropyl-naphthalene.**

B.p. 155–7°/12 mm.

Picrate : orange red needles from MeOH. M.p. 102·5–103°.*sym.-Trinitrobenzene add. comp.* : yellow cryst. from EtOH. M.p. 144·5–5·5°.Ruzicka, Ehmann, Maderni, Vass, *Helv. Chim. Acta*, 1933, 16, 272.**1 : 5-Dimethyl-3-isopropyl-naphthalene
(Vetivalene).**

B.p. 110–12°/0·8 mm.

Picrate : orange yellow needles. M.p. 115·5–116·5°.*sym.-Trinitrobenzene add. comp.* : yellow needles from EtOH. M.p. 145–7°.Bradfield, Hedge, Rao, Simonsen, Gillam,
J. Chem. Soc., 1936, 670.Ruzicka, Reichstein, Pfähler, *Helv. Chim. Acta*, 1933, 16, 273.**1 : 6-Dimethyl-4-isopropyl-naphthalene.***See* Cadalene.**1 : 6-Dimethyl-7-isopropyl-naphthalene.**

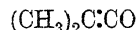
B.p. 154–8°/13 mm.

Picrate : orange red needles from EtOH. M.p. 124–6°.*Styphnate* : orange yellow needles from EtOH. M.p. 141–2°.Bradfield, Hedge, Rao, Simonsen, Gillam,
J. Chem. Soc., 1936, 675.**1 : 7-Dimethyl-4-isopropyl-naphthalene.**

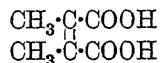
Plates from EtOH.Aq. M.p. 60°.

Picrate : orange red needles from EtOH. M.p. 92°.*Styphnate* : yellow needles. M.p. 120°.Rapson, Short, *J. Chem. Soc.*, 1933, 129.**Dimethylitaconic Acid.***See* Methylidenesuccinic Acid, 3-Methyl-1-butylene-2 : 3-dicarboxylic Acid and Isopropylidenesuccinic Acid.**Dimethylketazine** $C_6H_{12}N_2$

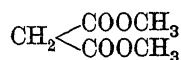
MW, 112

B.p. 131°, 54°/37 mm. Misc. with H_2O , EtOH, Et_2O . D_4^{20} 0·8381. n_D^{20} 1·45102. Min. acids \rightarrow acetone + hydrazine.Curtius, Zinkeisen, *J. prakt. Chem.*, 1898, 58, 315.**Dimethylketene** C_4H_6O

MW, 70

Pale yellow liq. F.p. – 97·5°. B.p. 34°, – 49°/12 mm. Forms explosive compound with O . $H_2O \rightarrow$ isobutyric acid. EtOH \rightarrow ethyl isobutyrate. Polymerises.*Dimeride* : $(C_4H_6O)_2$. B.p. 111–14°.Staudinger, Klever, Kober, *Ann.*, 1910, 374, 16.Staudinger, Felix, Horder, *Helv. Chim. Acta*, 1925, 8, 306.Hurd, Dull, *J. Am. Chem. Soc.*, 1932, 54, 2432.**Dimethylketol.***See* Acetoïn.**1 : 1-Dimethyl-levulinic Acid.***See* Mesitonic Acid.**Dimethylmaleic Acid** (*cis*-2-Butylene-2 : 3-dicarboxylic acid, pyrocinchonic acid) $C_6H_8O_4$

MW, 144

Di-Me ester : $C_8H_{12}O_4$. MW, 172. B.p. 219°.*Di-Et ester* : $C_{10}H_{16}O_4$. MW, 200. B.p. 237°.*Anhydride* : $C_6H_6O_3$. MW, 126. Pearly plates or leaflets. M.p. 96°. B.p. 223°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. cold H_2O . D_4^{20} 0·90921. Volatile in steam.*Imide* : $C_6H_6O_2N$. MW, 125. Leaflets. M.p. 118°. Sol. EtOH. Sublimes.Thiele, *Ann.*, 1899, 306, 242.**Dimethyl malonate** $C_5H_8O_4$

MW, 132

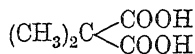
B.p. 181°. D_4^{20} 1.1544. n_D^{17} 1.41490. Heat of comb. C_p 552.5 Cal. Forms Na deriv.
 $SnCl_4$ add. comp.: m.p. 154° after sintering at 110°.

$SnBr_4$ add. comp.: m.p. 69°.

Leuchs, Theodorescu, *Ber.*, 1910, 43, 1251.

Perkin, *J. Chem. Soc.*, 1884, 45, 509.

Dimethylmalonic Acid



$C_5H_8O_4$ MW, 132

Prisms from C_6H_6 -pet. ether. Sublimes with part. decomp. above 130°. M.p. 192-3° (186°). Sol. EtOH, Et_2O , hot H_2O . Spar. sol. C_6H_6 , ligroin. k (first) = 7.7×10^{-4} at 25°; (second) = 0.31×10^{-6} at 100°. Heat of comb. C_p 515.3 Cal.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 177-8°/753 mm., 71°/22 mm. D_4^{20} 1.0591. n_D^{20} 1.41505.

Et ester: $C_7H_{12}O_4$. MW, 160. B.p. 135-6°/19 mm., 114-6°/6 mm. *Chloride*: b.p. 74-8°/19 mm. *Anilide*: prisms from pet. ether. M.p. 47-8°.

Di-Et ester: $C_9H_{16}O_4$. MW, 188. B.p. 196-5°, 97-8°/22 mm. D_4^{20} 1.0315. n_D^{20} 1.42528.

Monochloride: $C_5H_7O_3Cl$. MW, 150.5. Cryst. from pet. ether. M.p. 64-5° decomp.

Dichloride: $C_5H_6O_2Cl_2$. MW, 169. B.p. 165°.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. M.p. 269° (263°).

Dinitrile: $C_5H_6N_2$. MW, 94. M.p. 31-2°. B.p. 169-5°. Sublimes.

Thorne, *J. Chem. Soc.*, 1881, 39, 544.

Morton, Fallwell, *J. Am. Chem. Soc.*, 1938, 60, 1924.

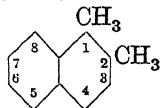
Dimethylmesaconic Acid.

See Isopropylfumaric Acid.

Dimethylmethiononic Acid.

See Propane-2 : 2-disulphonic Acid.

1 : 2-Dimethylnaphthalene



$C_{12}H_{12}$ MW, 156

M.p. -3.5°. B.p. 139-40°/15 mm. D_4^{20} 1.015. n_D^{20} 1.6135.

Picrate: orange needles from MeOH. M.p. 130-31°.

Styphnate: yellow cryst. from MeOH. M.p. 142-3°.

sym.-*Trinitrobenzene add. comp.*: yellow needles from MeOH. M.p. 147-8°.

Schroeter, Lichtenstadt, Irineu, *Ber.*, 1918, 51, 1601.

Darzens, Levy, *Compt. rend.*, 1936, 202, 73.

Kloetzel, *J. Am. Chem. Soc.*, 1940, 62, 1712.

1 : 3-Dimethylnaphthalene.

B.p. 107°/1 mm.

Picrate: orange needles from MeOH. M.p. 118°.

Styphnate: m.p. 132-3° (116-8°).

Barnett, Sanders, *J. Chem. Soc.*, 1933, 434.

Kloetzel, *J. Am. Chem. Soc.*, 1940, 62, 1711.

1 : 4-Dimethylnaphthalene.

B.p. 262-4°, 145°/40 mm., 108-9°/1 mm. D_4^{16} 1.01803. n_D^{16} 1.61567.

Picrate: orange needles from MeOH. M.p. 144°.

Styphnate: orange prisms from MeOH. M.p. 125-6°.

sym.-*Trinitrobenzene add. comp.*: yellow needles from MeOH. M.p. 165-6°.

Meyer, Fricke, *Ber.*, 1914, 47, 2771.

Barnett, Sanders, *J. Chem. Soc.*, 1933, 434.

Kloetzel, *J. Am. Chem. Soc.*, 1940, 62, 1710.

1 : 5-Dimethylnaphthalene.

Cryst. from 85% EtOH. M.p. 80-80.5°.

Picrate: m.p. 138-9°.

Anderson, Short, *J. Chem. Soc.*, 1933, 485.

Butz, *J. Am. Chem. Soc.*, 1940, 62, 2557.

1 : 6-Dimethylnaphthalene.

B.p. 262-3°, (265°). D_4^{15} 1.0056. Constituent of coal tar.

Picrate: m.p. 114°.

Styphnate: m.p. 121-2°.

sym.-*Trinitrobenzene add. comp.*: m.p. 131-2°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 349.

Kipping, Wild, *J. Chem. Soc.*, 1940, 1239.

1 : 7-Dimethylnaphthalene.

B.p. 261-2°, 147-9°/15 mm. D_4^{20} 1.0115. n_D^{20} 1.60831. Volatile in steam.

Picrate: m.p. 121°.

Kruber, Schade, *Ber.*, 1936, 69, 1722.

1 : 8-Dimethylnaphthalene.

Leaflets from EtOH.Aq. M.p. 63°. B.p. 140°/18 mm.

Picrate: m.p. 148°.

Styphnate: m.p. 160°.

Linstead, Millidge, Thomas, Walpole, *J. Chem. Soc.*, 1937, 1156.

2 : 3-Dimethylnaphthalene (*Guaiene*).

Leaflets from EtOH. M.p. 104-104.5°. Sol. EtOH, Et_2O . Sublimes. Volatile in steam.

Picrate: m.p. 123-4°.

Schroeter, Lichtenstadt, Irineu, *Ber.*, 1918, 51, 1603.

2 : 6-Dimethylnaphthalene.

Plates from EtOH. M.p. 110–11°. B.p. 261–2°. Volatile in steam.

Picrate : m.p. 142–3°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 363.

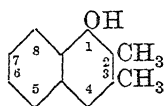
2 : 7-Dimethylnaphthalene.

Leaflets from EtOH. M.p. 96–7°. B.p. 262°.

Picrate : yellow needles from MeOH. M.p. 136–136.5°.

Styphnate : yellow needles from MeOH. M.p. 158–159.5°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 364.

2 : 3-Dimethyl-1-naphthol

$C_{12}H_{12}O$

MW, 172

M.p. 84–5°.

Picrate : scarlet. M.p. 143–4°.

Cocker, *J. Chem. Soc.*, 1946, 39.

2 : 4-Dimethyl-1-naphthol.

M.p. 84–5°. B.p. 169–70°/10 mm.

Phenylurethane : m.p. 174–5°.

Picrate : dark red needles. M.p. 143–4°.

Cornforth, Cornforth, Robinson, *J. Chem. Soc.*, 1943, 168.

Clemo, Cocker, *J. Chem. Soc.*, 1946, 30.

2 : 6-Dimethyl-1-naphthol.

M.p. 113°.

I.G., F.P. 807,830, (*Chem. Abstracts*, 1937, 31, 6023).

2 : 7-Dimethyl-1-naphthol.

Cryst. from H_2O . M.p. 95°.

Picrate : red. M.p. 147°.

Buu-Hoi, Lecocq, *J. Chem. Soc.*, 1946, 830.

3 : 4-Dimethyl-1-naphthol.

Leaflets from ligroin. M.p. 114–15°. B.p. 205–10°/15 mm. Becomes red in air.

Kruber, Schade, *Ber.*, 1935, 68, 15.

3 : 7-Dimethyl-1-naphthol.

Needles from pet. ether. M.p. 105–6°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 360.

4 : 6-Dimethyl-1-naphthol.

Needles from toluene. M.p. 102°.

Kruber, Schade, *Ber.*, 1936, 69, 1726.

4 : 7-Dimethyl-1-naphthol.

Needles from toluene. M.p. 82°. B.p. 180–3°/30 mm. Becomes red in air.

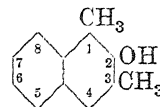
Weissgerber, Kruber, *Ber.*, 1919, 52, 351.

6 : 7-Dimethyl-1-naphthol.

Cryst. from C_6H_6 -pet. ether. M.p. 140°.

Coulson, *J. Chem. Soc.*, 1938, 1310.

Dict. of Org. Comp.—II.

1 : 3-Dimethyl-2-naphthol

$C_{12}H_{12}O$

MW, 172

M.p. 89–90°.

Phenylurethane : m.p. 197°.

p-Toluenesulphonyl : m.p. 85–6°.

Picrate : scarlet. M.p. 132–3°.

Cocker, *J. Chem. Soc.*, 1946, 38.

1 : 4-Dimethyl-2-naphthol.

Needles. M.p. 135–6°. B.p. 315–16°. Sol. EtOH, Et_2O . Spar. sol. H_2O . Sublimes at 100°.

Me ether : $C_{13}H_{14}O$. MW, 186. Prisms. M.p. 68°.

Acetyl : leaflets. M.p. 77–8°.

Cannizzaro, Carnelutti, *Gazz. chim. ital.*, 1882, 12, 406.

Andreocci, *Gazz. chim. ital.*, 1893, 23, 481.

1 : 5-Dimethyl-2-naphthol.

Needles from Et_2O -hexane. M.p. 162–3°. Sublimes at 100–20°/0.5 mm.

Benzoyl : prisms. M.p. 151°.

Ruzicka, Sternbach, *Helv. Chim. Acta*, 1940, 23, 359.

Ruzicka, Rey, *Helv. Chim. Acta*, 1943, 26, 2136.

3 : 4-Dimethyl-2-naphthol.

M.p. 113°.

p-Toluenesulphonyl : m.p. 128°.

Cocker, *J. Chem. Soc.*, 1946, 38.

3 : 6-Dimethyl-2-naphthol.

Needles from toluene. M.p. 171–2°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 367.

3 : 7-Dimethyl-2-naphthol.

Needles from toluene. M.p. 173–4°. Distils.

Weissgerber, Kruber, *Ber.*, 1919, 52, 360.

3 : 8-Dimethyl-2-naphthol.

Needles from C_6H_6 -hexane. M.p. 94–5°.

Me ether : cryst. from EtOH. M.p. 70–1°.

Ruzicka, Sternbach, *Helv. Chim. Acta*, 1940, 23, 359.

4 : 8-Dimethyl-2-naphthol.

Cryst. from C_6H_6 -hexane. M.p. 152°.

Me ether : needles. M.p. 86°.

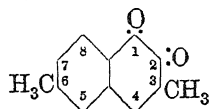
Ruzicka, Sternbach, *Helv. Chim. Acta*, 1940, 23, 359.

6 : 7-Dimethyl-2-naphthol.

Needles from C_6H_6 -pet. ether or toluene. M.p. 160°.

Kruber, *Ber.*, 1929, 62, 3047.

3 : 6-Dimethyl-1 : 2-naphthoquinone

 $C_{12}H_{10}O_2$

MW, 186

Brownish red prisms from AcOEt. M.p. 152–3°.

Weissgerber, Kruber, *Ber.*, 1919, 52, 368.

3 : 7-Dimethyl-1 : 2-naphthoquinone.

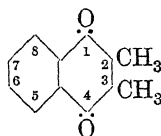
Red needles from EtOH. M.p. 151–2°.

2-*Oxime*: orange needles. M.p. 222° decomp.Weissgerber, Kruber, *Ber.*, 1919, 52, 362.Fieser, Seligman, *J. Am. Chem. Soc.*, 1934, 56, 2693.

6 : 7-Dimethyl-1 : 2-naphthoquinone.

Brownish red scales from Et₂O. M.p. 146–7°.Kruber, *Ber.*, 1929, 62, 3047.

2 : 3-Dimethyl-1 : 4-naphthoquinone

 $C_{12}H_{10}O_2$

MW, 186

Yellow prisms from EtOH. M.p. 127°. Volatile in steam. Antihæmorrhagic.

Smith, Webster, *J. Am. Chem. Soc.*, 1937, 59, 664.

2 : 5-Dimethyl-1 : 4-naphthoquinone.

Yellow needles from MeOH. M.p. 94°. Volatile in steam.

Monophenylhydrazone: red needles from AcOH. M.p. 226°.Heilbron, Wilkinson, *J. Chem. Soc.*, 1930, 2552.

2 : 6-Dimethyl-1 : 4-naphthoquinone.

Yellow needles from AcOEt. M.p. 136–7°. Volatile in steam.

Fieser, Seligman, *J. Am. Chem. Soc.*, 1934, 56, 2694.Weissgerber, Kruber, *Ber.*, 1919, 52, 356.

2 : 7-Dimethyl-1 : 4-naphthoquinone.

Yellow needles from AcOEt. M.p. 114–5°. Volatile in steam.

Weissgerber, Kruber, *Ber.*, 1919, 52, 368.

2 : 8-Dimethyl-1 : 4-naphthoquinone.

Cryst. from MeOH. M.p. 135°.

Tishler, Fieser, Wendler, *J. Am. Chem. Soc.*, 1940, 62, 2870.

3 : 5-Dimethyl-1 : 4-naphthoquinone.

Yellow prisms from petrol. M.p. 135–6°.

Kruber, Schade, *Ber.*, 1936, 69, 1726.

5 : 6-Dimethyl-1 : 4-naphthoquinone.

Pale yellow needles from AcOEt. M.p. 125°.

Kruber, Schade, *Ber.*, 1935, 68, 14.

5 : 8-Dimethyl-1 : 4-naphthoquinone.

M.p. 124–5°.

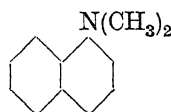
Arbuzov, Spekterman, *Chem. Abstracts*, 1941, 35, 2498.

6 : 7-Dimethyl-1 : 4-naphthoquinone.

Yellow needles from EtOH. M.p. 118–19°.

Fieser, Campbell, Fry, *J. Am. Chem. Soc.*, 1939, 61, 2217.

N-Dimethyl-1-naphthylamine

 $C_{12}H_{13}N$

MW, 171

Liq. with violet fluor. B.p. 272–4°, 185°/69 mm. D_{15}^{25} 1.0446. n_D^{25} 1.624.*Picrate*: lemon yellow cryst. M.p. 145°.sym.-*Trinitrobenzene add. comp.*: orange red needles. M.p. 105–7°.*Picryl chloride add. comp.*: red needles. M.p. 42°.Gokhle, Mason, *J. Chem. Soc.*, 1930, 1757.

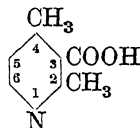
N-Dimethyl-2-naphthylamine.

M.p. 46–7°. B.p. 305°, 212–13°/69 mm., 155–6°/10 mm. D_{20}^{25} 1.0387.*B,HCl*: prisms from AcOH-EtOH. M.p. 159°.*Picrate*: yellow cryst. M.p. 200° decomp.2 : 4 : 6-*Trinitroanisole add. comp.*: red needles from EtOH. M.p. 69°.Pinnow, *Ber.*, 1899, 32, 1405.Rodionov, Vvedenskii, *Chem. Abstracts*, 1931, 25, 4545.

Dimethylnaphthylamine.

See also Aminodimethylnaphthalene.

2 : 4-Dimethylnicotinic Acid (2 : 4-Dimethylpyridine-3-carboxylic acid, 2 : 4-lutidine-3-carboxylic acid)

 $C_8H_9O_2N$

MW, 151

Prisms. M.p. 160°. Sol. H₂O, EtOH.*Hydrochloride*: m.p. 166°.*Chloroplatinate*, 2H₂O: m.p. anhyd. 216°.*Et ester*: C₁₀H₁₃O₂N. MW, 179. B.p. 246–7°. Sol. min. acids. Non-volatile in steam.*Chloroplatinate*: m.p. 191°.*Amide*: C₈H₁₀ON₂. MW, 150. Needles + ½H₂O. M.p. 191°.*Nitrile*: C₈H₈N₂. MW, 132. Prisms. M.p. 53°. B.p. 218°, 108°/15 mm. *B,HCl*: m.p. 187°. *B,HAuCl₄*: m.p. 172°. *B,HgCl₂*: m.p. 178°. *Picrate*: yellow prisms. M.p. 161°.Michael, *Ber.*, 1885, 18, 2023.

2 : 6-Dimethylnicotinic Acid (2 : 6-Dimethylpyridine-3-carboxylic acid, 2 : 6-lutidine-3-carboxylic acid).

M.p. 160°. Sol. H₂O, EtOH.

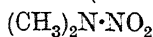
B. HCl, H₂O : m.p. 220°.

Et ester : b.p. 244-5° (255-7°), 129-30°/18 mm. D₄²⁰ 1.060. n_D²⁰ 1.5070. Picrate : m.p. 137°.

Picrolonate : m.p. 142° decomp.

Weiss, Ber., 1886, 19, 1305.

Dimethylnitramine (N-Nitrodimethylamine)

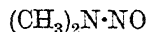


C₂H₆O₂N₂ MW, 90

Needles from ligroin. M.p. 58°. B.p. 187°. Sol. H₂O, EtOH, Et₂O, C₆H₆. D₄²⁵ 1.109. n_D²⁵ 1.4462. Volatile in steam. Decomp. by hot dil. alkalis. Zn + AcOH.Aq. → unsym.-dimethylhydrazine.

Degner, Pechmann, Ber., 1897, 30, 647.

Dimethylnitrosamine (N-Nitrosodimethylamine)



C₂H₆ON₂ MW, 74

Yellow liq. B.p. 153°/774 mm. D₄¹⁸ 1.0049. n_D¹⁸ 1.43743. Heat of comb. C_v 394.3 Cal. Gradually decomp. on standing. Hot conc. HCl → dimethylamine. Zn + AcOH → unsym.-dimethylhydrazine.

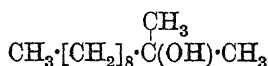
van Romburgh, Rec. trav. chim., 1886, 5, 248.

2 : 8-Dimethylnonanol-5.

See Di-isoamylcarbinol.

Dimethylnonylcarbinol (2-Methylundecanol-

2)

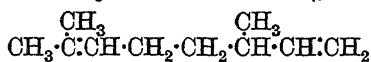


C₁₂H₂₆O MW, 186

B.p. 134-5°/15 mm., 123-7°/13 mm. D₄¹ 0.8437, D₄¹³ 0.8349. n_D¹³ 1.43968.

Barbier, Locquin, Compt. rend., 1913, 156, 1445.

3 : 7-Dimethyl-1 : 6-octadiene (β-Linalolene)



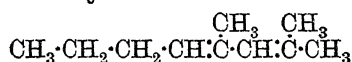
C₁₀H₁₈ MW, 138

B.p. 160-1° (165-8°). D₄²⁰ 0.7580 (0.7882). n_D²⁰ 1.4358 (1.455).

Semmler, Ber., 1894, 27, 2520.

Mannich, Handke, Roth, Ber., 1936, 69, 2122.

2 : 4-Dimethyl-2 : 4-octadiene

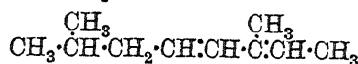


C₁₀H₁₈ MW, 138

B.p. 160°. D₄²⁰ 0.7802. n_D²⁰ 1.4558.

Jacquemain, Compt. rend., 1942, 215, 179.

3 : 7-Dimethyl-2 : 4-octadiene



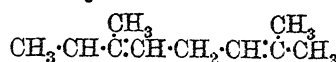
C₁₀H₁₈ MW, 138

B.p. 164-7°, 58°/12 mm. D₄²⁰ 0.7933. n_D²⁰ 1.456.

Pastureau, Zamenhof, Bull. soc. chim., 1926, 39, 1436.

Abelmann, Ber., 1910, 43, 1588.

2 : 6-Dimethyl-2 : 5-octadiene

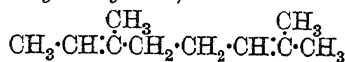


C₁₀H₁₈ MW, 138

B.p. 59-9.5°/12 mm. D₄²⁰ 0.773. n_D²⁰ 1.4500.

Dupont, Dulou, Desreux, Picoux, Bull. soc. chim., 1938, 5, 322.

2 : 6-Dimethyl-2 : 6-octadiene (Dihydroocimene, dihydromyrcene)



C₁₀H₁₈ MW, 138

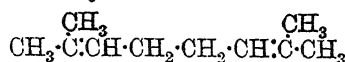
B.p. 168° (171-3°), 75°/30 mm. D₄²¹ 0.775. n_D¹⁸ 1.45245.

Semmler, Ber., 1904, 34, 3126.

Escourrou, Bull. soc. chim., 1926, 39, 1250.

Doeuvre, Bull. soc. chim., 1939, 6, 882.

2 : 7-Dimethyl-2 : 6-octadiene



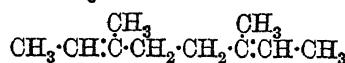
C₁₀H₁₈ MW, 138

B.p. 163.5-4.5° (161-3°). D₄²⁰ 0.7849. n_D²⁰ 1.44814.

Bouvet, Bull. soc. chim., 1915, 17, 205.

Krestinski, Chem. Zentr., 1915, I, 933.

3 : 6-Dimethyl-2 : 6-octadiene

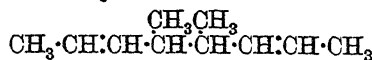


C₁₀H₁₈ MW, 138

B.p. 153-5°. D₄²⁰ 0.7767. n_D²⁰ 1.44453.

Krestinski, Chem. Zentr., 1915, I, 933.

4 : 5-Dimethyl-2 : 6-octadiene

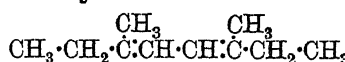


C₁₀H₁₈ MW, 138

B.p. 152.9-153.8°. D₄²⁵ 0.7611. n_D²⁵⁻¹ 1.4375.

Mulliken, Wakeman, Gerry, J. Am. Chem. Soc., 1935, 57, 1607.

3 : 6-Dimethyl-3 : 5-octadiene



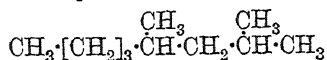
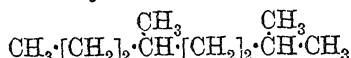
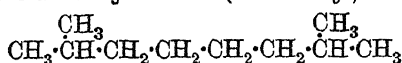
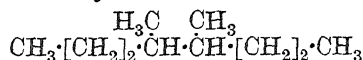
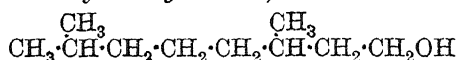
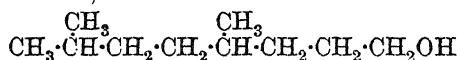
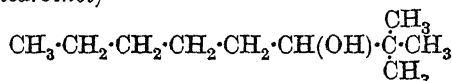
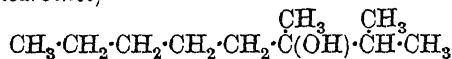
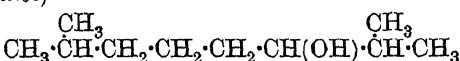
C₁₀H₁₈ MW, 138

B.p. 167-70°.

Wassiljeff, Chem. Zentr., 1899, I, 775.

Dimethyloctadienol.

See Geraniol, Nerol and Linalool.

2 : 4-Dimethyloctane $\text{C}_{10}\text{H}_{22}$ MW, 142B.p. 152.5°/746 mm. D_{20}^{20} 0.7259. n_D^{20} 1.4090.Tuot, *Compt. rend.*, 1933, 197, 1434.**2 : 5-Dimethyloctane** $\text{C}_{10}\text{H}_{22}$ MW, 142*d.*
B.p. 156°. D_4^{28} 0.723. $[\alpha]_D^{28} + 1.02^\circ$.*dl.*
B.p. 156-8°. D_4^{20} 0.7370. n_D^{20} 1.4160.Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1.**2 : 6-Dimethyloctane** $\text{C}_{10}\text{H}_{22}$ MW, 142*dl.*
B.p. 158-9°. D_4^{15} 0.734. n_D^{15} 1.4135.*d.*
B.p. 160-1°. D_6^{20} 0.7301. n_D 1.4109. $[\alpha]_D + 6.27^\circ$.Vavon, *Ann. chim.*, 1914, 1, 169.Escourrou, *Bull. soc. chim.*, 1928, 43, 1101.**2 : 7-Dimethyloctane (Di-isoamyl)** $\text{C}_{10}\text{H}_{22}$ MW, 142B.p. 159.6°. Sol. AcOH. D_4^{15} 0.72640. n_D^{15} 1.41049.Timmermans, Hennaut-Roland, *Chem. Abstracts*, 1930, 24, 55.Gazopoulos, *Chem. Abstracts*, 1934, 28, 4726.**3 : 6-Dimethyloctane** $\text{C}_{10}\text{H}_{22}$ MW, 142*d.*
B.p. 160-1°. D^{13} 0.7348. $[\alpha]_D^{13} + 16.85^\circ$.*dl.*
B.p. 159-60°. D^{15} 0.7402. n_D^{15} 1.4145.Welt, *Ann. chim. phys.*, 1895, 6, 122.Dupont, *Ann. chim. phys.*, 1913, 30, 516.Hardin, Sikorsky, *Chem. Zentr.*, 1908, I, 2143.**4 : 5-Dimethyloctane** $\text{C}_{10}\text{H}_{22}$ MW, 142B.p. 159-60°. D^{20} 0.7458. n_D^{20} 1.4173.Henne, Chanan, *J. Am. Chem. Soc.*, 1944, 66, 392.Vogel, *J. Chem. Soc.*, 1946, 133.**3 : 7-Dimethyloctanol-1 (Tetrahydrogeraniol, 3 : 7-dimethyl-n-octyl alcohol)** $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158B.p. 212-13°, 112-13°/18 mm., 98-9°/9 mm. (113-14°/7 mm.). D^{18} 0.8280. n_D^{20} 1.4379 (1.4433).Smith, Ungnade, Austin, Pritchard, Opie, *J. Org. Chem.*, 1939, 4, 338.Longinov, Margoliss, *Bull. soc. chim.*, 1929, 45, 156.Natelson, Gottfried, Kornblau, *J. Am. Chem. Soc.*, 1942, 64, 1484.**4 : 7-Dimethyloctanol-1 (4 : 7-Dimethyl-n-octyl alcohol)** $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158*d.*
B.p. 115°/15 mm. D_4^{27} 0.824. $[\alpha]_D^{27} + 0.81^\circ$.Levene, Marker, *J. Biol. Chem.*, 1932, 95, 1.**2 : 2 - Dimethyloctanol - 3 (tert.-Butyl-n-amylcarbinol)** $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158B.p. 86-8°/18 mm. n_D^{20} 1.4340.Whitmore, Meyer, Pedlow, Popkin, *J. Am. Chem. Soc.*, 1938, 60, 2789.**2 : 3-Dimethyloctanol-3 (Methylisopropyl-n-amylcarbinol)** $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158B.p. 69-70°/5 mm. D_4^{20} 0.8401. n_D^{20} 1.4380.Whitmore, Evers, *J. Am. Chem. Soc.*, 1933, 55, 813.**2 : 7-Dimethyloctanol-3 (Isopropylisohexylcarbinol)** $\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158B.p. 193-4°. D_4^{20} 0.8152. n_D^{20} 1.43021.Michiels, *Chem. Zentr.*, 1912, I, 1105.

3 : 6-Dimethyloctanol-3

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 B.p. 192°. D_{20}^{25} 0.8347. n_D^{25} 1.4395.
 Dupont, *Ann. chim.*, 1913, 30, 527.

3 : 7-Dimethyloctanol-3 (*Methylethylisohexylcarbinol, tetrahydrolinalool*)

$$\text{CH}_3 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 l.
 B.p. 89°/15 mm. D_4^{25} 0.8250. n_D^{25} 1.4320.
 $[\alpha]_D^{25} = 0.45^\circ$.
Phenylurethane: m.p. about 42°.

dl.
 B.p. 196–7°, 87–8°/10 mm. D_{20}^{20} 0.8280. n_D^{20} 1.4335.

Phenylurethane: m.p. about 50°.

Stevens, McNiven, *J. Am. Chem. Soc.*, 1939, 61, 1295.

Barbier, Locquin, *Ann. chim.*, 1914, 2, 395.

2 : 4-Dimethyloctanol-4 (*Methyl-n-butylisoamylcarbinol*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 B.p. 97°/27 mm. D_{20}^{20} 0.8253. n_D^{20} 1.4338.
 Meyer, Tuot, *Compt. rend.*, 1933, 196, 1231.

2 : 5-Dimethyloctanol-4

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}}(\text{OH}) \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 B.p. 102–4°/34 mm. D_4^{25} 0.8125. n_D^{25} 1.42596.
Phenylurethane: m.p. 39–40°.
 Bjelouss, *Ber.*, 1912, 45, 628.

2 : 6-Dimethyloctanol-4 (*Isobutyl-active-amylicarbinol*)

$$\text{CH}_3 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}}(\text{OH}) \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 B.p. 195°, 79°/15 mm. $D_{15.3}^{25}$ 0.8230, D_{20}^{20} 0.8129. n_D^{20} 1.4270 (1.4242).

Jones, Smith, *J. Chem. Soc.*, 1925, 2530, 2535.

Marcel, Tuot, *Compt. rend.*, 1936, 202, 1339.

2 : 7-Dimethyloctanol-4 (*Isobutylisoamylcarbinol*)

$$(\text{CH}_3)_2\text{CH} \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}}(\text{CH}_3)_2$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158

B.p. 96°/18 mm. D_{20}^{20} 0.8154. n_D^{20} 1.4280.
 3 : 5-Dinitrobenzoyl: m.p. 81–2°.

Marcel, Tuot, *Compt. rend.*, 1936, 202, 1339.

Powell, Hagemann, *J. Am. Chem. Soc.*, 1944, 66, 372.

4 : 7-Dimethyloctanol-4 (*Methylpropyl-isoamylcarbinol*)

$$\text{CH}_3 \cdot \underset{\text{CH}_3}{\underset{|}{\text{CH}}} \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \underset{\text{CH}_3}{\underset{|}{\text{C}}}(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}_3$$

$\text{C}_{10}\text{H}_{22}\text{O}$ MW, 158
 B.p. 192°. D^0 0.8421.

Guerbet, *Bull. soc. chim.*, 1912, 11, 537.

2 : 7-Dimethyl-5-octanolone-4.

See Isovaleroin.

2 : 6-Dimethyloctanone-4.

See Isobutyl active-amyl Ketone.

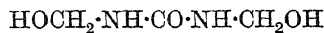
Dimethyloctatriene.

See Allo-ocimene and Ocimene.

Dimethyloctyl Alcohol.

See Dimethyloctanol-1.

Dimethylolurea (sym.-Dihydroxydimethylurea)



$\text{C}_3\text{H}_8\text{O}_3\text{N}_2$ MW, 120
 Prisms from EtOH. M.p. 126° (138–40°). Sol. H_2O , MeOH, EtOH. Insol. Et_2O and most org. solvents. Reduces $\text{NH}_3 \cdot \text{AgNO}_3$. Heat. → white solid, decomp. about 260°. Employed in manufacture of synthetic resins.

Einhorn, *Hamburger, Ber.*, 1908, 41, 26.

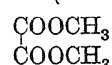
Dixon, *J. Chem. Soc.*, 1918, 113, 247.

Pollopas, B.P. 299,487, (*Chem. Abstracts*, 1929, 23, 3236).

Dimethylorthanilic Acid.

See Dimethylaniline-o-sulphonic Acid.

Dimethyl oxalate (*Oxalic dimethyl ester*)



$\text{C}_4\text{H}_6\text{O}_4$ MW, 118
 Monoclinic prisms. M.p. 54°. B.p. 163.5°. NH_3 gas → methyl oxamate. $\text{NH}_3 \cdot \text{Aq.}$ → oxamide.

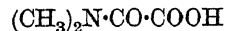
Kenyon, *Organic Syntheses*, Collective Vol. I, 259.

Bowden, *Organic Syntheses*, 1930, X, 70.

Dimethyloxamethane.

See under Dimethyloxamic Acid.

Dimethyloxamic Acid (*Oxalic dimethyl-monoamide*)



$\text{C}_4\text{H}_7\text{O}_3\text{N}$ MW, 117
 Prisms from MeOH. M.p. 130° decomp. (225° decomp.). Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 . Dist. → dimethylformamide.

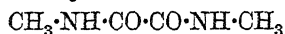
Me ester: $C_5H_9O_3N$. MW, 131. B.p. 236.5–238.5°.

Et ester: dimethyloxamethane. $C_6H_{11}O_3N$. MW, 145. M.p. –22°. B.p. 241–2°, 149°/36 mm. D_4^{25} 1.0735. n_D^{25} 1.44144.

Amide: unsym.-dimethyloxamide. $C_4H_8O_2N_2$. MW, 116. M.p. 104°. Sol. H_2O , EtOH.

Franchimont, Rouffaer, *Rec. trav. chim.*, 1894, 13, 339.

sym.-Dimethyloxamide



$C_4H_8O_2N_2$ MW, 116

Leaflets or needles from H_2O . M.p. 217° (209–10°). Sol. hot H_2O . Mod. sol. EtOH. Sublimes. Hyd. by alkalis.

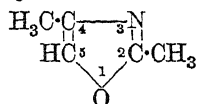
Wallach, Boehringer, *Ann.*, 1877, 184, 50.

Allenby, Wright, *Can. J. Research*, 1947, 25B, 295.

unsym.-Dimethyloxamide.

See under Dimethyloxamic Acid.

2 : 4-Dimethyloxazole



C_5H_7ON

MW, 97

B.p. 108°. Sol. H_2O , EtOH, Et_2O .

$B_2H_2PtCl_6$: m.p. 196° decomp.

Oesterreich, *Ber.*, 1897, 30, 2255.

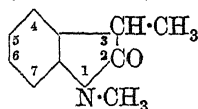
2 : 5-Dimethyloxazole.

B.p. 117–8°. Misc. with H_2O .

Picrate: m.p. 124°.

Wrede, Feuerriegel, *Z. physiol. Chem.*, 1933, 218, 129.

1 : 3-Dimethyloxindole (N-Methylatroxindole)



$C_{10}H_{11}ON$

MW, 161

M.p. 55°. Metastable form, m.p. 27°. B.p. 136–8°/11 mm. Very sol. EtOH, Et_2O . Spar. sol. H_2O . Reduces $NH_3 \cdot AgNO_3$, and Fehling's on boiling.

$B, HgCl_2$: m.p. 125°.

Julian, Pikel, Boggess, *J. Am. Chem. Soc.*, 1934, 56, 1800.

3 : 3-Dimethyloxindole.

Cryst. from AcOEt. M.p. 152–3°. B.p. 303°. Readily sol. EtOH, hot C_6H_6 . Sol. Et_2O , ligroin. Spar. sol. hot H_2O .

Ag salt: microcryst. M.p. 240–5° decomp.

Brunner, *Monatsh.*, 1897, 18, 98.

Plancher, Bettinelli, *Gazz. chim. ital.*, 1899, 29, 115.

4 : 7-Dimethyloxindole.

Needles from C_6H_6 . M.p. 159°. B.p. 205–10°/15 mm. Very sol. EtOH, Me_2CO , $CHCl_3$. Prac. insol. H_2O .

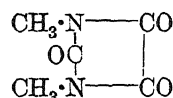
Wahl, Livouschi, *Bull. soc. chim.*, 1938, 5, 654.

5 : 7-Dimethyloxindole.

Plates from EtOH or C_6H_6 . M.p. 153°.

Wahl, Livouschi, *Bull. soc. chim.*, 1938, 5, 658.

Dimethylparabanic Acid (Oxalyldimethylurea, cholestrophane)



$C_5H_6O_3N_2$

MW, 142

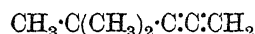
Leaflets. M.p. 155.5° B.p. 275–7°, 148–50°/13 mm. Sol. H_2O . Spar. sol. cold EtOH. Alc. alkalis \rightarrow dimethylurea + oxalic acid.

Maly, Hinteregger, *Ber.*, 1881, 14, 723.

2 : 3-Dimethylparaconic Acid.

See Terebic Acid.

4 : 4-Dimethyl-1 : 2-pentadiene (tert.-Butylallene)



C_7H_{12}

MW, 96

B.p. 80–3° (81–2.5°). D_4^{20} 0.7184.

Favorskii, *Chem. Abstracts*, 1924, 18, 1466.

2 : 4-Dimethyl-1 : 3-pentadiene



C_7H_{12}

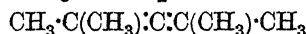
MW, 96

B.p. 93°. D_4^{20} 0.7368. n_D^{20} 1.4412.

Waterman, de Kok, *Rec. trav. chim.*, 1933, 52, 234.

Jacquemain, *Compt. rend.*, 1942, 214, 880.

2 : 4-Dimethyl-2 : 3-pentadiene



C_7H_{12}

MW, 96

B.p. 86.5° (82–4°). D_4^{20} 0.7006. n_D^{20} 1.40039.

Slobodin, *Chem. Zentr.*, 1937, I, 4491.

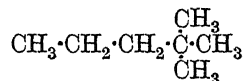
1 : 1-Dimethylpentamethylene Glycol.

See 2-Methylhexandiol-2 : 6.

1 : 5-Dimethylpentamethylene Glycol.

See Heptandiol-2 : 6.

2 : 2-Dimethylpentane (1 : 1 : 1-Trimethylbutane)



C_7H_{16}

MW, 100

F.p. -124° . B.p. 79.3° . D_4^{20} 0.6737. n_D^{20} 1.38233.

Noller, *J. Am. Chem. Soc.*, 1929, **51**, 594.

Soroos, Willis, *J. Am. Chem. Soc.*, 1941, **63**, 881.

2 : 3-Dimethylpentane (2-Methyl-3-ethylbutane)

C_7H_{16} $CH_3 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot \overset{\overset{CH_3}{|}}{CH} \cdot CH_3$ MW, 100

d.

B.p. 90° . D_4^{21} 0.695. $[\alpha]_D^{21} + 2.9^{\circ}$.

l.

B.p. $89-90^{\circ}$. D_4^{21} 0.695. $[\alpha]_D^{21} - 9.44^{\circ}$.

dl.

B.p. 89.8° . D_4^{20} 0.69514. n_D^{20} 1.39201.

Levene, Marker, *J. Biol. Chem.*, 1931, **91**, 405; 1935, **111**, 299.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1483, 1540.

2 : 4-Dimethylpentane (Di-isopropylmethane)

C_7H_{16} $CH_3 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{CH} \cdot CH_3$ MW, 100

F.p. -119° . B.p. $79-80^{\circ}$. D_4^{20} 0.6742. n_D^{20} 1.38256.

Waterman, de Kok, *Rec. trav. chim.*, 1933, **52**, 234.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1483.

3 : 3-Dimethylpentane (Dimethyldiethylmethane)

C_7H_{16} $CH_3 \cdot CH_2 \cdot \overset{\overset{CH_3}{|}}{\underset{\underset{CH_3}{|}}{C}} \cdot CH_2 \cdot CH_3$ MW, 100

F.p. -135° . B.p. $86-7^{\circ}$. D_4^{20} 0.6934. n_D^{20} 1.39114.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, **51**, 1487.

Soroos, Willis, *J. Am. Chem. Soc.*, 1941, **63**, 881.

Dimethylpentanol.

See Di-isopropylcarbinol, Dimethylisobutylcarbinol, Ethyl-tert.-butylcarbinol and Methyl-ethylisopropylcarbinol.

Dimethylpentanone.

See Ethyl tert.-butyl Ketone and Di-isopropyl Ketone.

2 : 3-Dimethyl-1-pentene (2-Methyl-3-ethyl-1-butylene)

C_7H_{14} $CH_3 \cdot CH_2 \cdot CH(CH_3) \cdot C(CH_3) : CH_2$ MW, 98

B.p. $84.1-84.3^{\circ}$. D_4^{20} 0.7054. n_D^{20} 1.4022.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3293.

2 : 4-Dimethyl-1-pentene (2 : 4 : 4-Trimethyl-1-butylene)

C_7H_{14} $CH_3 \cdot CH(CH_3) \cdot CH_2 \cdot C(CH_3) : CH_2$ MW, 98

B.p. $80.9-81.3^{\circ}$. D_4^{20} 0.6937. n_D^{20} 1.3970.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3293.

3 : 3-Dimethyl-1-pentene (3 : 3 : 4-Trimethyl-1-butylene)

C_7H_{14} $CH_3 \cdot CH_2 \cdot C(CH_3)_2 \cdot CH : CH_2$ MW, 98

B.p. 76.9° . D_4^{20} 0.6961. n_D^{20} 1.3991.

Schurman, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 4930.

4 : 4-Dimethyl-1-pentene (4 : 4 : 4-Trimethyl-1-butylene, 3-tert.-butylpropylene)

C_7H_{14} $CH_3 \cdot C(CH_3)_2 \cdot CH_2 \cdot CH : CH_2$ MW, 98

B.p. 72.35° . D_4^{20} 0.6827. n_D^{20} 1.3911.

Whitmore, Homeyer, *J. Am. Chem. Soc.*, 1933, **55**, 4555.

2 : 3-Dimethyl-2-pentene (2 : 3 : 4-Trimethyl-2-butylene, trimethylethylethylene)

C_7H_{14} $CH_3 \cdot CH_2 \cdot C(CH_3) : C(CH_3) \cdot CH_3$ MW, 98

B.p. $92-5^{\circ}$. D_4^{20} 0.7363, D_4^0 0.7553. n_D^{18} 1.4195.

Kaschirsky, *J. Russ. Phys.-Chem. Soc.*, 1881, **13**, 90, 95.

2 : 4-Dimethyl-2-pentene (Dimethylisopropylethylene, 2 : 4 : 4-trimethyl-2-butylene)

C_7H_{14} $CH_3 \cdot CH(CH_3) \cdot CH : C(CH_3) \cdot CH_3$ MW, 98

B.p. $83-4^{\circ}$. D_4^{22} 0.6958, D_4^0 0.7139. n_D^{22} 1.40165.

Wibaut, Pelt, *Rec. trav. chim.*, 1938, **57**, 1055.

Slobodin, *J. Gen. Chem. U.S.S.R.*, 1936, **6**, 1806.

Pawlow, *Ann.*, 1874, **173**, 194.

Maihle, *Bull. soc. chim.*, 1914, **15**, 328.

de Graef, *Bull. soc. chim. Belg.*, 1931, **40**, 315.

3 : 4-Dimethyl-2-pentene (1 : 1 : 2-Trimethyl-2-butylene, 2-isopropyl-2-butylene)

C_7H_{14} $CH_3 \cdot CH(CH_3) \cdot C(CH_3) : CH \cdot CH_3$ MW, 98

B.p. $86.2-86.4^{\circ}$. D_4^{20} 0.7126. n_D^{20} 1.4052.

Soday, Boord, *J. Am. Chem. Soc.*, 1933, **55**, 3293.

4 : 4-Dimethyl-2-pentene (1 : 1 : 1-Trimethyl-2-butylene, 1-tert.-butylpropylene)

C_7H_{14} $CH_3 \cdot C(CH_3)_2 \cdot CH : CH \cdot CH_3$ MW, 98

B.p. 76.0–76.1° (84–6°). D_4^{20} 0.6881 (D_4^{20} 0.7220). n_D^{20} 1.3986 (n_D^{17} 1.4100).

Schurmann, Boord, *J. Am. Chem. Soc.*, 1933, 55, 4930.

Faworskii, Alexejiwa, *J. Russ. Phys.-Chem. Soc.*, 1921, 50, 561.

Wibaut, Smittenberg, *Rec. trav. chim.*, 1942, 61, 348.

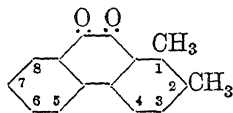
2 : 3 - Dimethyl - 2 - pentene - 5 - carboxylic Acid.

See Teracrylic Acid.

Dimethylpentenylcarbinol.

See Methylheptenol.

1 : 2-Dimethylphenanthraquinone



$C_{16}H_{12}O_2$ MW, 236

Orange prisms from AcOH. M.p. 213–14°.

Quinoxaline deriv.: prisms from EtOH or AcOH. M.p. 143–4°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

1 : 3-Dimethylphenanthraquinone.

Orange prisms from EtOH. M.p. 215–16°.

Quinoxaline deriv.: yellow prisms from AcOH. M.p. 154–5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

1 : 4-Dimethylphenanthraquinone.

Orange plates from $CHCl_3$ -MeOH. M.p. 214–16° corr.

Akim, Stamatoff, Bogert, *J. Am. Chem. Soc.*, 1937, 59, 1272.

1 : 6-Dimethylphenanthraquinone.

Orange plates from EtOH. M.p. 200°.

Quinoxaline deriv.: needles from AcOH- $CHCl_3$. M.p. 189°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

1 : 7-Dimethylphenanthraquinone.

See Pimanthrenequinone.

1 : 8-Dimethylphenanthraquinone.

Orange plates from AcOH. M.p. 190°.

Quinoxaline deriv.: needles from AcOH. M.p. 178°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

2 : 3-Dimethylphenanthraquinone.

Orange plates from AcOH. M.p. 237–8°.

Quinoxaline deriv.: yellow prisms from AcOH. M.p. 205°.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1935, 57, 2192.

2 : 4-Dimethylphenanthraquinone.

Red plates from MeOH. M.p. 169°.

Quinoxaline deriv.: needles from AcOH- $CHCl_3$. M.p. 155–6°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 5-Dimethylphenanthraquinone.

Orange prisms from AcOH. M.p. 140–41°.

Quinoxaline deriv.: yellow prisms from AcOH. M.p. 166°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 6-Dimethylphenanthraquinone.

Orange needles from AcOH. M.p. 202°.

Quinoxaline deriv.: pale yellow needles from AcOH. M.p. 178–80°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 7-Dimethylphenanthraquinone.

Orange plates from EtOH. M.p. 224–5°.

Quinoxaline deriv.: needles from AcOH. M.p. 235°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

3 : 4-Dimethylphenanthraquinone.

Orange needles from EtOH. M.p. 207–8°.

Quinoxaline deriv.: pale yellow needles from AcOH. M.p. 203–4°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

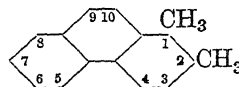
3 : 6-Dimethylphenanthraquinone.

Orange needles from MeOH. M.p. 212–13°.

Quinoxaline deriv.: needles from AcOH- $CHCl_3$. M.p. 252°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

1 : 2-Dimethylphenanthrene



$C_{16}H_{14}$ MW, 206

Leaflets from EtOH or AcOH. M.p. 142–3° (140°).

Picrate: orange needles from EtOH. M.p. 154° (148°).

Styphnate: yellow needles from EtOH. M.p. 153°.

Butenandt, Weidlich, Thompson, *Ber.*, 1933, 66, 603.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

Bergmann, Weizmann, *J. Org. Chem.*, 1946, 11, 592.

1 : 3-Dimethylphenanthrene.

Needles from AcOH. M.p. 76–7°. Sol. Et_2O , C_6H_6 .

Picrate: orange needles from EtOH. M.p. 153–5°.

Styphnate : m.p. 165-6°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, 52, 590.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

1 : 4-Dimethylphenanthrene.

Needles from MeOH. M.p. 50-1° corr.

Picrate : orange yellow needles. M.p. 143.5°.

Styphnate : orange cryst. M.p. 135.5-6.5° corr.

Papa, Perlman, Bogert, *J. Am. Chem. Soc.*, 1938, 60, 319.

Johnson, Goldman, Schneider, *J. Am. Chem. Soc.*, 1945, 67, 1357.

1 : 5-Dimethylphenanthrene.

Plates from MeOH. M.p. 57-8°.

Picrate : orange needles from MeOH. M.p. 134-5°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

1 : 6-Dimethylphenanthrene.

Plates from MeOH. M.p. 87-8°.

Picrate : yellow needles from EtOH. M.p. 134°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 457.

1 : 7-Dimethylphenanthrene.

See Pimanthrene.

1 : 8-Dimethylphenanthrene.

Plates from AcOH or C₆H₆. M.p. 191-2°. Sol. CHCl₃. Spar. sol. EtOH.

Picrate : yellow needles. M.p. 151-2°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

1 : 9-Dimethylphenanthrene.

Prisms from EtOH. M.p. 88°.

Picrate : orange yellow needles from MeOH. M.p. 163.5°.

Styphnate : m.p. 181°.

Haworth, Mavin, *J. Chem. Soc.*, 1932, 2722.

Darzens, Lévy, *Compt. rend.*, 1936, 202, 427.

2 : 3-Dimethylphenanthrene.

M.p. 79-80°.

Picrate : orange red needles from EtOH. M.p. 146-7°.

Styphnate : orange needles from EtOH. M.p. 147-8°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1935, 57, 2196.

2 : 4-Dimethylphenanthrene.

Plates from EtOH. M.p. 111°.

Picrate : orange needles from MeOH. M.p. 139-40°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 458.

2 : 5-Dimethylphenanthrene.

Prisms from EtOH. M.p. 46-7°. B.p. 204-5°/15 mm.

Picrate : yellow needles from EtOH. M.p. 127-9°.

Styphnate : orange needles from EtOH. M.p. 132-3°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 6-Dimethylphenanthrene.

Plates from MeOH. M.p. 33-4°.

Picrate : yellow needles from MeOH. M.p. 135-6°.

Styphnate : yellow needles from MeOH. M.p. 148-50°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 7-Dimethylphenanthrene.

Plates from MeOH. M.p. 101-2°.

Picrate : orange needles from EtOH. M.p. 152-3°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

2 : 9-Dimethylphenanthrene.

Plates from EtOH. M.p. 56-7°.

Picrate : yellow needles from EtOH. M.p. 138°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

3 : 4-Dimethylphenanthrene.

Needles from MeOH. M.p. 62-3°.

Picrate : orange red needles from EtOH. M.p. 129-30°.

Styphnate : orange red needles from EtOH. M.p. 142-3°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 459.

Bergmann, Weizmann, *J. Org. Chem.*, 1946, 11, 592.

3 : 5-Dimethylphenanthrene.

Plates from MeOH. M.p. 53-4°.

Picrate : orange needles from MeOH. M.p. 139°.

Styphnate : orange yellow needles. M.p. 124-5°.

Lewis, Elderfield, *J. Org. Chem.*, 1940, 5, 295.

3 : 6-Dimethylphenanthrene.

Plates from EtOH. M.p. 141°.

Picrate : orange yellow needles from MeOH. M.p. 172-3°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

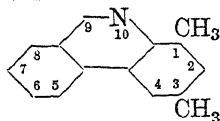
9 : 10-Dimethylphenanthrene.

Cryst. from AcOH.Aq. M.p. 139°. Sol. AcOH, CHCl₃, C₆H₆. Less sol. EtOH, pet. ether. Sublimes without decomp.

Zincke, Tropp, *Ann.*, 1908, **362**, 250.

Meerwein, *Ann.*, 1914, **405**, 174.

Bradsher, Amore, *J. Am. Chem. Soc.*, 1944, **66**, 1280.

1 : 3-Dimethylphenanthridine

C₁₅H₁₃N

MW, 207

M.p. 84.5°. Blue fluor. in H₂SO₄.

Picrate: m.p. 261°.

Kenner, Ritchie, Statham, *J. Chem. Soc.*, 1937, 1171.

1 : 4-Dimethylphenanthridine.

Pale yellow needles. M.p. 76.5°.

Picrate: m.p. 222°.

Kenner, Ritchie, Statham, *J. Chem. Soc.*, 1937, 1171.

2 : 9-Dimethylphenanthridine.

M.p. 104.5–105.5°. B.p. 240°/14 mm.

Picrate: m.p. 240° decomp.

Methiodide: yellow. M.p. 278° (261–2°) decomp.

Methosulphate: yellow needles. M.p. 227° decomp.

Petrow, *J. Chem. Soc.*, 1945, 18.

Ritchie, *Chem. Abstracts*, 1946, **40**, 880.

6 : 9-Dimethylphenanthridine.

Picrate: m.p. 214°.

Borsche, *Ann.*, 1910, **377**, 98.

Dimethylphenetidine.

See under Dimethylaminophenol.

Dimethylphenetole.

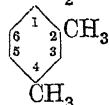
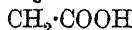
See under Xylenol.

Dimethylphenol.

See Xylenol.

Dimethyl-phenylacetaldehyde.

See 1-Phenylisobutyraldehyde.

2 : 4-Dimethylphenylacetic Acid

C₁₀H₁₂O₂

MW, 164

Needles from H₂O. M.p. 104°. Readily sol. EtOH, Et₂O, CHCl₃.

Me ester: C₁₁H₁₄O₂. MW, 178. B.p. 138°/20 mm. D₄¹⁹ 1.032. n_D¹⁹ 1.509.

Et ester: C₁₂H₁₆O₂. MW, 192. B.p. 146.5°/18 mm. D₄¹⁹ 1.007. n_D¹⁹ 1.500.

n-Propyl ester: C₁₃H₁₈O₂. MW, 206. B.p. 155°/18 mm. D₄¹⁹ 0.988. n_D¹⁹ 1.496.

n-Butyl ester: C₁₄H₂₀O₂. MW, 220. B.p. 164°/17 mm. D₄¹⁹ 0.978. n_D¹⁹ 1.494.

Phenyl ester: C₁₆H₁₆O₂. MW, 240. Needles from EtOH.Aq. M.p. 39°.

Benzyl ester: C₁₇H₁₈O₂. MW, 254. B.p. 192°/11 mm. D₄¹⁹ 1.071. n_D¹⁹ 1.552.

Chloride: C₁₀H₁₁OCl. MW, 145.5. B.p. 116°/11 mm. D₄¹⁹ 1.112. n_D¹⁹ 1.529.

Anhydride: C₂₀H₂₂O₃. MW, 310. Prisms from C₆H₆-pet. ether. M.p. 86–7°.

Amide: C₁₀H₁₃ON. MW, 163. Needles from 25% EtOH. M.p. 184°.

Nitrile: C₁₀H₁₁N. MW, 145. B.p. 140°/11 mm.

Anilide: needles from 25% EtOH. M.p. 144.5°.

o-Toluidide: m.p. 172°.

p-Toluidide: m.p. 145°.

α-Naphthylamide: m.p. 209°.

β-Naphthylamide: m.p. 183°.

Bogert, Stamatoff, *Rec. trav. chim.*, 1933, **52**, 584.

Harispe, *Ann. chim.*, 1936, **6**, 249.

2 : 5-Dimethylphenylacetic Acid.

Needles. M.p. 128–9°.

Me ester: b.p. 253–4°.

Et ester: b.p. 261.5°, 114°/4 mm.

Amide: needles. M.p. 154°.

Nitrile: b.p. 115–9°/6 mm.

Guerbet, *Compt. rend.*, 1897, **125**, 36.

3 : 5-Dimethylphenylacetic Acid.

Cryst. from EtOH. M.p. 101°. B.p. 273°/73 mm. Spar. sol. cold H₂O.

Et ester: b.p. 141–2°/18 mm.

Amide: m.p. 153°.

Nitrile: m.p. 45°. B.p. 132°/15 mm.

Wahl, Livovschi, *Bull. soc. chim.*, 1938, **5**, 658.

Dimethyl-phenylacetic Acid.

See 1-Phenylisobutyric Acid.

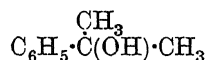
Dimethylphenylbenzylammonium**Hydroxide.**

See Leucotrope.

Dimethylphenylbenzylammonium salts.

See under Leucotrope.

Dimethyl-phenylcarbinol (2-Hydroxy-2-phenylpropane, α-hydroxyisopropylbenzene, ω-dimethylbenzyl alcohol, α-hydroxycumene, 2-phenylisopropyl alcohol)



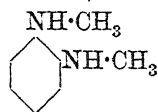
C₉H₁₂O

MW, 136

Prisms. M.p. 35–7°. B.p. 202° (215–20° decomp.), 94°/13 mm. Sol. EtOH, Et₂O, AcOH, C₆H₆. D₄¹⁹ 0.9724. n_D¹⁹ 1.5314. Ac₂O, anhyd. oxalic acid, KHSO₄, etc. → isopropenylbenzene.

Klages, *Ber.*, 1902, **35**, 2637.

sym.-Dimethyl-o-phenylenediamine (o-Phenylenedimethyldiamine)



$C_8H_{12}N_2$ MW, 136
Prisms from ligroin. M.p. 34–5°. B.p. 245–55°. Volatile in steam.
 B_2HCl : m.p. 180°.

Fischer, Fussenegger, *Ber.*, 1901, 34, 937.

sym.-Dimethyl-m-phenylenediamine (m-Phenylenedimethyldiamine).

B.p. 275–80°/739 mm., 165–70°/10 mm.
Rapidly turns brown in air.
N : N-Dinitroso : brown leaflets from EtOH.
M.p. 109–10°.

Fischer, Diepolder, *Ann.*, 1895, 286, 173.

sym.-Dimethyl-p-phenylenediamine (p-Phenylenedimethyldiamine).

Leaflets from light petroleum. M.p. 53°.
B.p. 150°/17 mm.
N : N-Dinitroso : prisms. M.p. 148°.
Picrate : m.p. 186°.

Willstätter, Pfannensteil, *Ber.*, 1905, 38, 2248.

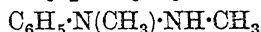
unsym.-Dimethylphenylenediamine.

See Aminodimethylaniline.

Dimethylphenylglyoxylic Acid.

See Dimethylbenzoylformic Acid.

NN'-Dimethylphenylhydrazine



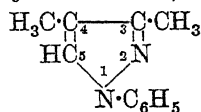
$C_8H_{12}N_2$ MW, 136
B.p. 93–4°/7 mm. Sol. EtOH, Et₂O, AcOH, CHCl₃, C₆H₆.

Harries, *Ber.*, 1894, 27, 698.

Dimethylphenylpropionic Acid.

See Dimethylhydrocinnamic Acid.

3 : 4-Dimethyl-1-phenylpyrazole (3 : 4-Dimethyl-1-phenyl-1 : 2-diazole)



$C_{11}H_{12}N_2$ MW, 172
B.p. 285–5·5°, 155°/15 mm., 148°/11 mm.
Sol. EtOH, Et₂O, CHCl₃. D_4^{25} 1·05742. n_D^{20} 1·5724. Volatile in steam.

Chloroaurate : m.p. 166–7°.

Chloroplatinate : m.p. 180–1°.

Picrate : yellow cryst. from H₂O. M.p. 122·5°.

Auwers, Kohlhaas, *Ann.*, 1924, 437, 45.

3 : 5-Dimethyl-1-phenylpyrazole.

B.p. 273°/754 mm., 145–6°/12·5 mm. Sol. most ord. org. solvents. Insol. H₂O. D_4^{20} 1·0566. $n_D^{19·3}$ 1·5738. Volatile in steam.

Hydrochloride : m.p. 158°.

$B_2H_2PtCl_6 \cdot 4H_2O$: decomp. at 186°.

Picrate : m.p. 103°.

Methiodide : m.p. 190°.

Knorr, *Ber.*, 1887, 20, 1103.

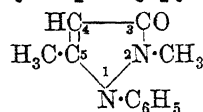
4 : 5-Dimethyl-1-phenylpyrazole.

B.p. 141°/11 mm.

Picrate : greenish yellow prisms from EtOH.
M.p. 106–8°.

Auwers, Kohlhaas, *Ann.*, 1924, 437, 46.

2 : 5-Dimethyl-1-phenylpyrazolone-3



$C_{11}H_{12}ON_2$ MW, 188

Plates from Et₂O. M.p. 113°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. Et₂O.

Chloroplatinate : m.p. 192°.

Picrate : m.p. 168°.

Lederer, *J. prakt. Chem.*, 1892, 45, 90.

4 : 5-Dimethyl-1-phenylpyrazolone-3.

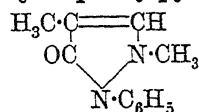
Needles from AcOH. M.p. 254°. Sol. dil. min. acids and alkalis. Mod. sol. AcOH. Spar. sol. EtOH.

Michaelis, Drew, *Ann.*, 1906, 350, 321.

2 : 3-Dimethyl-1-phenylpyrazolone-5.

See Antipyrine.

2 : 4-Dimethyl-1-phenylpyrazolone-5

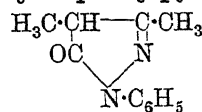


$C_{11}H_{12}ON_2$ MW, 188

Prisms + 2H₂O from H₂O. Anhyd. from C₆H₆. M.p. 125°.

Stoly, *Ber.*, 1905, 38, 3275.

3 : 4-Dimethyl-1-phenylpyrazolone-5

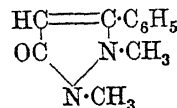


$C_{11}H_{12}ON_2$ MW, 188

M.p. 117–20°. Sol. EtOH, CHCl₃, AcOH. Spar. sol. H₂O, Et₂O.

Knorr, *Ann.*, 1887, 238, 162.

1 : 2-Dimethyl-3-phenylpyrazolone-5 (Isoantipyrine)



$C_{11}H_{12}ON_2$ MW, 188

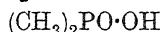
Hygroscopic needles from ligroin. Softens at 98°. M.p. 108°. Sol. H₂O, EtOH, toluene and CHCl₃. Insol. Et₂O.

B, HCl: needles from dil. HCl. M.p. 207°.
B₂H₃Fe(CN)₆: yellow needles from H₂O.
 M.p. 122° decomp.

Picrate: yellow cryst. from H₂O. M.p. 142°.

Michaelis, Dorn, *Ann.*, 1907, 352, 126.

Dimethylphosphinic Acid



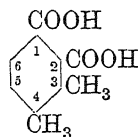
$\text{C}_2\text{H}_7\text{O}_2\text{P}$ MW, 94

M.p. 76°. Sol. H₂O, EtOH, Et₂O.

Chloride: $(\text{CH}_3)_2\text{POCl}$. $\text{C}_2\text{H}_6\text{OCIP}$. MW, 112.5. M.p. 66°. B.p. 204°. Hyd. by H₂O.

Hofmann, *Ber.*, 1872, 5, 108.

3 : 4-Dimethylphthalic Acid (*o*-Xylene-3 : 4-dicarboxylic acid, 1 : 2-dimethylbenzene-3 : 4-dicarboxylic acid)



$\text{C}_{10}\text{H}_{10}\text{O}_4$ MW, 194

M.p. 201° → anhydride.

Anhydride: $\text{C}_{10}\text{H}_8\text{O}_3$. MW, 176. Needles from ligroin. M.p. 126°.

Imide: $\text{C}_{10}\text{H}_8\text{O}_2\text{N}$. MW, 175. Needles from EtOH. M.p. 240-1°.

Methylimide: needles from pet. ether. M.p. 98-9°.

Diesbach, Weid, *Helv. Chim. Acta*, 1927, 10, 886.

Brunner, Hofer, Stein, *Monatsh.*, 1933, 63, 87.

3 : 5-Dimethylphthalic Acid (*m*-Xylene-4 : 5-dicarboxylic acid, 1 : 3-dimethylbenzene-4 : 5-dicarboxylic acid).

Needles from H₂O. M.p. 183°. Sol. EtOH. Spar. sol. CHCl_3 .

Anhydride: needles from EtOH. M.p. 116°.

Freund, Fleischer, *Ann.*, 1916, 411, 33.

3 : 6-Dimethylphthalic Acid (*p*-Xylene-2 : 3-dicarboxylic acid, 1 : 4-dimethylbenzene-2 : 3-dicarboxylic acid).

Prisms. M.p. 96°. Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Mod. sol. H₂O. Spar. sol. ligroin.

Anhydride: cryst. from Et₂O. M.p. 145-5°.

Freund, Fleischer, *Ann.*, 1916, 411, 23.

4 : 5-Dimethylphthalic Acid (*o*-Xylene-4 : 5-dicarboxylic acid, 1 : 2-dimethylbenzene-4 : 5-dicarboxylic acid).

Leaflets from EtOH. M.p. 123° (196°).

Anhydride: cryst. from C_6H_6 . M.p. 208-5°.

Methylimide: cryst. from pet. ether. M.p. 150-1°.

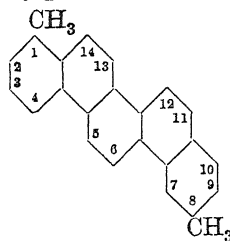
Ethylimide: cryst. from pet. ether. M.p. 89°.

Korczyński, *Ber.*, 1902, 35, 871.

Coffey, *Rec. trav. chim.*, 1923, 42, 1029.

Brunner, Hofer, Stein, *Monatsh.*, 1933, 63, 97.

1 : 8-Dimethylpicene



$\text{C}_{24}\text{H}_{18}$ MW, 306

Leaflets from Py. M.p. 305-6° corr. Sublimes at 260° in high vac.

Ruzicka, Hofmann, *Helv. Chim. Acta*, 1937, 20, 1161.

1 : 10-Dimethylpicene.

Blue fluorescent plates from Py. M.p. 380-1° corr.

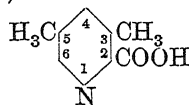
Ruzicka, Hofmann, *Helv. Chim. Acta*, 1939, 22, 130.

3 : 8-Dimethylpicene.

Needles from Py-xylene. M.p. 293-4° corr.

Ruzicka, Mörgeli, *Helv. Chim. Acta*, 1936, 19, 385.

3 : 5-Dimethylpicolinic Acid (3 : 5-Dimethylpyridine-2-carboxylic acid, 3 : 5-lutidine-2-carboxylic acid)



$\text{C}_8\text{H}_9\text{O}_2\text{N}$ MW, 151

M.p. 150-1°. Sol. H₂O, EtOH.

Et ester: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. B.p. 90-100°/0.01 mm.

Picrate: cryst. from Et₂O. M.p. 111-12°.

Dürkopf, Götsch, *Ber.*, 1890, 23, 687.

4 : 6-Dimethylpicolinic Acid (4 : 6-Dimethylpyridine-2-carboxylic acid, 2 : 4-dimethylpyridine-6-carboxylic acid, 2 : 4-lutidine-6-carboxylic acid).

M.p. 157°. Sol. H₂O, EtOH.

Altar, *Ann.*, 1887, 237, 185.

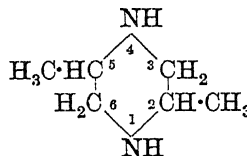
1 : 5-Dimethylpimelic Acid.

See Heptane-2 : 6-dicarboxylic Acid.

N : N-Dimethylpiperazine.

See under Piperazine.

2 : 5-Dimethylpiperazine (2 : 5-Dimethylhexahydropyrazine, 2 : 5-dimethylhexahydro-p-diazine)



$\text{C}_6\text{H}_{14}\text{N}_2$

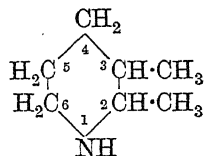
MW, 114

Cis-.

M.p. 114°. B.p. 162°.

Tartrate: $B_2C_4H_6O_6 \cdot 1\frac{1}{2}H_2O$. Cryst. from H_2O . M.p. anhyd. 222-3° decomp.*Dibenzoyl*: m.p. 152°.*Dinitroso*: m.p. 95°.*Di-p-toluenesulphonyl*: prisms from EtOH. M.p. 146-7°.*Trans*-. Prisms. M.p. 118°. B.p. 162°. Sol. H_2O , EtOH. Spar. sol. Et_2O . Sublimes. Spar. volatile in steam. Reacts strongly alkaline.*Tartrate*: lyctol. $B_2C_4H_6O_6 \cdot 3H_2O$. M.p. anhyd. 242-3°. $B_2HCl_4 \cdot HgCl_2$: cryst. from H_2O . M.p. 235-6° decomp.*Dibenzoyl*: m.p. 228-9°.*Dinitroso*: m.p. 174°.*Di-p-toluenesulphonyl*: m.p. 225°.*Di-α-naphthalenesulphonyl*: needles from $CHCl_3$. M.p. 269-70°.Godehot, Mousseron, *Bull. soc. chim.*, 1932, 51, 350.Bain, Pollard, *J. Am. Chem. Soc.*, 1939, 61, 532.**2 : 6-Dimethylpiperazine.***Cis*-. Leafflets or plates. M.p. 110-11°. B.p. 162°. Sol. H_2O , EtOH, $CHCl_3$. Spar. sol. C_6H_6 . Prac. insol. Et_2O .*Dibenzoyl*: m.p. 147-8°.*Di-p-toluenesulphonyl*: needles. M.p. 89-90°.*Di-α-naphthalenesulphonyl*: needles + $1\frac{1}{2}H_2O$ from EtOH.Aq. M.p. anhyd. 117-18°.Pope, Read, *J. Chem. Soc.*, 1912, 101, 2325.Kipping, Pope, *J. Chem. Soc.*, 1926, 1077.**1 : 2- and 1 : 3-Dimethylpiperidine.**

See under Pipecoline.

2 : 3-Dimethylpiperidine $C_7H_{15}N$

MW, 113

B.p. 138-40°/720 mm. Absorbs CO_2 from air. B_2HAuCl_4 : prisms. M.p. 130-5°. $B_2HCl_4 \cdot 6HgCl_2$: cryst. from H_2O . M.p. 211-12°. $B_2HCl_4 \cdot SnCl_2$: cryst. from H_2O . M.p. 115-6°. $B_2H_2PtCl_6$: needles from EtOH. M.p. 145° decomp.*Picrate*: m.p. 147-8°.Lipp, Widmann, *Ann.*, 1915, 409, 137.**2 : 4-Dimethylpiperidine (*xy-Lupetidine*).**B.p. 140-2°. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.8615. d_4^{20} + 23.17°: l , $[α]_D^{20}$ - 21.0°. B_2HCl : m.p. 235°. B_2HBr : m.p. 142°. $B_2(COOH)_2$: needles from EtOH. M.p. 134°.Engels, *Ber.*, 1900, 33, 1088.Ladenburg, *Ann.*, 1888, 247, 88.**2 : 5-Dimethylpiperidine.**

B.p. 138-40°.

 B_2HCl : m.p. 194-5°. B_2HBr : m.p. 148-9°. B_2HI : m.p. 167-8°. $B_2H_2PtCl_6$: m.p. 210°.Ahrens, Gorkow, *Chem. Zentr.*, 1903, I, 1034.**2 : 6-Dimethylpiperidine (*Lupetidine*).**B.p. 127-8°. Sol. H_2O , EtOH, Et_2O . D_4^{25} 0.8158. n_D^{25} 1.4366. B_2HCl : m.p. 281°. B_2HBr : m.p. 285°.*Tartrate*: m.p. 79°. $B_2H_2O_2$: cryst. from Et_2O . M.p. 69-70°. $B_2H_2PtCl_6$: m.p. 212°.*N-Benzoyl*: m.p. 111°.*N-Benzenesulphonyl*: m.p. 50°.*Picrate*: m.p. 162-4°.*Stereoisomeride*: isolupetidine.

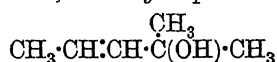
B.p. 132-3°.

 B_2HCl : m.p. 232-4°. B_2HBr : m.p. 245°.*N-Benzoyl*: m.p. 84°.*N-Benzenesulphonyl*: m.p. 65°.*Picrate*: m.p. 124-127.5°.Marcuse, Wolfenstein, *Ber.*, 1899, 32, 2528.Adkins, Kuick, Farlow, Wojcik, *J. Am. Chem. Soc.*, 1934, 56, 2427.**3 : 3-Dimethylpiperidine.**

B.p. 137°.

 B_2HI : m.p. 200°. B_2HAuCl_4 : needles from H_2O . M.p. 182°.*N-Benzoyl*: m.p. 68-9°. B.p. 204°/15 mm.Dunlop, *J. Chem. Soc.*, 1915, 107, 1712.**4 : 4-Dimethylpiperidine.**B.p. 145-6°. Misc. with H_2O . B_2HCl : m.p. 220-1° decomp. Very sol. H_2O . B_2HAuCl_4 : m.p. 168°. Prac. insol. cold H_2O .Kompapa, *Chem. Zentr.*, 1912, I, 1472.**2 : 2-Dimethylpropane.**

See Tetramethylmethane.

2 : 2-Dimethylpropanol-1.See *tert*-.Butylcarbinol.**Dimethylpropenylcarbinol (4-Hydroxy-4-methyl-2-pentene, 4-methyl-2-pentenol-4)** $C_6H_{12}O$

MW, 100

B.p. 112°, (110–15° slight decomp.), 80°/145 mm. D_4^{20} 0.8347. n_D^{20} 1.4302.

Kyriakides, *J. Am. Chem. Soc.*, 1914, **36**, 661.

Keersbilk, *Bull. Soc. Chim. Belg.*, 1929, **38**, 205.

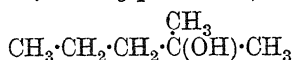
2 : 2-Dimethyl-*n*-propyl Alcohol.

See *tert*.-Butylcarbinol.

2 : 2-Dimethyl-*n*-propylamine.

See 1-Amino-2 : 2-dimethylpropane.

Dimethylpropylcarbinol (2-*Hydroxy* - 2-methylpentane, 2-methylpentanol-2)



$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

B.p. 120.5–1.5°, 64.8–65.6°/70 mm. Prac. insol. H_2O . $D_4^{15.5}$ 0.8350. $n_D^{15.5}$ 1.4125. CrO_3 → acetic and propionic acids.

Acetyl: b.p. 142–3°/752 mm., 34.5°/10 mm. D^{20} 0.9114. n_D^{20} 1.41433.

Benzoyl: needles from EtOH. M.p. 182–3°.

3 : 5-Dinitrobenzoyl: pale yellow needles from pet. ether. M.p. 72°.

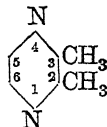
Phenylurethane: needles from EtOH– Me_2CO . M.p. 239°.

Schreiner, *J. prakt. Chem.*, 1910, **82**, 292.

Deschamps, *J. Am. Chem. Soc.*, 1920, **42**, 2671.

Norton, Hass, *J. Am. Chem. Soc.*, 1936, **58**, 2148.

2 : 3-Dimethylpyrazine (2 : 3-Dimethyl-1 : 4-diazine)



$\text{C}_6\text{H}_8\text{N}_2$ MW, 108

B.p. 156° corr. D_4^1 1.0218. Sol. H_2O , EtOH, Et_2O . Volatile in steam.

B, *AuCl*₃: yellow needles. M.p. 150° decomp.

B, *H*, *AuCl*₄: yellow needles. M.p. 97°.

Picrate: m.p. 150°.

Gabriel, Sonn, *Ber.*, 1907, **40**, 4855.

2 : 5-Dimethylpyrazine (*Glycoline*, *ketine*).

M.p. 15°. B.p. 155°. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9887. n_D^{20} 1.4992. Volatile in steam.

$\text{Na} + \text{EtOH} \rightarrow$ 2 : 5-dimethylpiperazine.

Picrate: m.p. 157°.

Gabriel, Pinkus, *Ber.*, 1893, **26**, 2206.

2 : 6-Dimethylpyrazine.

Prisms. M.p. 47–8°. B.p. 155–6°. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9647.

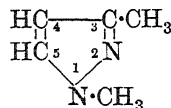
B, *AuCl*₃: yellow needles. M.p. 144° decomp.

B, *H*, *AuCl*₄: cryst. from dil. HCl . M.p. 148° decomp.

Picrate: m.p. 175–6°.

Brandes, Stöhr, *J. prakt. Chem.*, 1896, **54**, 492.

1 : 3-Dimethylpyrazole (1 : 3-Dimethyl-1 : 2-diazole)



$\text{C}_5\text{H}_8\text{N}_2$ MW, 96

B.p. 136°. Sol. H_2O . $D_4^{15.2}$ 0.9628. $n_D^{15.2}$ 1.46769.

Picrate: m.p. 138°.

Methiodide: needles from EtOH– Et_2O . M.p. 256°.

Rojahn, *Ber.*, 1926, **59**, 609.

Auwers, Hollmann, *Ber.*, 1926, **59**, 606.

1 : 4-Dimethylpyrazole.

B.p. 148°.

Picrate: yellow cryst. from H_2O . M.p. 165°.

Auwers, Caver, *J. prakt. Chem.*, 1930, **126**, 168.

1 : 5-Dimethylpyrazole.

B.p. 145–55°. Sol. H_2O , EtOH, Et_2O .

B, *H*, *AuCl*₄, $2\text{H}_2\text{O}$: yellow needles from dil. HCl . M.p. 175°.

Chloroplatinate: m.p. 253°.

Picrate: m.p. 172°.

Methiodide: m.p. 251°.

Rojahn, *Ber.*, 1926, **59**, 609.

Auwers, Hollmann, *Ber.*, 1926, **59**, 606.

3 : 4-Dimethylpyrazole.

M.p. 58°. B.p. 111°/10–11 mm.

N: *O*-*Di-nitrobenzoyl*: cryst. powder from EtOH.Aq. M.p. 149–50°.

Picrate: yellow needles from Et_2O . M.p. 153°.

Wallach, *Ann.*, 1903, **329**, 133.

Diels, Ilberg, *Ber.*, 1916, **49**, 162.

Auwers, Caver, *J. prakt. Chem.*, 1930, **126**, 169.

3 : 5-Dimethylpyrazole.

M.p. 106–7°. B.p. 218°. Sol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 . D_4^{20} 0.8839. Volatile in steam.

1-*N*-*Acetyl*: cryst. from EtOH.Aq. M.p. 38°. B.p. 88–90°/40 mm.

1-*N*-*Benzoyl*: needles from EtOH. M.p. 48–9°.

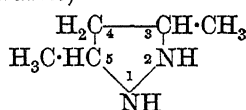
Picrate: m.p. 166–7°.

Styphnate: golden yellow scales. M.p. 203–4°.

Thiele, Dralle, *Ann.*, 1898, **302**, 294.

Auwers, Caver, *J. prakt. Chem.*, 1930, **126**, 146.

3 : 5-Dimethylpyrazolidine (3 : 5-Dimethyl-tetrahydropyrazole)



$\text{C}_5\text{H}_{12}\text{N}_2$

MW, 100

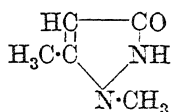
F.p. — 6 to — 7°. B.p. 141–3°, 40–1°/13·5 mm. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ and Fehling's. $\text{FeCl}_3 \rightarrow$ brown ppt. $\text{CuSO}_4 \rightarrow$ deep bluish violet col.

1 : 2-Dibenzoyl: prisms from EtOH. M.p. 204·5°.

Di-picrate: needles. M.p. 129–30° decomp. Acetone add. comp.: needles. M.p. 68–9°.

Tafel, Pfeiffermann, *Ber.*, 1903, 36, 221.

1 : 5-Dimethylpyrazolone-3



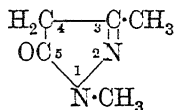
$\text{C}_5\text{H}_8\text{ON}_2$

MW, 112

M.p. 172–3°.

Rojahn, *Ber.*, 1922, 55, 2968.

1 : 3-Dimethylpyrazolone-5



$\text{C}_5\text{H}_8\text{ON}_2$

MW, 112

Cryst. from CHCl_3 . M.p. 100–5°. Sol. H_2O . Anil: needles from ligroin. M.p. 95°.

Wolff, Schreiner, *Ber.*, 1908, 41, 555.

3 : 4-Dimethylpyrazolone-5.

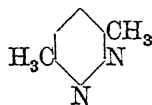
Leaflets. M.p. 272–3° (269°). Sol. EtOH, hot H_2O . Insol. Et_2O , CHCl_3 , C_6H_6 . $\text{FeCl}_3 \rightarrow$ red col.

N-Nitroso: m.p. 214°.

De, Dutt, *J. Indian Chem. Soc.*, 1930, 7, 477.

De, Rakshit, *J. Indian Chem. Soc.*, 1936, 13, 509.

3 : 6-Dimethylpyridazine



$\text{C}_6\text{H}_8\text{N}_2$

MW, 108

Hygroscopic cryst. M.p. 32°. B.p. 214–5°, 109–10°/20 mm. Readily sol. H_2O , EtOH, Et_2O .

B, HCl : needles and plates from EtOH– Et_2O . M.p. 184°.

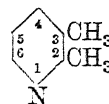
B, HAuCl_4 : yellow needles. M.p. 175°.

B, HgCl_2 : needles. M.p. 115°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: yellowish red prisms from EtOH. Decomp. above 200°.

Picrate: yellow needles from EtOH. M.p. 164°.

Paal, Koch, *Ber.*, 1904, 37, 4383.

2 : 3-Dimethylpyridine (2 : 3- or $\alpha\beta$ -Lutidine)

$\text{C}_7\text{H}_9\text{N}$

MW, 107

B.p. 163–4°. Sol. EtOH, Et_2O . $\text{KMnO}_4 \rightarrow$ quinolinic acid.

B, HAuCl_4 : m.p. 162–4°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: m.p. 195° (216°) decomp.

$\text{B}, \text{HCl}, 2\text{HgCl}_2$: needles. M.p. about 120°.

$\text{B}, \text{HCl}, 5\text{HgCl}_2$: prisms from H_2O . M.p. 191–3°.

Picrate: cryst. from EtOH. M.p. 187–8°.

Picrolonate: m.p. 223–5°.

Lipp, Widmann, *Ann.*, 1915, 409, 140.

Finkelstein, Elderfield, *J. Org. Chem.*, 1939, 4, 373.

Wibaut, Kooyman, *Rec. trav. chim.*, 1944, 63, 231.

2 : 4-Dimethylpyridine (2 : 4- or $\alpha\gamma$ -Lutidine).

B.p. 157·1° (159°). Sol. cold H_2O , less sol. hot. Sol. EtOH, Et_2O . D_4^{25} 0·9273. n_D^{25} 1·5033. Volatile in steam. Ox. \rightarrow lutidinic acid.

B, HCl : hygroscopic cryst. M.p. 195–7°.

B, HBr : m.p. 189–90°.

B, HAuCl_4 : m.p. 77° (94°).

$\text{B}_2, \text{H}_2\text{PtCl}_6$: m.p. 216° (209°) decomp.

Picrate: cryst. from H_2O . M.p. 182·5–83°.

Picrolonate: m.p. 207–8°.

Komatsu, Mohri, *J. Chem. Soc. Japan*, 1931, 52, 722.

Heap, Jones, Speakman, *J. Am. Chem. Soc.*, 1921, 43, 1936.

Garrett, Smythe, *J. Chem. Soc.*, 1902, 81, 452.

Oparina, *Ber.*, 1931, 64, 572.

Bratton, Bailey, *J. Am. Chem. Soc.*, 1937, 59, 177.

2 : 5-Dimethylpyridine (2 : 5- or $\alpha\beta'$ -Lutidine).

B.p. 159–60° (154–5°, 162–6°). Sol. cold H_2O , less sol. hot. Sol. EtOH, Et_2O . Volatile in steam. Ox. \rightarrow isocinchomeric acid.

B, HAuCl_4 : m.p. 157°.

$\text{B}_2, \text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: m.p. 192–4°.

Picrate: m.p. 169°.

Picrolonate: m.p. 171–2°.

Errera, *Ber.*, 1901, 34, 3698.

Komatsu, Mohri, *J. Chem. Soc. Japan*, 1931, 52, 722.

Garrett, Smythe, *J. Chem. Soc.*, 1902, 81, 452.

Prelog, Szpilfogel, *Helv. Chim. Acta*, 1942, 25, 1306.

2 : 6-Dimethylpyridine (2 : 6- or $\alpha\alpha'$ -Lutidine).

B.p. 142–3°. Sol. cold H_2O , less sol. hot. Sol. EtOH, Et_2O . D_4^0 0.942. Ox. \rightarrow dipicolinic acid.

B, HCl : cryst. from EtOH. M.p. 230–1° decomp.

B, HBr : m.p. 210°.

$B, HAuCl_4$: m.p. 125°.

B_2, H_2PtCl_6 : m.p. 208° (210°) decomp.

$B_2, H_2Cr_2O_7$: reddish yellow prisms. M.p. 92°.

$B, HCl, HgCl_2$: plates from dil. HCl. M.p. 191.5°.

Picrate: m.p. 168° (161°, 163–4°).

Picrolonate: m.p. 206°.

Methiodide: m.p. 233°.

Komatsu, Mohri, *J. Chem. Soc. Japan*, 1931, 52, 722.

Aldred, Lyons, *Chem. Abstracts*, 1931, 25, 3345.

Heap, Jones, Speakman, *J. Am. Chem. Soc.*, 1921, 43, 1936.

Rabe, Milarch, *Ber.*, 1912, 45, 2171.

Pictet, Chou, *Ber.*, 1916, 49, 378.

Oparina, *Ber.*, 1931, 64, 572.

Bratton, Bailey, *J. Am. Chem. Soc.*, 1937, 59, 177.

Singer, McElvain, *Organic Syntheses*, 1934, XIV, 30.

3 : 4-Dimethylpyridine (3 : 4- or $\beta\gamma$ -Lutidine).

B.p. 163.5–164.5°. Sol. EtOH, Et_2O . Volatile in steam. Ox. \rightarrow cinchomeronic acid.

$B, HAuCl_4$: yellow needles. M.p. 160–2°.

$B_2, H_2PtCl_6, 2H_2O$: m.p. 205° decomp.

$B, HCl, 2HgCl_2$: needles from dil. HCl. M.p. 146–8°.

Picrate: needles. Sinters at 163°.

Picrolonate: m.p. 227–8°.

Oshima, Ishibashi, *Chem. Abstracts*, 1927, 21, 486.

Wibaut, Kooyman, *Rec. trav. chim.*, 1944, 63, 231.

3 : 5-Dimethylpyridine (3 : 5- or $\beta\beta'$ -Lutidine).

B.p. 170–1°. Sol. EtOH, Et_2O . Mod. sol. cold H_2O . D_4^0 0.9614. Volatile in steam.

B_2, H_2PtCl_6 : m.p. 255°.

$B, HAuCl_4$: m.p. 149° (146–7°).

Chlorostannate: m.p. 205°.

Picrate: m.p. 245°.

Picrolonate: m.p. 239–40°.

Oparina, *Chem. Abstracts*, 1930, 24, 3790.

Eckert, Loria, *Monatsh.*, 1917, 38, 239.

Dürkopf, Götsch, *Ber.*, 1890, 23, 1113.

Bratton, Bailey, *J. Am. Chem. Soc.*, 1937, 59, 177.

Dimethylpyridine-carboxylic Acid.

See Dimethylnicotinic Acid and Dimethylpicolinic Acid.

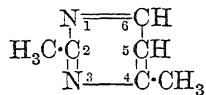
Dimethylpyridine-dicarboxylic Acid.

See Dimethylcinchomeronic Acid and Dimethyldinicotinic Acid.

Dimethylpyridone.

See Hydroxydimethylpyridine.

2 : 4-Dimethylpyrimidine (2 : 4-Dimethyl-1 : 3-diazine)



$C_6H_8N_2$

MW, 108

B.p. 146°. Misc. with H_2O . D^{14} 1.168.

Schmidt, *Ber.*, 1902, 35, 1577.

4 : 5-Dimethylpyrimidine.

Needles. M.p. 3°. B.p. 177°. Misc. with H_2O .

B_2, H_2PtCl_6 : m.p. 242–3°.

$B, AuCl_3$: needles from dil. HCl. M.p. 120° decomp.

$B, 2HgCl_2$: needles from H_2O . M.p. 207°.

Schlenker, *Ber.*, 1901, 34, 2814.

4 : 6-Dimethylpyrimidine.

M.p. 25°. B.p. 159.5°/754 mm. Very sol. H_2O .

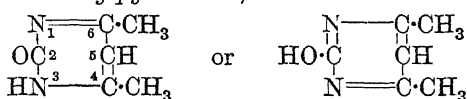
B_2, H_2PtCl_6 : m.p. 103–4°.

Picrate: m.p. 142–3°.

Angerstein, *Ber.*, 1901, 34, 3957.

Gabriel, Colman, *Ber.*, 1899, 32, 1532.

4 : 6-Dimethyl-2-pyrimidone (2-Hydroxy-4 : 6-dimethylpyrimidine)



$C_6H_8ON_2$

MW, 124

Exists in both colourless and yellow forms. Prisms, columns or tablets + $2H_2O$ from H_2O .

M.p. 198–9°. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 .

B, H_2SO_4 : cryst. from H_2O . M.p. 209°.

B, HNO_3 : cryst. Decomp. at 245°.

Imide: see 2-Amino-4 : 6-dimethylpyrimidine.

Anil: see under 2-Amino-4 : 6-dimethylpyrimidine.

de Haan, *Rec. trav. chim.*, 1908, 27, 162.

2 : 6-Dimethyl-4-pyrimidone (4-Hydroxy-2 : 6-dimethylpyrimidine, 2 : 4-dimethyl-6-pyrimidone).

Needles from C_6H_6 . M.p. 192°. Sol. H_2O , EtOH. Spar. sol. Et_2O .

Imide: see 4-Amino-2 : 6-dimethylpyrimidine.

Anil: see under 4-Amino-2 : 6-dimethylpyrimidine.

Pinner, *Ber.*, 1889, 22, 1616.

5 : 6-Dimethyl-4-pyrimidone (4-Hydroxy-5 : 6-dimethylpyrimidine, 4 : 5-dimethyl-6-pyrimidone).

Plates from C_6H_6 . M.p. 204°. Sol. H_2O , Me_2CO , $CHCl_3$, ligroin.

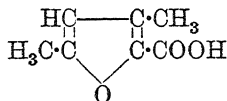
B, HI: yellow prisms from $\text{Et}_2\text{O}-\text{EtOH}$. Sinters about 200° . M.p. 260° .

Imide: see 6-Amino-4 : 5-dimethylpyrimidine.

Anil: see under 6-Amino-4 : 5-dimethylpyrimidine.

Schlenker, *Ber.*, 1901, 34, 2825.

3 : 5-Dimethylpyromucic Acid (3 : 5-Dimethylfuran-2-carboxylic acid, 3 : 5-dimethyl- α -furoic acid)

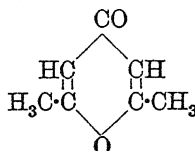


$\text{C}_7\text{H}_8\text{O}_3$ MW, 140

Cryst. from H_2O . M.p. $146-7^\circ$. $\text{FeCl}_3 \rightarrow$ orange col.

Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, 14, 1279.

2 : 6-Dimethyl- γ -pyrone



$\text{C}_7\text{H}_8\text{O}_2$ MW, 124

Needles. M.p. 132° . B.p. $248-9^\circ/713$ mm. Sol. H_2O , EtOH , Et_2O . Sublimes. Non-volatile in steam. k (base) $= 1.9 \times 10^{-14}$ at 25° ; k (acid) $= 0.8 \times 10^{-14}$ at 25° . Does not form a phenylhydrazone. Forms large number of (oxonium) salts with min. and org. acids.

Hydrochloride, $2\text{H}_2\text{O}$: m.p. $83-5^\circ$, anhyd. 154° . Hygroscopic.

Hydrobromide: sinters at 188° , m.p. $194-6^\circ$.

Oxalate: m.p. $121-2^\circ$.

Picrate: m.p. $101-2^\circ$.

$(\text{C}_7\text{H}_8\text{O}_2)_2, \text{ZnCl}_2$: cryst. M.p. 200° .

$(\text{C}_7\text{H}_8\text{O}_2)_2, \text{ZnBr}_2$: m.p. $204-5^\circ$.

$\text{C}_7\text{H}_8\text{O}_2, \text{HgCl}_2$: cryst. M.p. 149° .

$(\text{C}_7\text{H}_8\text{O}_2)_3, \text{Fe}_2\text{Cl}_6$: lemon yellow cryst. M.p. $173-4^\circ$.

$(\text{C}_7\text{H}_8\text{O}_2)_2, \text{SnCl}_4$: m.p. $232-5^\circ$ decomp.

Feist, *Ann.*, 1890, 257, 273.

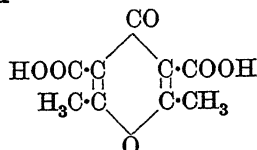
Collie, Tickle, *J. Chem. Soc.*, 1899, 75, 710.

Skraup, Priglinger, *Monatsh.*, 1910, 31, 363.

Philippi, Seka, *Ber.*, 1921, 54, 1089.

Arndt, Eistert, Scholz, Aron, *Ber.*, 1936, 69, 2379.

2 : 6-Dimethyl- γ -pyrone - 3 : 5-dicarboxylic Acid



$\text{C}_9\text{H}_8\text{O}_6$

MW, 212

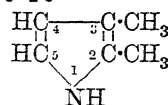
Dict. of Org. Comp.—II.

Di-Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_6$. MW, 268. M.p. 80° . Decompos. on dist. Sol. Et_2O , C_6H_6 , hot EtOH . Spar. sol. H_2O .

Conrad, Guthzeit, *Ber.*, 1886, 19, 22; 1887, 20, 152.

Torticci, *Gazz. chim. ital.*, 1900, 30, 523.

2 : 3-Dimethylpyrrole



$\text{C}_6\text{H}_9\text{N}$

MW, 95

B.p. 165° , $62^\circ/11$ mm.

Picrate: m.p. 148° .

Dimer: cryst. from pet. ether. M.p. $84-5^\circ$. B.p. $163-7^\circ/15$ mm. Spar. volatile in steam.

N-Et: see 2 : 3-Dimethyl-1-ethylpyrrole.

Fischer, Kutscher, *Ann.*, 1930, 481, 199.

Fischer, Beller, Stern, *Ber.*, 1928, 61, 1080.

Fischer, Wiedemann, *Z. physiol. Chem.*, 1926, 155, 52.

Piloty, Hirsch, *Ann.*, 1913, 395, 73.

2 : 4-Dimethylpyrrole.

B.p. $165^\circ/743$ mm., (171°) , $62-3^\circ/10$ mm. Liq. shows pale blue fluor. Sol. EtOH , Et_2O , C_6H_6 . Prac. insol. H_2O . Volatile in steam.

$\text{B}_2, \text{SnCl}_4$: yellowish needles from CHCl_3 . M.p. $123-4^\circ$.

$\text{B}_2, \text{SbCl}_3$: yellow prisms from CHCl_3 . M.p. 104° .

Picrate: m.p. $92-3^\circ$.

De Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 244.

Fischer, Walach, *Ann.*, 1926, 437, 41.

Fischer, Müller, *Z. physiol. Chem.*, 1925, 148, 155.

Fischer, Bartolomäus, *Z. physiol. Chem.*, 1912, 80, 6.

Piloty, Hirsch, *Ann.*, 1913, 395, 65.

Fischer, *Organic Syntheses*, 1935, XV, 20.

Timoschavskaja, *Brit. Chem. Abstracts*, 1940, II, 53.

2 : 5-Dimethylpyrrole.

B.p. 165° (169°), $50-3^\circ/8$ mm.. Sol. EtOH , Et_2O . Prac. insol. H_2O . D_4^{20} 0.935. n_D^{20} 1.5036. Volatile in steam.

N-Et: see 2 : 5-Dimethyl-1-ethylpyrrole.

Tronov, Popov, *Chem. Abstracts*, 1928, 22, 2561.

Schlesinger, *Ber.*, 1909, 42, 1159.

Trephillieff, *Ber.*, 1908, 41, 2545.

Knorr, *Ber.*, 1885, 18, 1565.

De Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 244.

Allen, Young, *Organic Syntheses*, 1936, XVI, 25.

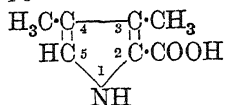
Timoschavskaja, *Brit. Chem. Abstracts*, 1940, II, 53.

3 : 4-Dimethylpyrrole.

M.p. 33°. B.p. 66°/14 mm. Volatile in steam or Et₂O vapour. Does not form a picrate.

Fischer, Walach, *Ann.*, 1926, 450, 128.

Fischer, Höfelmann, *Ann.*, 1938, 533, 223.

3 : 4-Dimethylpyrrole-2-carboxylic Acid
(3 : 4-Dimethylpyrrole-5-carboxylic acid)

C₇H₉O₂N

MW, 139

Sublimes at 180°.

Et ester : C₉H₁₃O₂N. MW, 167. M.p. 95–6°. B.p. 340°/10 mm.

Siedel, *Ann.*, 1943, 554, 144.

3 : 5-Dimethylpyrrole-2-carboxylic Acid
(2 : 4-Dimethylpyrrole-5-carboxylic acid).

M.p. 137° decomp. Decomp. by boiling H₂O. $k = 2 \times 10^{-6}$ at 25°.

Et ester : m.p. 125°. *Picrate* : red needles, from EtOH. M.p. 99°.

Amide : C₇H₁₀ON₂. MW, 138. Prisms from Et₂O. M.p. 163°.

Azide : leaflets from Et₂O. Decomp. at 121°.

Hydrazide : cryst. from MeOH. M.p. 182° decomp.

Houben, Fischer, *Ber.*, 1931, 64, 2639.

Fischer, Weiss, Schubert, *Ber.*, 1923, 56, 1199.

Allessandri, Passerini, *Gazz. chim. ital.*, 1921, 51, 262.

2 : 4-Dimethylpyrrole-3-carboxylic Acid
(3 : 5-Dimethylpyrrole-4-carboxylic acid).

M.p. 183° decomp. → 2 : 4-dimethylpyrrole. $k = 7.5 \times 10^{-7}$ at 25°.

Et ester : C₉H₁₃O₂N. MW, 167. M.p. 78–9°. B.p. 291°, 181°/35 mm. Sol. EtOH, Et₂O.

Picrate : reddish brown needles from Et₂O-ligroin. M.p. 81°. *SbCl₃ add. comp.* : needles from CHCl₃. M.p. 97°. *HgCl₂ add. comp.* : needles from EtOH. M.p. 218° decomp.

Anilide : m.p. 80°.

Hydrazide : needles from EtOH. M.p. 210°.

Küster, Weber, Maurer, Schlack, Schlayerbach, Willig, *Z. physiol. Chem.*, 1922, 121, 135.

Piloty, Hirsch, *Ann.*, 1913, 395, 65.

Knorr, Lange, *Ber.*, 1902, 35, 3007.

2 : 5-Dimethylpyrrole-3-carboxylic Acid
(2 : 5-Dimethylpyrrole-4-carboxylic acid).

M.p. 213° decomp. → 2 : 5-dimethylpyrrole. $k = 1.1 \times 10^{-6}$ at 25°.

Me ester : cryst. from EtOH. M.p. 119–5°. B.p. 170°/15 mm.

Et ester : m.p. 118°. B.p. 290°/731 mm., 130°/15 mm. Volatile in steam. *HgCl₂ add. comp.* : needles from Me₂CO. M.p. 239° decomp.

Amide : m.p. 160–1°.

Nitrile : C₇H₈N₂. MW, 120. Needles from H₂O. M.p. 89°.

Hantzsch, *Ber.*, 1890, 23, 1475.

Küster *et al.*, *Z. physiol. Chem.*, 1922, 121, 135.

Justoni, *Gazz. chim. ital.*, 1941, 71, 375.

4 : 5-Dimethylpyrrole-3-carboxylic Acid
(2 : 3-Dimethylpyrrole-4-carboxylic acid).

M.p. 188°.

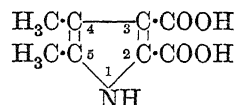
Et ester : m.p. 110–11°.

Anhydride : plates and prisms from EtOH. M.p. 236°.

Picrate : red cryst. M.p. 143°.

Piloty, Hirsch, *Ann.*, 1913, 395, 73.

Piloty, Wilke, *Ber.*, 1912, 45, 2587; 1913, 46, 1603.

4 : 5-Dimethylpyrrole-2 : 3-dicarboxylic Acid
(2 : 3-Dimethylpyrrole-4 : 5-dicarboxylic acid)

C₈H₉O₄N

MW, 183

Sinters at 200°. M.p. 225° decomp.

3-Et ester : C₁₀H₁₃O₄N. MW, 211. Prisms. M.p. 201°.

Di-Et ester : C₁₂H₁₇O₄N. MW, 239. Leaflets. M.p. 110°. *Picrate* : m.p. 112–13°.

2-Nitrile : C₈H₈O₂N₂. MW, 164. Cryst. from 50% EtOH. M.p. 242°.

Fischer, Kutscher, *Ann.*, 1930, 481, 199.

Piloty, Wilke, *Ber.*, 1912, 45, 2587; 1913, 46, 1598.

Piloty, Hirsch, *Ann.*, 1913, 395, 73.

Bilton, Linstead, *J. Chem. Soc.*, 1937, 925.

3 : 5-Dimethylpyrrole-2 : 4-dicarboxylic Acid
(2 : 4-Dimethylpyrrole-3 : 5-dicarboxylic acid).

Decomp. at 260° → 2 : 4-dimethylpyrrole. Hot min. acids → 2 : 4-dimethylpyrrole.

4-Me ester : C₉H₁₁O₄N. MW, 197. Needles. M.p. 182° decomp.

Di-Me ester : C₁₀H₁₃O₄N. MW, 211. M.p. 174–5°.

2-Et ester : C₁₀H₁₃O₄N. MW, 211. Needles from EtOH. M.p. 273°. *4-Anilide* : cryst. from AcOH. M.p. 216°.

4-Et ester : needles. M.p. 204° decomp. *2-Anilide* : needles from EtOH. M.p. 180°.

Di-Et ester : C₁₂H₁₇O₄N. MW, 239. Needles. M.p. 135°. Sol. EtOH, AcOH, C₆H₆. Spar. sol. Et₂O, ligroin. *SbCl₃ add. comp.* : needles from CHCl₃. M.p. 111°. *Add. comp. with HClO₄* : needles from AcOH. M.p. 123°.

4-Anilide : needles from EtOH. Decomp. at 198°.

Di-anilide : m.p. 255°.

Diazide : needles from Me₂CO. Explodes at 119°.

Dihydrazide: leaflets from EtOH. M.p. 262° decomp.

De Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 244.

Fischer, Schneller, *Z. physiol. Chem.*, 1923, 128, 240.

Küster, Weber, Maurer, Schlack, Schlayerbach, Willig, *Z. physiol. Chem.*, 1922, 121, 135.

Knorr, *Ann.*, 1886, 236, 318.

Fischer, *Organic Syntheses*, 1935, XV, 17.

Corwin, Quattlebaum, *J. Am. Chem. Soc.*, 1936, 58, 1083.

2 : 5-Dimethylpyrrole-3 : 4-dicarboxylic Acid.

Cryst. from EtOH. M.p. 251° → 2 : 5-dimethylpyrrole. Hot min. acids → 2 : 5-dimethylpyrrole.

Et ester: cryst. from EtOH. M.p. 227° decomp.

Di-Et ester: C₁₂H₁₇O₄N. MW, 239. M.p. 99°. Decomp. on dist. Sol. EtOH. Spar. sol. Et₂O. Insol. H₂O. N-p-Nitrophenyl: m.p. 94°. N-p-Aminophenyl: m.p. 117°.

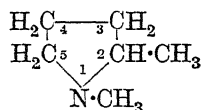
4-Nitrile: m.p. 286°. *Et ester*: cryst. from H₂O. M.p. 152°.

Dinitrile: needles from EtOH. M.p. 239°.

Knorr, *Ber.*, 1885, 18, 302, 1559.

Bilton, Linstead, *J. Chem. Soc.*, 1937, 925.

1 : 2-Dimethylpyrrolidine (1 : 2-Dimethyl-tetrahydropyrrole)



C₆H₁₃N MW, 99
B.p. 96° (87–88.5°, 98–101°). Sol. EtOH, Et₂O, H₂O. D₄²⁰ 0.7994. n_D²⁰ 1.4252. Strong base.

B.HAuCl₄: m.p. 215°.

B₂H₂PtCl₆: m.p. 223° decomp.

Picrate: m.p. 235° decomp.

Löffler, *Ber.*, 1910, 43, 2044.

Willstätter, *Ber.*, 1900, 33, 377.

Yuv'ev, *Chem. Abstracts*, 1939, 33, 5845.

Coleman, Goheen, *J. Am. Chem. Soc.*, 1938, 60, 730.

Coleman, Nichols, Martens, *Organic Syntheses*, 1945, XXV, 19.

1 : 3-Dimethylpyrrolidine.

B.p. 96–7°. Sol. H₂O, EtOH, Et₂O. D₄¹⁵ 0.792.

B.HAuCl₄: m.p. 137°.

B₂H₂PtCl₆: m.p. 58–9°.

HgCl₂ add. comp.: m.p. 200–1°.

Picrate: dimorphous. M.p. 181–2° or 110–15°.

Löffler, *Ber.*, 1910, 43, 2044.

2 : 4-Dimethylpyrrolidine.

B.p. 115–17°. Sol. EtOH, Et₂O. D₄²⁰ 0.8297. n_D²⁰ 1.4325.

B₂H₂PtCl₆: m.p. 210°.

Picrate: m.p. 116–17°.

Picrolonate: m.p. 227°.

Knorr, Rabe, *Ber.*, 1901, 34, 3498.

de Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 245.

2 : 5-Dimethylpyrrolidine.

B.p. 106–8°. Sol. H₂O, EtOH, Et₂O. D₄¹² 0.8185. n_D¹⁵ 1.4357.

B.HCl: m.p. 205–8° (188–90°).

B.HAuCl₄: dimorphous. M.p. 85° or 102–4°.

B₂H₂PtCl₆: m.p. 225° decomp.

Picrate: m.p. 117–18°.

N-Nitroso: b.p. 135°/60 mm.

Merling, *Ann.*, 1891, 264, 328.

Fenner, Tafel, *Ber.*, 1899, 32, 3226.

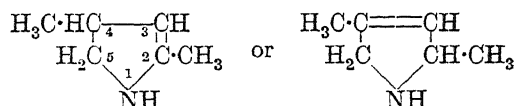
Blaise, Cornillot, *Compt. rend.*, 1924, 178, 1617.

de Jong, Wibaut, *Rec. trav. chim.*, 1930, 49, 245.

1 : 2-Dimethyl-2-pyrroline.

See under 2-Methyl-2-pyrroline.

2 : 4-Dimethyl-2(3)-pyrroline



C₆H₁₁N MW, 97

B.p. 121°/752 mm. D₄²⁰ 0.8554. n_D²⁰ 1.4493.

B₂H₂PtCl₆: needles from HCl. M.p. 185°.

Picrate: yellow prisms from EtOH. M.p. 102–4°.

Picrolonate: yellow cryst. from EtOH. M.p. 225°.

Knorr, Rabe, *Ber.*, 1901, 34, 3494.

2 : 5-Dimethyl-2(3)-pyrroline.

B.p. 110°. D₄²⁰ 0.8369. n_D²⁰ 1.4401.

B₂H₂PtCl₆: orange prisms from HCl. M.p. about 198°.

B.HAuCl₄: prisms from HCl. M.p. 68–9°.

Picrate: yellow needles from Et₂O. M.p. 107°.

Picrolonate: reddish brown cryst. M.p. 130° decomp.

Blaise, Cornillot, *Compt. rend.*, 1924, 178, 1617.

Knorr, Rabe, *Ber.*, 1901, 34, 3492.

Dimethylpyruvic Acid.

See 1-Ketoisovaleric Acid.

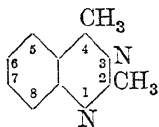
Dimethylquinaldine.

See Trimethylquinaldine.

Dimethylquinaldinic Acid.

See Dimethylquinoline-2-carboxylic Acid.

2 : 4-Dimethylquinazoline

 $C_{10}H_{10}N_2$

MW, 158

Needles + $2H_2O$ from H_2O . M.p. 72° .
Oil when anhyd. B.p. $249^\circ/713$ mm. D^{16}_4 1.0980.

Picrate: yellow cryst. from EtOH.Aq. M.p. about 170° decomp.

Bischler, Burkart, *Ber.*, 1893, 26, 1350.

2 : 6-Dimethylquinazoline.

Pale yellow leaflets from ligroin. M.p. 79° .
B.p. $255^\circ/726$ mm. Spar. sol. H_2O .

B.HCl: powder. Decomp. about 180° .

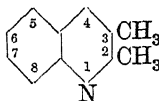
Picrate: yellow needles from EtOH. M.p. 145° .

Bischler, Muntendam, *Ber.*, 1895, 28, 729.

Dimethylquinizarin.

See Dihydroxydimethylanthraquinone.

2 : 3-Dimethylquinoline (3-Methylquinaldine)

 $C_{11}H_{11}N$

MW, 157

M.p. $68-9^\circ$. B.p. $261^\circ/730$ mm. Sol. EtOH, Et_2O , ligroin. Mod. sol. hot H_2O .

$B_2H_2SO_4.H_2O$: m.p. 235° .

$B_2H_2PtCl_6.2H_2O$: orange yellow needles from dil. HCl. Decomp. about 230° .

Picrate: m.p. 235° .

Styphnate: m.p. 243° .

Methiodide: pale yellow needles. M.p. 218° .
Sol. H_2O , EtOH.

Pfützing, *J. prakt. Chem.*, 1897, 56, 315.

Poth, Schulze, King, Thompson, Slagle, Floyd, Bailey, *J. Am. Chem. Soc.*, 1930, 52, 1249.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

2 : 4-Dimethylquinoline (4-Methylquinaldine).

B.p. $264-5^\circ$, $143^\circ/15$ mm. Sol. EtOH, Et_2O . D^{15}_4 1.0611. n^{20}_D 1.6075.

B.HCl: m.p. $265-7^\circ$ ($210-15^\circ$).

$B_2H_2SO_4$: m.p. $225-8^\circ$ part. decomp.

$B_2H_2PtCl_6$: m.p. 229° .

$B_2H_2Cr_2O_7$: orange needles from H_2O . M.p. 172° decomp.

Tartrate: m.p. 158° .

Picrate: m.p. 196° .

Styphnate: m.p. 212° .

Methiodide: m.p. $263-5^\circ$.

Ethiodide: yellow needles. M.p. 214° .

Wise, Mikeska, Stewart, Wise, *Ind. Eng. Chem.*, 1919, 11, 456.

Fischer, Bauer, Scheibe, Muller, *J. prakt. Chem.*, 1919, 100, 91.

Knovenagel, Bähr, *Ber.*, 1922, 55, 1923, 1926.

Kalnin, *Ann.*, 1936, 523, 125.

Craig, *J. Am. Chem. Soc.*, 1938, 60, 1462.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

2 : 5-Dimethylquinoline (5-Methylquinaldine).

Needles from EtOH or pet. ether. M.p. 61° .
B.p. $264-5^\circ$, $80-5^\circ/1$ mm. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O .

Picrate: m.p. 223° .

Styphnate: m.p. 207° .

Doebner, Miller, *Ber.*, 1883, 16, 2471.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

2 : 6-Dimethylquinoline (6-Methylquinaldine, p-toluquinaldine).

M.p. 60° . B.p. $266-7^\circ$ ($259-61^\circ$) $152-5^\circ/13$ mm. Sol. EtOH, Et_2O . Spar. sol. hot H_2O .

Methyl p-toluenesulphonate: cryst. from EtOH-AcOEt. M.p. 175° .

Picrate: m.p. 191° .

Styphnate: cryst. from EtOH. M.p. $199-200^\circ$.

Methiodide: yellow needles. M.p. $236-7^\circ$. Sol. H_2O .

Pfützing, *J. prakt. Chem.*, 1897, 56, 320.

Wise et al., *Ind. Eng. Chem.*, 1919, 11, 456.

Romet, *Compt. rend.*, 1935, 200, 1677.

I.G., D.R.P. 567,273, (*Chem. Zentr.*, 1933, I, 1687).

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

2 : 7-Dimethylquinoline (7-Methylquinaldine, m-toluquinaldine).

Needles. M.p. 61° . B.p. $264-5^\circ$, $115-16^\circ/7$ mm. Sol. EtOH, Et_2O .

Picrate: m.p. 196° .

Styphnate: m.p. 222° .

Doebner, Miller, *Ber.*, 1883, 16, 2471.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

2 : 8-Dimethylquinoline (8-Methylquinaldine, o-toluquinaldine).

M.p. 27° . B.p. 252° , $93-5^\circ/2$ mm. Sol. EtOH, Et_2O . Spar. sol. H_2O . D^{20}_4 1.0394. n^{20}_D 1.6022. Readily volatile in steam.

B.HCl: m.p. 227° .

$B_2H_2SO_4$: needles from EtOH. M.p. 187° .

Perchlorate: needles from EtOH. M.p. 189° .

$B.HCl.HgCl_2$: needles from AcOH. M.p. 211° .

Picrate : m.p. 183°.

Styphnate : m.p. 194°.

Methiodide : yellow needles. M.p. 221°.

Ethiodide : yellow needles. M.p. 229°.

B.D.C., B.P. 276,156, (*Chem. Zentr.*, 1928, II, 2286).

Doebner, Miller, *Ber.*, 1883, 16, 2469.

I.G., D.R.P. 567,273, (*Chem. Zentr.*, 1933, I, 1687).

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

3 : 4-Dimethylquinoline (3-Methyl-lepidine).

M.p. 73-4°. B.p. 290°/737 mm. Sol. EtOH, Et₂O.

B.HCl : m.p. 290° decomp.

B.HAuCl₄ : m.p. 177°.

Picrate : m.p. 221°.

Styphnate : m.p. 232°.

Methiodide : m.p. 191°.

Knorr, *Ann.*, 1888, 245, 362.

A.G.F.A., U.S.P. 1,806,563, (*Chem. Abstracts*, 1931, 25, 3668).

Plant, Rosser, *J. Chem. Soc.*, 1930, 2444.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

3 : 5-Dimethylquinoline.

Picrate : m.p. 220°.

Styphnate : m.p. 214°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

3 : 6-Dimethylquinoline.

M.p. 58°. B.p. 270-1.5°.

Picrate : m.p. 253°.

Styphnate : m.p. 234°.

Ethiodide : m.p. 181°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Utermohlen, *J. Org. Chem.*, 1943, 8, 544.

3 : 7-Dimethylquinoline.

M.p. 80°. B.p. 270-1.5°, 101-3°/1 mm.

Picrate : m.p. 244°.

Styphnate : m.p. 214°.

Ethiodide : m.p. 250°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Utermohlen, *J. Org. Chem.*, 1943, 8, 544.

3 : 8-Dimethylquinoline.

B.p. 269°/751 mm. D_{20}^{20} 1.051. n_D^{20} 1.6063.

Picrate : m.p. 210°.

Styphnate : m.p. 205°.

Methiodide : m.p. 197°.

Ethiodide : m.p. 192°.

Poth et al., *J. Am. Chem. Soc.*, 1930, 52, 1248.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Utermohlen, *J. Org. Chem.*, 1943, 8, 544.

4 : 5-Dimethylquinoline (5-Methyl-lepidine).

M.p. 78°.

Picrate : m.p. 233°.

Styphnate : m.p. 227°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

4 : 6-Dimethylquinoline (6-Methyl-lepidine).

B.p. 273-4° (280°), 140°/12 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D_4^{20} 1.0577. n_D^{20} 1.6100.

B.HCl : m.p. 262-4°.

B.HAuCl₄ : yellow needles. M.p. 192°.

B₂H₂PtCl₆, 2H₂O : m.p. 238°.

Picrate : m.p. 249°.

Styphnate : m.p. 221°.

Methiodide : m.p. 235-9°.

Miller, *Ber.*, 1890, 23, 2264.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 110.

Mikeska, *J. Am. Chem. Soc.*, 1920, 42, 2396.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Campbell, Schaffner, *J. Am. Chem. Soc.*, 1945, 67, 86.

4 : 7-Dimethylquinoline (7-Methyl-lepidine).

B.p. 283°, 141°/15 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O.

B₂H₂PtCl₆, 2H₂O : brownish red prisms. De-comp. at 227°.

Picrate : m.p. 230°.

Styphnate : m.p. 272°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 110.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

4 : 8-Dimethylquinoline (8-Methyl-lepidine).

M.p. 58°. B.p. 258-9°, 134-5°/12 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O.

B.HAuCl₄ : cryst. from HCl. M.p. 181°.

B₂H₂PtCl₆ : m.p. 226-7° decomp.

Picrate : m.p. 229°.

Styphnate : m.p. 231°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 110.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

5 : 6-Dimethylquinoline.

M.p. 50°.

Picrate : m.p. 201°.

Styphnate : m.p. 205°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

5 : 7-Dimethylquinoline.

M.p. 22°.

B.HCl : m.p. 243-4°.

Picrate : m.p. 249°.

Styphnate : m.p. 247°.

Methiodide : m.p. 206°.

Borsche, Groth, *Ann.*, 1941, 549, 238.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

5 : 8-Dimethylquinoline.

M.p. 4-5°. B.p. 265°/736 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D²¹ 1.070.

B₂H₂Cr₂O₇ : orange needles from H₂O. M.p. 149°.

B₂H₂PtCl₆ : yellow needles from H₂O. M.p. 234° decomp.

Picrate : m.p. 186°.

Styphnate : m.p. 184°.

Lellmann, Alt, *Ann.*, 1887, 237, 308.

Ganguli, Guha, *J. Indian Chem. Soc.*, 1934, 11, 197.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Neumann *et al.*, *Organic Syntheses*, 1946, XXVI, 45.

6 : 7-Dimethylquinoline.

M.p. 58°.

Picrate : m.p. 278°.

Styphnate : m.p. 259°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

6 : 8-Dimethylquinoline (β-Cytisolidine).

B.p. 269°, 133-4°/14 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D⁴ 1.0665.

B.HCl : m.p. 246°.

B₂H₂PtCl₆ : m.p. 235° decomp.

Picrate : m.p. 230°.

Styphnate : m.p. 190°.

Ewins, *J. Chem. Soc.*, 1913, 103, 102.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

Neumann *et al.*, *Organic Syntheses*, 1946, XXVI, 45.

7 : 8-Dimethylquinoline.

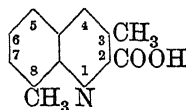
Picrate : m.p. 198°.

Styphnate : m.p. 179°.

Manske, Marion, Leger, *Can. J. Research*, 1942, 20B, 133.

3 : 8-Dimethylquinoline-2-carboxylic Acid

(3 : 8-Dimethylquinaldinic acid)



C₁₂H₁₁O₂N

MW, 201

Prisms from EtOH. Needles from H₂O. M.p. 157.5° decomp. Soda lime dist. → 3 : 8-dimethylquinoline.

Poth, Schulze, King, Thompson, Slagle, Floyd, Bailey, *J. Am. Chem. Soc.*, 1930, 52, 1247.

4 : 6-Dimethylquinoline-2-carboxylic Acid

(4 : 6-Dimethylquinaldinic acid).

Decomp. at 265°.

Simon, *Compt. rend.*, 1908, 147, 127.

6 : 8-Dimethylquinoline-2-carboxylic Acid

(6 : 8-Dimethylquinaldinic acid).

Yellow needles from EtOH. Melts with decomp.

Panajotow, *Ber.*, 1895, 28, 1513.

2 : 4-Dimethylquinoline-3-carboxylic Acid.

Needles from H₂O. M.p. 231° decomp. Readily sol. EtOH.

Amide : C₁₂H₁₂ON₂. MW, 200. Needles from H₂O. M.p. 198°.

Nitrile : C₁₂H₁₀N₂. MW, 182. Needles from EtOH. M.p. 161-2°. Picrate : yellow needles. M.p. 203°.

Meyer, *J. prakt. Chem.*, 1914, 90, 25.

2 : 3-Dimethylquinoline-4-carboxylic Acid

(2 : 3-Dimethylcinchoninic acid).

Leaflets from H₂O. M.p. above 310° decomp.

Me ester : C₁₃H₁₃O₂N. MW, 215. M.p. 120-1°.

Pfützing, *J. prakt. Chem.*, 1897, 56, 314.

2 : 6 - Dimethylquinoline - 4 - carboxylic Acid (2 : 6-Dimethylcinchoninic acid).

Cryst. from EtOH. Leaflets from H₂O. M.p. 265° decomp. Heat above m.p. or dist. with soda lime → 2 : 6-dimethylquinoline.

B₂H₂PtCl₆ : needles + 2H₂O from EtOH. M.p. anhyd. 243-4° decomp.

Silberg, *Bull. soc. chim.*, 1936, 3, 1767.

Pfützing, *J. prakt. Chem.*, 1897, 56, 318.

2 : 8-Dimethylquinoline-4-carboxylic Acid

(2 : 8-Dimethylcinchoninic acid).

Needles from EtOH. M.p. 253°.

Silberg, *Bull. soc. chim.*, 1936, 3, 1767.

2 : 3-Dimethylquinoline-6-carboxylic Acid.

Brownish needles from EtOH. M.p. about 270° decomp. Soda lime dist. → 2 : 3-dimethylquinoline.

Miller, *Ber.*, 1890, 23, 2269.

2 : 8-Dimethylquinoline-6-carboxylic Acid.

Needles from EtOH. Melts with decomp. Spar. sol. H₂O. Soda lime dist. → 2 : 8-dimethylquinoline.

Picrate : yellow needles + H₂O. M.p. 221°.

Panajotow, *Ber.*, 1887, 20, 38.

2 : 3-Dimethylquinoline-8-carboxylic Acid.

Needles from C₆H₆, AcOEt or EtOH.Aq. M.p. 202°. Soda lime dist. → 2 : 3-dimethylquinoline.

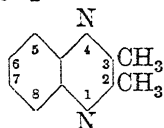
Poth *et al.*, *J. Am. Chem. Soc.*, 1930, 52, 1249.

2 : 4-Dimethylquinoline-8-carboxylic Acid.

Cryst. from EtOH. M.p. 241-2° decomp.

Axe, *J. Am. Chem. Soc.*, 1939, 61, 1018.

2 : 3-Dimethylquinoxaline

C₁₀H₁₀N₂ MW, 158Needles from H₂O. M.p. 106°. Sol. acids and most ord. org. solvents.

Picrate : m.p. 189°.

Gabriel, Sonn, *Ber.*, 1907, 40, 4850.Ogg, Bergstrom, *J. Am. Chem. Soc.*, 1931, 53, 1848.Henderson, *J. Chem. Soc.*, 1929, 466.

2 : 6(or 2 : 7)-Dimethylquinoxaline.

Cryst. M.p. 54°. B.p. 267-9°.

v. Pechmann, *Ber.*, 1887, 20, 2544.Hinsberg, *Ann.*, 1887, 237, 368.

Dimethylresorcinol.

See Dihydroxyxylene.

Dimethylsalicylaldehyde.

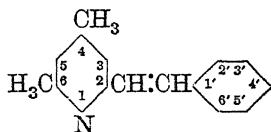
See Hydroxydimethylbenzaldehyde.

Dimethylsalicylic Acid.

See Hydroxydimethylbenzoic Acid.

2 : 2-Dimethylserine.

See 2-Hydroxyvaline.

4 : 6-Dimethyl- α -stilbazole (6-Styryl- $\alpha\gamma$ -lutidine)C₁₅H₁₅N MW, 209

B.p. 188-9°/9 mm., slight decomp.

B, HCl : prisms + 2H₂O from EtOH-Et₂O. M.p. 215-17°.B, HBr : yellow needles + 2H₂O from H₂O. M.p. 218-20°.B, H₂AuCl₄ : needles from dil. HCl. M.p. 189-91°.B₂, H₂PtCl₆ : yellowish red needles + 2H₂O from dil. HCl. M.p. 230-2° (245° decomp.). Cryst. powder + 1H₂O. M.p. 236-8°.

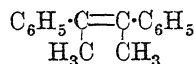
Picrate : needles. M.p. 240-1° decomp.

Dubke, *Ber.*, 1894, 27, 79.Walther, Weinhausen, *J. prakt. Chem.*, 1917, 96, 56.4 : 4'-Dimethyl- α -stilbazole.Cryst. from EtOH. M.p. 202°. Spar. sol. Me₂CO, C₆H₆.

B, HBr : yellow leaflets. M.p. 115°.

B, H₂AuCl₄ : yellow needles. M.p. 170°.B₂, H₂PtCl₆ : yellow cryst. powder from dil. HCl. M.p. 208°.Langer, *Ber.*, 1905, 38, 3706.6 : 4'-Dimethyl- α -stilbazole.Leaflets from EtOH. M.p. 144-5°. Sol. Et₂O, C₆H₆, CHCl₃. Insol. H₂O.B, H₂AuCl₄ : red needles. M.p. 210-11°.B₂, H₂PtCl₆ : reddish yellow needles from dil. HCl. M.p. above 260°.

Picrate : leaflets from EtOH. M.p. 226° decomp.

Werner, *Ber.*, 1903, 36, 1683. α : β -Dimethylstilbene (2 : 3-Diphenyl-2-butylene)C₁₆H₁₆ MW, 208

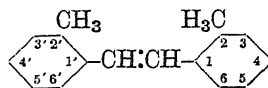
Cis-.

Cryst. from MeOH. M.p. 66°. Sol. AcOH, MeOH. D₄²⁰ 1.004. n_D²⁰ 1.5919.

Trans-.

M.p. 107°. Spar. sol. MeOH. D₄²⁰ 0.987. n_D²⁰ 1.6173.Ott, *Ber.*, 1928, 61, 2129, 2135.Kharasch, Kleiman, *J. Am. Chem. Soc.*, 1943, 65, 11.

2 : 2'-Dimethylstilbene (sym.-Di-o-tolyl-ethylene)

C₁₆H₁₆ MW, 208Needles. M.p. 83°. B.p. 176-80°/10 mm. Sol. EtOH, Et₂O, MeOH.

Picrate : m.p. 102°.

Späth, *Monatsh.*, 1914, 35, 469.

3 : 3'-Dimethylstilbene (sym.-Di-m-tolyl-ethylene).

M.p. 55-6°. Sol. EtOH, Et₂O, C₆H₆, MeOH. CHCl₃.

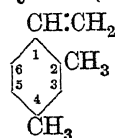
Picrate : m.p. 97°.

Wislicenus, Wren, *Ber.*, 1905, 38, 505.Aronstein, Van Nierop, *Rec. trav. chim.*, 1902, 21, 448.

4 : 4'-Dimethylstilbene (sym.-Di-p-tolyl-ethylene).

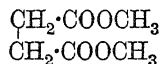
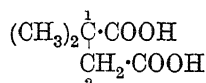
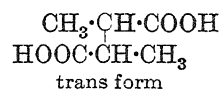
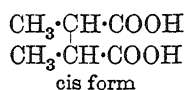
M.p. 179-80°. B.p. 304-5°. Sol. Et₂O, CS₂, hot EtOH. Sublimes. CrO₃ \rightarrow terephthalic acid. HNO₃. Aq. \rightarrow p-toluic acid.Meyer, Hofmann, *Monatsh.*, 1916, 37, 691.Späth, *Monatsh.*, 1914, 35, 470.

2 : 4-Dimethylstyrene (4-Vinyl-m-xylene)

C₁₀H₁₂ MW, 132B.p. 79-80°/12 mm. D₄²⁰ 0.905, D₄^{21.5} 0.9022, n_D²⁰ 1.539, n_D^{21.5} 1.5214.Harrispe, *Ann. chim.*, 1936, 6, 249.Marvel, Saunders, Overberger, *J. Am. Chem. Soc.*, 1946, 68, 1085.

2 : 5-Dimethylstyrene (2-Vinyl-p-xylene).B.p. 69°/10 mm. $D_4^{17.5}$ 0.9072. $n_D^{17.5}$ 1.5236.Klages, Keil, *Ber.*, 1903, 36, 1639.Marvel, Saunders, Overberger, *J. Am. Chem. Soc.*, 1946, 68, 1085.**3 : 4-Dimethylstyrene** (4-Vinyl-o-xylene).B.p. 94-6°/26 mm. D_{25}^{25} 0.909. n_D^{25} 1.5463.Marvel, Saunders, Overberger, *J. Am. Chem. Soc.*, 1946, 68, 1085.**3 : 5-Dimethylstyrene** (5-Vinyl-m-xylene).B.p. 57-8°/4 mm. D_{25}^{25} 0.897. n_D^{25} 1.5382.Marvel, Saunders, Overberger, *J. Am. Chem. Soc.*, 1946, 68, 1085. β : β -Dimethylstyrene.

See 1-Phenylisobutylene.

Dimethyl succinate (Succinic dimethyl ester) $\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146
M.p. 19°. B.p. 195.2°, 80°/11 mm. D_4^{18} 1.1202. n_D^{18} 1.41976.Emery, *Ber.*, 1889, 22, 3185.I.G., D.R.P. 485,313, (*Chem. Abstracts*, 1930, 24, 862).Vogel, *J. Chem. Soc.*, 1934, 338.**1 : 1-Dimethylsuccinic Acid** (unsym.-Dimethylsuccinic acid) $\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146
M.p. 141°. Sol. H_2O , EtOH, Me_2CO . Prac. insol. CHCl_3 , C_6H_6 , ligroin, Et_2O . $k = 8.05 \times 10^{-5}$ at 25°. Heat of comb. C_v 671.4 Cal. (459.1 Cal.). Alk. salts sol. H_2O .1-Me ester : $\text{C}_7\text{H}_{12}\text{O}_4$. MW, 160. M.p. 41°. B.p. 141°/14 mm. $k = 2.56 \times 10^{-5}$ at 25°.2-Me ester : m.p. 52°. $k = 2.28 \times 10^{-5}$ at 25°. Di-Me ester : $\text{C}_8\text{H}_{14}\text{O}_4$. MW, 174. B.p. 201-2°, 91-2°/17 mm. D_{21}^{21} 1.050. n_D^{20} 1.4234.Di-Et ester : $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p. 215°, 101°/15 mm. D_{17}^{17} 0.9976.Anhydride : $\text{C}_6\text{H}_8\text{O}_3$. MW, 128. M.p. 29°. B.p. 220°, 117°/22 mm.Dichloride : $\text{C}_6\text{H}_8\text{O}_2\text{Cl}_2$. MW, 183. B.p. 200-2° decomp.Dinitrile : $\text{C}_6\text{H}_8\text{N}_2$. MW, 108. B.p. 218-20°. Sol. H_2O .Anil : needles. M.p. 87°. Sol. EtOH, Et_2O , C_6H_6 .Levy, Engländer, *Ann.*, 1887, 242, 201.Hell, Rothberg, *Ber.*, 1889, 22, 1740.Vorländer, Gärtner, *Ann.*, 1899, 304, 14.Bone, Sudborough, Sprankling, *J. Chem. Soc.*, 1904, 85, 547.Vogel, *J. Chem. Soc.*, 1928, 2020.**1 : 2-Dimethylsuccinic Acid** (sym.-Dimethylsuccinic acid) $\text{C}_6\text{H}_{10}\text{O}_4$ MW, 146

Cis form.

d-.

M.p. 135°. $[\alpha]_D + 7.8^\circ$ in H_2O .

l-.

M.p. 135°. $[\alpha]_D - 8^\circ$ in H_2O .

dl-.

M.p. 129° (122-3°). Sol. EtOH, Et_2O , CHCl_3 , Me_2CO . Mod. sol. H_2O . Insol. ligroin. k (first) = 1.22×10^{-4} at 25°; (second) = 0.53×10^{-6} at 100°. Heat above m.p. \rightarrow anhydride.

Mono-Me ester : m.p. 50°.

Di-Me ester : $\text{C}_8\text{H}_{14}\text{O}_4$. MW, 174. B.p. 200°.Mono-Et ester : b.p. 115-7°/3 mm. n_D^{20} 1.4345.Di-Et ester : $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p. 221-2°.Anhydride : $\text{C}_6\text{H}_8\text{O}_3$. MW, 128. M.p. 87°.Imide : $\text{C}_6\text{H}_9\text{O}_2\text{N}$. MW, 127. M.p. 111° (106°). B.p. 300°.Monoamide : $\text{C}_6\text{H}_{11}\text{O}_3\text{N}$. MW, 145. M.p. 148-9°.Diamide : $\text{C}_6\text{H}_{12}\text{O}_2\text{N}_2$. MW, 144. M.p. 244° decomp.

Dianilide : m.p. 222°.

Anil : m.p. 146°.

Trans form.

Meso-.

M.p. 198° (208°) decomp. Sol. EtOH, Et_2O , hot H_2O . Insol. CHCl_3 , C_6H_6 . k (first) = 1.91×10^{-4} at 25°; (second) = 1.3×10^{-6} at 100°. Heat above m.p. \rightarrow anhydride of cis-form.

Di-Me ester : b.p. 198-9°.

Di-Et ester : b.p. 218°, 108°/15 mm. D_4^{18} 1.002.

Anhydride : m.p. 43°.

Imide : m.p. 78°.

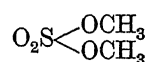
Monoamide : m.p. 165-7°.

Diamide : m.p. 238° decomp.

Dianilide : m.p. 235°.

Hückel, Müller, *Ber.*, 1931, 64, 1989.Gane, Ingold, *J. Chem. Soc.*, 1931, 2153.Auwers, Ottens, *Ber.*, 1924, 57, 437.Morrell, *J. Chem. Soc.*, 1914, 105, 2706.**Dimethylsulphanilic Acid.**

See Dimethylaniline-p-sulphonic Acid.

Dimethyl sulphate (Methyl sulphate) $\text{C}_2\text{H}_6\text{O}_4\text{S}$

MW, 126

F.p. — 27°. B.p. 188°, 76°/15 mm. D_4^{15} 1.3348. n_D^{20} 1.3874. Poisonous. Powerful methylating agent.

Langguth, *Chem. Abstracts*, 1930, 24, 1636.

Fuchs, Katscher, B.P. 299,064, (*Chem. Abstracts*, 1929, 23, 2991).

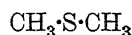
Levaillant, *Compt. rend.*, 1928, 187, 234.

Hayworth, Irvine, U.S.P. 1,401,693, (*Chem. Abstracts*, 1922, 16, 935).

Durrans, U.S.P. 1,317,648, (*Chem. Abstracts*, 1920, 14, 70).

Guyot, Simon, *Compt. rend.*, 1919, 169, 795.

Dimethyl sulphide (*Dimethyl thioether, methyl sulphide*)



$\text{C}_2\text{H}_6\text{S}$ MW, 62

F.p. — 83°. B.p. 37.5–38°. D_4^{21} 0.8458. Heat of comb. C_7 457.3 Cal. Forms add. comps. with metal halides.

$[\text{C}_2\text{H}_6\text{S}]_2, 3\text{HgCl}_2$: m.p. 150–1° (rapid heat.).
 $\text{C}_2\text{H}_6\text{S}, \text{HgI}_2$: yellow needles from Me_2CO .
 M.p. 75°.

$[\text{C}_2\text{H}_6\text{S}]_2, \text{SnBr}_4$: m.p. 85–7°.

$[\text{C}_2\text{H}_6\text{S}]_2, \text{PdCl}_2$: m.p. 130° (124°).

$[\text{C}_2\text{H}_6\text{S}]_2, \text{PtCl}_2$: m.p. 159°.

$[\text{C}_2\text{H}_6\text{S}]_2, \text{Pd}(\text{NO}_3)_2$: m.p. 137–8°.

$[\text{C}_2\text{H}_6\text{S}]_2, \text{Pt}(\text{NO}_3)_2$: m.p. 156°.

Beckmann, *J. prakt. Chem.*, 1878, 17, 453.

Finckh, *Ber.*, 1894, 27, 1239.

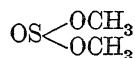
Dimethyl sulphide carboxylic Acid.

See *S*-Methylthioglycollic Acid.

Dimethyl sulphide dicarboxylic Acid.

See Thiodiglycollic Acid.

Dimethyl sulphite (*Methyl sulphite*)



$\text{C}_2\text{H}_6\text{O}_3\text{S}$ MW, 110

Liq. with odour resembling acetone. B.p. 126°, 52°/45 mm. D_4^{24} 1.2073. n_D^{20} 1.4093. Hyd. by caustic alkalis.

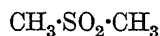
Carius, *Ann.*, 1859, 111, 97; 110, 219.

Arbusow, *Chem. Zentr.*, 1909, II, 684.

Voss, Blanke, *Ann.*, 1931, 485, 258.

Kyrides, *J. Am. Chem. Soc.*, 1944, 66, 1006.

Dimethyl sulphone (*Methyl sulphone*)



$\text{C}_2\text{H}_6\text{O}_2\text{S}$ MW, 94

M.p. 109°. B.p. 238° (235°).

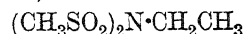
Saytzeff, *Ann.*, 1867, 144, 148.

Baumann, Walter, *Ber.*, 1893, 26, 1131.

Dimethyl sulphone dicarboxylic Acid.

See Sulphonyldiacetic Acid.

N-Di-[methylsulphonyl]-ethylamine (*Dimesylethylamine*)

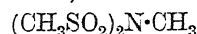


$\text{C}_4\text{H}_{11}\text{O}_4\text{NS}_2$ MW, 201

Cryst. from H_2O . M.p. 94–5°.

Helferich, Grünert, *Ber.*, 1940, 73, 1131.

N - Di - [methylsulphonyl] - methylamine (*Dimesylmethylamine*)

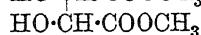
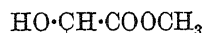


$\text{C}_3\text{H}_9\text{O}_4\text{NS}_2$ MW, 187

M.p. 116°.

Helferich, Grünert, *Ber.*, 1940, 73, 1131.

Dimethyl tartrate



$\text{C}_6\text{H}_{10}\text{O}_6$ MW, 178

d-.

Exists in three cryst. modifications; m.ps. 48°, 50° and 61°. B.p. 280°, 158–9°/12 mm. Sol. EtOH, CHCl_3 , C_6H_6 . D_4^{20} 1.3046. $[\alpha]_D^{20}$ + 9.32° in MeOH: $[\alpha]_D^{20}$ + 9.91° in Me_2CO : $[\alpha]_D^{20}$ + 3.4° in C_6H_6 .

l-.

Physical properties identical with those of the *d*-tartrate (above), except $[\alpha]_D^{20}$ — 8.3° in C_6H_6 .

dl- (*racemic*).

Stable form: m.p. 90°. Metastable form: m.p. 84°. B.p. 282°, 158°/12 mm.

Meso-.

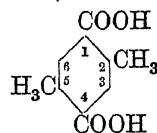
M.p. 111°.

Skrabal, Hermann, *Monatsh.*, 1922, 43, 633.

Sugasawa, *Chem. Abstracts*, 1928, 22, 1572.

Weygand, Weissberger, Baumgärtel, *Ber.*, 1932, 65, 696.

2 : 5-Dimethylterephthalic Acid (1 : 4-Dimethylbenzene-2 : 5-dicarboxylic acid, *p*-xylene-2 : 5-dicarboxylic acid)



$\text{C}_{10}\text{H}_{10}\text{O}_4$ MW, 194

Sublimes at 340–50°. Sol. hot EtOH. Insol. H_2O .

Di-Me ester: $\text{C}_{12}\text{H}_{14}\text{O}_4$. MW, 222. Needles. M.p. 114°. B.p. 297°.

Freund, Fleischer, *Ann.*, 1918, 414, 42.

2 : 6-Dimethylterephthalic Acid (1 : 3-Dimethylbenzene-2 : 5-dicarboxylic acid, *m*-xylene-2 : 5-dicarboxylic acid).

Needles. M.p. 300–1°. Sol. Me_2CO . Spar. sol. H_2O , Et_2O , ligroin. Sublimes.

2 : 4-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole 346

1-*Me ester*: $C_{11}H_{12}O_4$. MW, 208. Long needles. M.p. 154°.

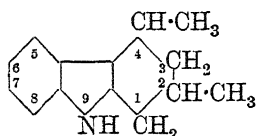
4-*Me ester*: needles. M.p. 190° (187°).

4-*Amide*: $C_{10}H_{11}O_3N$. MW, 193. Needles. M.p. 246°.

Bull, Fuson, *J. Am. Chem. Soc.*, 1933, 55, 3424.

Feist, Eggert, *Ann.*, 1923, 433, 60.

2 : 4-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole



$C_{14}H_{17}N$ MW, 199

Pale red cryst. from 50% EtOH. M.p. 96-9°.

v. Braun, Haensel, *Ber.*, 1926, 59, 2006.

2 : 6-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole.

Cryst. from MeOH. M.p. 146°.

Picrate: red leaflets. M.p. 129°.

Borsche, *Ann.*, 1908, 359, 63.

3 : 6-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole.

Needles from petrol. M.p. 112°.

Picrate: red prisms from C_6H_6 . M.p. 147°.

Oakeshott, Plant, *J. Chem. Soc.*, 1926, 1212.

3 : 9-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole (3 : N-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole).

Cryst. from ligroin. M.p. 74°. B.p. about 190°/12 mm.

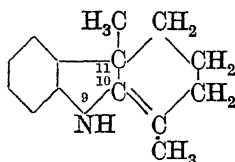
v. Braun, Schörnig, *Ber.*, 1925, 58, 2159.

6 : 9-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole (6 : N-Dimethyl-1 : 2 : 3 : 4-tetrahydro-carbazole).

Cryst. from ligroin. M.p. 90°.

v. Braun, Schörnig, *Ber.*, 1925, 58, 2159.

1 : 11-Dimethyl-2 : 3 : 4 : 11-tetrahydro-carbazole



$C_{14}H_{17}N$ MW, 199

Picrate: m.p. 123°.

Plancher, Carrasco, *Atti acad. Lincei*, 1904, 13, 632.

2 : 6-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene

9 : 11-Dimethyl-2 : 3 : 4 : 11-tetrahydro-carbazole.

B.p. 180-1°/31 mm., 160-5°/14 mm. Forms hydrate, m.p. 57-8°. Becomes red in air.

B, HI: yellow cryst. from EtOH. M.p. 211°.

B, H, PtCl6: red needles from EtOH.Aq. M.p. 204-8° decomp.

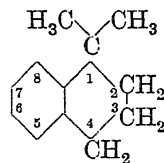
Picrate: orange yellow cryst. from EtOH. M.p. 157-8°.

Plancher, Cecchetti, Ghigi, *Gazz. chim. ital.*, 1929, 59, 334.

Dimethyltetrahydrocarboline.

See Leptocladine.

1 : 1-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (1 : 1-Dimethyltetralin)



$C_{12}H_{16}$ MW, 160

B.p. 220-2°, 98°/10 mm. D_4^{25} 0.9474. n_D^{25} 1.5274.

Bogert, Davidson, Apfelbaum, *J. Am. Chem. Soc.*, 1934, 56, 962.

1 : 2-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (1 : 2-Dimethyltetralin).

B.p. 235°. D_4^{25} 0.9433. n_D^{25} 1.5265.

Roblin, Davidson, Bogert, *J. Am. Chem. Soc.*, 1935, 57, 157.

2 : 2-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (2 : 2-Dimethyltetralin).

B.p. 123°/34 mm., 104°/12 mm. D_{14}^{24} 0.9248. n_D^{24} 1.5185.

Clemo, Dickenson, *J. Chem. Soc.*, 1937, 255.

Sengupta, *J. prakt. Chem.*, 1938, 151, 82.

2 : 3-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (2 : 3-Dimethyltetralin).

Two forms.

(1) B.p. 222-4°. On cooling → needles or plates, m.p. -8° to -5°.

(2) B.p. 229-31°. On cooling → needles, m.p. 4-8°.

Coulson, Holt, *J. Chem. Soc.*, 1938, 1308.

2 : 5-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (2 : 5-Dimethyltetralin).

B.p. 110-11°/10 mm. D^{16} 0.9487.

Mayer, Schulte, *Ber.*, 1922, 55, 2166.

Kipping, Wild, *J. Chem. Soc.*, 1940, 1239.

2 : 6-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene (2 : 6-Dimethyltetralin).

B.p. 237-9°. M.p. 14-17° after cooling.

Coulson, *J. Chem. Soc.*, 1935, 81.

2 : 7-Dimethyl-1 : 2 : 3 : 4-tetrahydro-naphthalene 347

2 : 7 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - naphthalene (2 : 7-Dimethyltetralin).
M.p. below 0°. B.p. 237–8°.

Coulson, *J. Chem. Soc.*, 1935, 81.

5 : 7 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - naphthalene (5 : 7-Dimethyltetralin).
B.p. 250–2°. D_4^{25} 0.9589. n_D^{25} 1.5409.

Krollpfeiffer, Schäfer, *Ber.*, 1923, 56, 627.

5 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - naphthalene (5 : 8-Dimethyltetralin).
B.p. 254°, 120°/1 mm.

Barnett, Sanders, *J. Chem. Soc.*, 1933, 436.

6 : 7 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - naphthalene (6 : 7-Dimethyltetralin).
Needles or prisms. M.p. 10°. B.p. 244–6°, 128°/7 mm.

Coulson, Holt, *J. Chem. Soc.*, 1938, 1307.

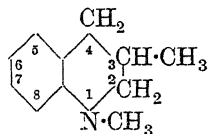
Dimethyltetrahydropyrazole.

See Dimethylpyrazolidine.

1 : 2 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

See under Tetrahydroquinoline.

1 : 3 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline



$C_{11}H_{15}N$

MW, 161

B.p. 130–32°/17 mm.

B, HCl: hygroscopic. M.p. 110°.

Picrate: cryst. from EtOH. M.p. 131°.

Methiodide: m.p. 204°.

v. Braun, Seeman, Schultheiss, *Ber.*, 1922, 55, 3807.

1 : 6 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

Liq. with blue fluor. B.p. 264–5°, 130°/14 mm.

B_2, H_2PtCl_6 : m.p. 175°.

Picrate: m.p. 152°.

Methiodide: cryst. from EtOH. M.p. 224°.

v. Braun, Aust, *Ber.*, 1916, 49, 509.

1 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 247–8°, 127°/22 mm.

B_2, H_2PtCl_6 : m.p. 208° (decomp. at 223°).

Picrate: red leaflets. M.p. 156° decomp.

Methiodide: cryst. from EtOH–Et₂O. M.p. 189°.

v. Braun, Aust, *Ber.*, 1916, 49, 509.

2 : 2 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

N-Me: see 1 : 2 : 2-Trimethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

2 : 4-Dimethyl-1 : 2 : 3 : 4-tetrahydro-quinoline

2 : 3 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

Two geometrical isomers, A and B, are known.

A.

Prisms from pet. ether. M.p. 38–9°.

B, HCl: prisms from EtOH. M.p. 240–3°.

N-Benzoyl: prisms from EtOH. M.p. 92°.

Picrate: yellow prisms from EtOH. M.p. 178°.

B.

B, HCl: hygroscopic needles from Et₂O. M.p. 169–70°.

N-Benzoyl: prisms from EtOH. M.p. 96–7°.

Plant, Rosser, *J. Chem. Soc.*, 1929, 1864.

2 : 4 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

A.

dl.

B, HCl: prisms from EtOH. M.p. 228°.

N-Acetyl: prisms from petrol. M.p. 50–1°.

N-Benzoyl: plates from EtOH. M.p. 115°.

N-Phenylcarbamyl: needles from petrol. M.p. 121–2°.

Picrate: yellow prisms from petrol. M.p. 139–41°.

d.

B.p. 251–4°. D_4 1.0009. $[\alpha]_D^{20} + 60.1^\circ$. $[\alpha]_D^{18} + 57^\circ$ in EtOH. Darkens in air.

B, HCl: prisms from H₂O. M.p. 226°. $[\alpha]_D^{18} + 83.7^\circ$ in H₂O.

α -Bromo-d-camphor- π -sulphonyl: needles from EtOH.Aq. Softens at 119°. M.p. 126°. $[\alpha]_D^{18} + 90.5^\circ$ in Me₂CO.

N-Benzoyl: plates from EtOH.Aq. M.p. 98–9°. $[\alpha]_D^{18} - 380^\circ$ in EtOH.

l.

D_4 1.0008. $[\alpha]_D^{20} - 57.2^\circ$. $[\alpha]_D^{18} - 56^\circ$ in EtOH.

B, HCl: cryst. powder. M.p. 226°. $[\alpha]_D^{18} - 81.5^\circ$ in H₂O.

α -Bromo-l-camphor- π -sulphonyl: $[\alpha]_D^{18} - 86^\circ$ in H₂O.

N-Benzoyl: plates. M.p. 98–9°. $[\alpha]_D^{18} + 378^\circ$ in EtOH.

B.

dl.

B, HCl: prisms from EtOH–Et₂O. M.p. 178–9°.

N-Acetyl: prisms from EtOH. M.p. 97–8°.

N-Phenylcarbamyl: prisms from EtOH. M.p. 112–3°.

Picrate: yellow prisms from EtOH. M.p. 188–90°.

d.

B.p. 244–6°. D_4^{15} 1.0044. $[\alpha]_D^{15} + 18.2^\circ$. $[\alpha]_D^{18} + 18.5^\circ$ in EtOH.

B, HCl: cryst. powder. M.p. 178°. $[\alpha]_D^{18} + 5.1^\circ$ in H₂O.

α -Bromo-l-camphor- π -sulphonyl: cubes. M.p. 176–8°. $[\alpha]_D^{18} - 55^\circ$ in H₂O.

2 : 6-Dimethyl-1 : 2 : 3 : 4-tetrahydro-quinoline

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2 : 3-Dimethyl-5 : 6 : 7 : 8-tetrahydro-quinoline

l.
B.p. 243-4°. D_4^{15} 1.0063. $[\alpha]_D^{15}$ -18.0°. $[\alpha]_D^{18}$ -17.6° in EtOH.
B.HCl: cryst. powder. M.p. 178-80°. $[\alpha]_D^{18}$ -5.1° in H_2O .
 α -Bromo-d-camphor- π -sulphonyl: m.p. 176-8°. $[\alpha]_D^{18}$ +55.7° in H_2O .
 $[\alpha]_D$ 0° in EtOH.
N-Me: see 1 : 2 : 4-Trimethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

Plant, Rosser, *J. Chem. Soc.*, 1930, 2453.
Thomas, *J. Chem. Soc.*, 1912, 101, 725.

2 : 6 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

dl.
Plates from pet. ether. M.p. 31-2°. B.p. 267°. Sol. EtOH, Et_2O . Spar. sol. H_2O .
B.HCl: cryst. from EtOH. Prisms from dil. HCl. M.p. 180-3°.
N-Benzoyl: needles from Me_2CO . M.p. 103-5°. *d.*
Prisms from pet. ether. M.p. 52-3°. $[\alpha]_D^{19}$ +81° in C_6H_6 .
B.HCl: cryst. powder + $1H_2O$ from Me_2CO .Aq. M.p. 194-6°. $[\alpha]_D^{18}$ +70° in H_2O .
 α -Bromo-d-camphor- β -sulphonyl: needles from AcOEt. M.p. 170-2°. $[\alpha]_D$ +94.3° in H_2O .
 α -Bromo-d-camphor- π -sulphonyl: needles from AcOEt or Me_2CO . M.p. 194-6°.

l.
Prisms from pet. ether. M.p. 52-3°. $[\alpha]_D^{21}$ -81° in C_6H_6 , $[\alpha]_D^{18}$ -59° in Me_2CO , -67.6° in EtOH, -79° in $CHCl_3$. Becomes liq. in air.
B.HCl: cryst. + $1H_2O$ from HCl. M.p. anhyd. 194-6°. $[\alpha]_D^{19}$ -70.6° in H_2O .
 α -Bromo-d-camphor- β -sulphonyl: needles. M.p. 171-2°. $[\alpha]_D$ +35° in H_2O .
 α -Bromo-d-camphor- π -sulphonyl: needles from EtOH. Prisms from AcOEt-EtOH. M.p. 195-6°.
N-Benzoyl: needles from Me_2CO . M.p. 100-101°. $[\alpha]_D^{18}$ +229° in C_6H_6 .

Pope, Rich, *J. Chem. Soc.*, 1899, 75, 1093.

2 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 260-2°.
N-Me: see 1 : 2 : 8-Trimethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

Doebner, Miller, *Ber.*, 1883, 16, 2469.

3 : 4 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.HCl: prisms from EtOH- Et_2O . M.p. 156-8°.
N-Phenylcarbamyl: prisms from EtOH. M.p. 107-8°.
Picrate: orange prisms from EtOH. M.p. 143-5°.

Plant, Rosser, *J. Chem. Soc.*, 1930, 2449.

4 : 6 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 254-6°, 135-7°/15 mm. Volatile in steam. H_2SO_4 \rightarrow purple-red sol., becoming blue then green.
N-Benzoyl: leaflets from EtOH.Aq. M.p. 109-10°.
Picrate: plates from C_6H_6 . M.p. 116-17°.
Picrolonate: yellow cryst. from EtOH.Aq. M.p. 204-5°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 111.

4 : 7 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 268-70°, 136-8°/13 mm. Volatile in steam.
N-Benzoyl: leaflets from pet. ether. M.p. 84-5°.
Picrate: orange yellow needles from EtOH.Aq. M.p. 155-6°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 110.

4 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 256-8°, 133-4°/16 mm. Spar. sol. H_2O . Volatile in steam.
N-Benzoyl: prisms from EtOH.Aq. M.p. 104-5°.
Picrate: orange-yellow prisms. M.p. 160°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 108.

5 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 271°.
Berend, *Ber.*, 1885, 18, 3165.

6 : 8 - Dimethyl - 1 : 2 : 3 : 4 - tetrahydro - quinoline.

B.p. 137°/11 mm. Volatile in steam.
B.HCl: prisms from HCl. M.p. 212°.
 $B_2H_2PtCl_6$: yellow cryst. M.p. 216°.
N-Nitroso: needles from Et_2O . Leaflets from EtOH.Aq. M.p. 42°.
N-Acetyl: b.p. 313.5°/719 mm.
N-Benzoyl: prisms from EtOH.Aq. M.p. 103°.

Picrate: orange plates from C_6H_6 -pet. ether. M.p. 147-8°.

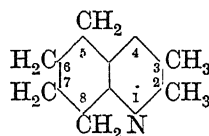
Methiodide: prisms from MeOH- Et_2O . M.p. 164-5°.

N-Me: see 1 : 6 : 8-Trimethyl-1 : 2 : 3 : 4-tetrahydroquinoline.

Ewins, *J. Chem. Soc.*, 1913, 103, 103.

Bamberger, Wulz, *Ber.*, 1891, 24, 2074.

2 : 3 - Dimethyl - 5 : 6 : 7 : 8 - tetrahydro - quinoline.



$C_{11}H_{15}N$

MW, 161

2 : 4-Dimethyl-5 : 6 : 7 : 8-tetrahydro-quinoline

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Cryst. M.p. 38°. B.p. 125-6°/14 mm.
B,HCl: hygroscopic. M.p. 192°.
Picrate: m.p. 169°.
Methiodide: m.p. 117°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, 56, 1346.

2 : 4 - Dimethyl - 5 : 6 : 7 : 8 - tetrahydro - quinoline.

M.p. 19-20°. B.p. 250-51°, 122-3°/12 mm.
*D*₄²⁰ 1.0043. *n*_D²⁰ 1.5415.
B,HCl: m.p. 195°.
Picrate: m.p. 144°.
Methiodide: m.p. 157°.

v. Braun, Gmelin, Schultheiss, *Ber.*, 1923, 56, 1346.

Yamaguchi, *J. Pharm. Soc. Japan*, 1926, 533, 53.

2 : 6 - Dimethyl - 5 : 6 : 7 : 8 - tetrahydro - quinoline.

M.p. 33°. B.p. 236.5°.
 Yamaguchi, *J. Pharm. Soc. Japan*, 1926, 533, 53.

2 : 7 - Dimethyl - 5 : 6 : 7 : 8 - tetrahydro - quinoline.

M.p. 37-8°. B.p. 238°.
 Yamaguchi, *J. Pharm. Soc. Japan*, 1926, 533, 53.

2 : 8 - Dimethyl - 5 : 6 : 7 : 8 - tetrahydro - quinoline.

M.p. 233-4°. *D*₄²⁴ 0.9917. *n*_D²¹ 1.5399.
 Yamaguchi, *J. Pharm. Soc. Japan*, 1926, 533, 53.

Dimethyltetralin.

See Dimethyltetrahydronaphthalene.

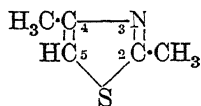
1 : 4-Dimethyltetramethylene Glycol.

See Hexandiol-2 : 5.

Dimethyltetrollic Acid.

See Isopropylpropionic Acid.

2 : 4-Dimethylthiazole



C_5H_7NS

MW, 113

B.p. 144-5°/719 mm. Sol. cold H_2O , less sol. hot. Sol. $EtOH$, Et_2O . *D*₁₅ 1.06.

B,HCl: m.p. 189°.

Chloroplatinate: m.p. 215° decomp.

B,2HgCl₂: m.p. 176-7°.

Picrate: yellow plates. M.p. 140-1°.

Methiodide: m.p. 260° decomp.

Hantzsch, *Ann.*, 1889, 250, 265.

Steude, *Ann.*, 1891, 261, 41.

Fisher, Hamer, *J. Chem. Soc.*, 1930, 2509.

Merck, D.R.P. 670,131, (*Chem. Zentr.*, 1939, I, 2296).

Schwarz, *Organic Syntheses*, 1945, XXV, 35.

sym.-Dimethylthiourea

2 : 5-Dimethylthiazole.

B.p. 153°, 150-1°/734 mm. Sol. $EtOH$, Et_2O . Volatile in steam.

Chloroplatinate: m.p. 213-14° decomp. (202°).

Picrate: m.p. 172° (166-7°).

Gabriel, *Ber.*, 1910, 43, 1283.

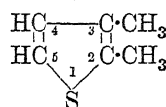
5 : 5 - Dimethylthiazoline - 4 - carboxylic Acid.

See under Penicillamine.

Dimethylthiocarbamilide.

See Ditolythiourea.

2 : 3-Dimethylthiophene (2 : 3-Thioxene)



C_6H_8S

MW, 112

B.p. 140-1° (136-7°). *D*₄²⁰ 1.0021. *n*_D²⁰ 1.5192.

HgCl₂ add. comp.: m.p. 218.5-19.5°.

Grünwald, *Ber.*, 1887, 20, 2586.

Midgley, Henne, Shepard, *J. Am. Chem. Soc.*, 1932, 54, 2953.

Shepard, *J. Am. Chem. Soc.*, 1932, 54, 2951.

2 : 4-Dimethylthiophene (2 : 4-Thioxene).

B.p. 137-8°. *D*₂₀ 0.9956.

HgCl₂ add. comp.: cryst. from C_6H_6 . M.p. 168-9° (rapid heat.).

Hg(CNS)₂ add. comp.: m.p. 175-7°.

Zelinsky, *Ber.*, 1887, 20, 2018.

2 : 5-Dimethylthiophene (2 : 5-Thioxene).

B.p. 136.5-137.5°. *D*₄¹⁹ 0.9859. *n*_D 1.51418.

Paal, *Ber.*, 1885, 18, 2252.

St. Opolski, *Chem. Zentr.*, 1905, II, 1797.

Scheibler, *Ber.*, 1915, 48, 1825.

3 : 4-Dimethylthiophene (3 : 4-Thioxene).

B.p. 144-6°. *D*₁₅²⁵ 0.994. *n*_D²⁵ 1.5187.

HgCl₂ add. comp.: m.p. 139-140.5°.

HgI₂ add. comp.: m.p. 140-1°.

Zelinsky, *Ber.*, 1888, 21, 1836.

Steinkopf, *Ann.*, 1914, 403, 64.

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1934, 56, 1355.

sym.-Dimethylthiourea



$C_3H_8N_2S$

MW, 104

M.p. 61-2° (51°). Sol. H_2O , $EtOH$, Me_2CO , $CHCl_3$. Spar. sol. Et_2O , C_6H_6 , CS_2 .

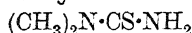
Chloroaurate: m.p. 108°.

Nitroso deriv.: m.p. 47°.

Traummann, *Ann.*, 1888, 249, 49.

Freund, Asbrand, *Ann.*, 1895, 285, 170.

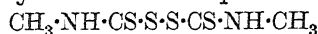
unsym.-Dimethylthiourea

C₃H₈N₂S

MW, 104

Cryst. from hot H₂O. M.p. 159°.Wallach, *Ber.*, 1899, 32, 1874.

Dimethylthiuram disulphide

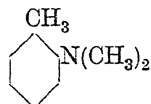
C₄H₈N₂S₄

MW, 212

Cryst. from AcOH. M.p. 102° (109° decomp.). Sol. EtOH, Et₂O, CHCl₃. Insol. H₂O, ligroin. Gradually decomp. on standing, rapidly on heating. Boiling H₂O → methyl isothiocyanate and H₂S.

Cummings, Simmons, *Ind. Eng. Chem.*, 1928, 20, 1173.

N-Dimethyl-o-toluidine

C₉H₁₃N

MW, 135

B.p. 184.8°. D₄²⁰ 0.9286. n_D²⁰ 1.5153 (1.5255).

B,2HCl: m.p. 156-7°.

B,2HBr: m.p. 29-6°.

Picrate: m.p. 116-17°.

sym.-Trinitrobenzene add. comp.: m.p. 113°.

v. Braun, Aust, *Ber.*, 1914, 47, 260.Ley, Pfeiffer, *Ber.*, 1921, 54, 376.

N-Dimethyl-m-toluidine.

B.p. 211.5-212.5°. D₄²⁰ 0.941. n_D²⁰ 1.5492.

Picrate: m.p. 130-1°.

Wurster, Riedel, *Ber.*, 1879, 12, 1797.Bielecki, Koleniew, *Chem. Zentr.*, 1908, II, 877.Ley, Pfeiffer, *Ber.*, 1921, 54, 376.Thomas, Billman, Davis, *J. Am. Chem. Soc.*, 1946, 68, 895.

N-Dimethyl-p-toluidine.

B.p. 210-11°. D₄²⁰ 0.9287 (0.9366). n_D²⁰ 1.53664 (1.5460).

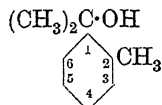
Picrate: m.p. 130° (128°).

1:3-Dinitrobenzene add. comp.: black cryst. M.p. 43°.

sym.-Trinitrobenzene add. comp.: violet needles. M.p. 124°.

Ley, Pfeiffer, *Ber.*, 1921, 54, 376.Hodgson, Kershaw, *J. Chem. Soc.*, 1930, 277.Schwenk et al., *J. Org. Chem.*, 1944, 9, 1.Thomas, Billman, Davis, *J. Am. Chem. Soc.*, 1946, 68, 895.

Dimethyl-o-tolylcarbinol (α-Hydroxy-o-cymene, o-[1-hydroxyisopropyl]-toluene, 8-o-cymenol)

C₁₀H₁₄O

MW, 150

M.p. 41°. B.p. 217-18°, 126-30°/45 mm., 112°/15 mm. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆. KHSO₄, anhyd. oxalic acid, etc., → 1-methyl-2-isopropenylbenzene.

Kay, Perkin, *J. Chem. Soc.*, 1905, 87, 1082.

Tiffeneau, *Ann. chim. phys.*, 1907, 10, 194.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 272.

Dimethyl-m-tolylcarbinol (α-Hydroxy-m-cymene, m-[1-hydroxyisopropyl]-toluene, 8-m-cymenol).

B.p. 116°/16 mm. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆. KHSO₄ → 1-methyl-3-isopropenylbenzene.

Perkin, Tattersall, *J. Chem. Soc.*, 1905, 87, 1106.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 272.

Dimethyl-p-tolylcarbinol (α-Hydroxy-p-cymene, p-[1-hydroxyisopropyl]-toluene, 8-p-cymenol).

B.p. 145°/75 mm., 112°/16 mm. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆. D₄²⁰ 0.9769. n_D²⁰ 1.5162.

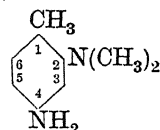
Phenylurethane: m.p. 119-20°.

Perkin, Pickles, *J. Chem. Soc.*, 1905, 87, 652.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 272.

Hintikka, *Chem. Abstracts*, 1925, 19, 42.

2-N-Dimethyl-2:4-tolylenediamine (4-Amino-2-dimethylaminotoluene, 2:4-tolylene-2-dimethyldiamine)

C₉H₁₄N₂

MW, 150

Yellow oil. B.p. 257-9°/730 mm. (248°). Sol. EtOH, Et₂O. Insol. H₂O.

B,2HCl: m.p. 208°.

B,H₂SO₄: m.p. 209°.

N-Acetyl deriv.: m.p. 103°.

Ullmann, Rozenband, Mühlhauser, Grether, *Ber.*, 1902, 35, 332.

Möhlau, Klimmer, Kahl, *Chem. Zentr.*, 1902, II, 377.

4-N-Dimethyl-2:4-tolylenediamine (2-Amino-4-dimethylaminotoluene, 2:4-tolylene-4-dimethyldiamine).

Prisms. M.p. 54°. Spar. sol. H₂O. Sol. EtOH, Et₂O, C₆H₆.

N-Acetyl deriv.: m.p. 135°.

Morgan, Clayton, *J. Chem. Soc.*, 1905, 87, 948.

M.L.B., D.R.P. 69,188.

2-N-Dimethyl-2 : 5-tolylenediamine
(5-Amino-2-dimethylaminotoluene, 2 : 5-tolylene-2-dimethyldiamine).

M.p. 47°. B.p. 253-4°. Sol. EtOH, Et₂O.

Bernthsen, *Ber.*, 1892, 25, 3134.

5-N-Dimethyl-2 : 5-tolylenediamine
(2-Amino-5-dimethylaminotoluene, 2 : 5-tolylene-5-dimethyldiamine).

Needles. M.p. 28°. Sol. H₂O, EtOH, Et₂O.
MnO₂ + dil. H₂SO₄ → toluquinone.

N-Acetyl deriv. : m.p. 158°.

Wurster, Riedel, *Ber.*, 1879, 12, 1801.

4-N-Dimethyl-3 : 4-tolylenediamine
(3-Amino-4-dimethylaminotoluene, 3 : 4-tolylene-4-dimethyldiamine).

B.p. 234°.

B₂HCl : m.p. 192-3°.

Picrate : m.p. 151°.

Pinnow, *Ber.*, 1895, 28, 3042.

3 : 4-N-Dimethyl-3 : 4-tolylenediamine.
See under 3 : 4-Tolylenediamine.

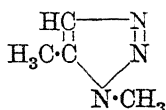
3-N-Dimethyl-3 : 5-tolylenediamine (3-Dimethylamino-5-amino toluene, 3 : 5-tolylene-3-dimethyldiamine).

B.p. 118°/0.5 mm.

N-Acetyl : m.p. 141°.

Haworth, Lamberton, Woodcock, *J. Chem. Soc.*, 1947, 182.

1 : 5-Dimethyl-1 : 2 : 3-triazole



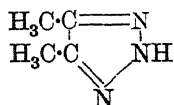
C₄H₇N₃ MW, 97

M.p. -4°. B.p. 255°/751 mm. Sol. H₂O.

B₂HAuCl₄ : m.p. 149-50°.

Wolff, *Ann.*, 1912, 394, 53.

4 : 5-Dimethyl-1 : 2 : 3-triazole (3 : 4-Dimethyl-1 : 2 : 5-triazole)

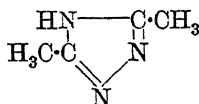


C₄H₇N₃ MW, 97

Prisms + 3H₂O. M.p. 97°, anhyd. 70°. Sol. H₂O, EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

Pechmann, Bauer, *Ber.*, 1909, 42, 670.

3 : 5-Dimethyl-1 : 2 : 4-triazole (2 : 5-Dimethyl-1 : 3 : 4-triazole, dimethylpyrroldiazole)



C₄H₇N₃ MW, 97

Needles or leaflets. M.p. 143°. B.p. 258-9°, 159°/19 mm. Sol. H₂O, EtOH, Et₂O. Volatile in steam. Very hygroscopic.

B₂HCl : mp. 199-200° (119°).

B₂HNO₃ : decomp. at 130° (m.p. 126-7°).

Stollé, *Ber.*, 1899, 32, 797.

Silberrad, *J. Chem. Soc.*, 1900, 77, 1187.

Brunner, Medweth, *Monatsh.*, 1926, 47, 741.

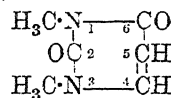
1 : 1-Dimethyltricarballic Acid.

See Isopentane-2 : 3 : 4-tricarboxylic Acid.

Dimethyltriphenylmethane.

See Phenyliditolyldimethane.

1 : 3-Dimethyluracil (1 : 3-Dimethyl-2 : 6-diketopyrimidine)



C₆H₈O₂N₂ MW, 140

Prisms from Et₂O-EtOH. M.p. 121-2°.

Johnson, Clapp, *J. Biol. Chem.*, 1908, 5, 49.

Johnson, Hill, Case, *Chem. Abstracts*, 1922, 16, 3873.

1 : 4-Dimethyluracil (1 : 4-Dimethyl-2 : 6-diketopyrimidine, β-dimethyluracil).

Prisms. M.p. 261-2°. Sol. hot H₂O. Mod. sol. CHCl₃. Spar. sol. EtOH. Prac. insol. Et₂O. $k = 6.8 \times 10^{-11}$ at 25°.

Henkel, *Ann.*, 1911, 378, 174.

Schmedes, *Ann.*, 1925, 441, 196.

1 : 5-Dimethyluracil.

See under Thymine.

3 : 4-Dimethyluracil (3 : 4-Dimethyl-2 : 6-diketopyrimidine, α-dimethyluracil).

Leaflets from EtOH. M.p. 220-2°. Mod. sol. H₂O. Insol. Et₂O. $k = 8.1 \times 10^{-11}$ at 25°.

Henkel, *Ann.*, 1911, 378, 174.

3 : 5-Dimethyluracil.

See under Thymine.

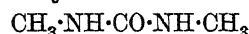
4 : 5-Dimethyluracil (4 : 5-Dimethyl-2 : 6-diketopyrimidine).

M.p. 294-6° (292° decomp.). Sol. H₂O, EtOH, Me₂CO, PhNO₂. Insol. Et₂O, C₆H₆, CHCl₃.

Kircher, *Ann.*, 1911, 385, 298.

Endicott, Johnson, *J. Am. Chem. Soc.*, 1941, 63, 1286.

sym.-Dimethylurea



C₃H₈ON₂ MW, 88

Rhombic prisms. M.p. 106° (102.5°). B.p. 268-70°. Sol. H₂O, EtOH.

B₂HCl : needles. M.p. 124°.

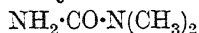
B₂HNO₃ : deliquescent cryst. M.p. 65°.

Fichter, Becker, *Ber.*, 1911, 44, 3481.

Schenck, *Arch. Pharm.*, 1911, 249, 467.

Farlow, U.S.P. 2,422,400, (*Chem. Abstracts*, 1947, 41, 6279).

unsym.-Dimethylurea



$\text{C}_3\text{H}_8\text{ON}_2$ MW, 88
Monoclinic prisms from MeOH. M.p. 182°.
Sol. H_2O . Spar. sol. cold EtOH. Prac. insol.
Et₂O.

*B.HNO*₃: m.p. 103-4°.

Picrate: m.p. 130° decomp.

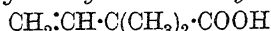
Diels, Gollmann, *Ber.*, 1911, 44, 3165.

Davis, Blanchard, *J. Am. Chem. Soc.*,
1929, 51, 1790.

Dimethylurethane.

See under Dimethylcarbamic Acid.

Dimethylvinylacetic Acid (*Vinylisobutyric acid, 3-methyl-1-butylene-3-carboxylic acid*)



$\text{C}_6\text{H}_{10}\text{O}_2$ MW, 114
M.p. — 6°. B.p. 185°, 99°/23 mm. Insol.
 H_2O . D_{15}^{20} 0.9567. n_D^{20} 1.4305. Dil. $\text{KMnO}_4 \rightarrow$
dimethylmalonic acid.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. 144-6°.

Chloride: $\text{C}_6\text{H}_9\text{OCl}$. MW, 132.5. B.p. 26°/
14 mm.

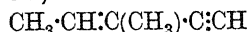
Amide: $\text{C}_6\text{H}_{11}\text{ON}$. MW, 113. M.p. 93°.
Sol. H_2O .

Anilide: m.p. 88°.

Courtot, *Bull. soc. chim.*, 1906, 35, 118,
156.

Colonge, Dumont, *Bull. soc. chim.*, 1947, 38.

3 : 4-Dimethylvinylacetylene (3 : 4-Dime-
thyl-3-butenyne-1)

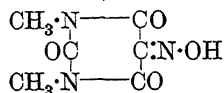


C_6H_8 MW, 80
B.p. 68-71°. n_D^{20} 1.4332.

Thompson, Burr, Shaw, *J. Am. Chem.*
Soc., 1941, 63, 188.

Zahkarova, *Chem. Abstracts*, 1938, 32,
2506.

Dimethylvioluric Acid (1 : 3-Dimethyl-5-
isonitrosobarbituric acid)



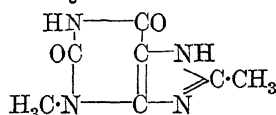
$\text{C}_6\text{H}_7\text{O}_4\text{N}_3$ MW, 185

Pearly needles + H_2O . M.p. 124°, anhyd.
141° (137° decomp.). Sol. hot H_2O . Mod. sol.
 Me_2CO . Spar. sol. cold EtOH. Decomp. by
hot alkalis and hot dil. min. acids. $k = 1.57 \times$
 10^{-5} at 25°.

Benzyl ether: m.p. 164°. Sol. H_2O .

Biltz, Hamburger, *Ber.*, 1916, 49, 649.

3 : 8-Dimethylxanthine



$\text{C}_7\text{H}_8\text{O}_2\text{N}_4$ MW, 180

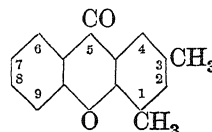
Needles + H_2O from AcOH.Aq. Anhyd. at
140°. M.p. about 350° decomp. Readily sol.
hot H_2O , EtOH, alkalis.

Traube *et al.*, *Ann.*, 1923, 432, 272.

Dimethylxanthine.

See also Paraxanthine, Theobromine and
Theophylline.

1 : 3-Dimethylxanthone



$\text{C}_{15}\text{H}_{12}\text{O}_2$ MW, 224

Leaflets from ligroin. M.p. 152°. Sol. EtOH,
Et₂O, AcOH, hot C_6H_6 . Sol. conc. H_2SO_4 with
greenish yellow fluor.

Ullmann, Slokasow, *Ber.*, 1905, 38, 2116.

1 : 9-Dimethylxanthone.

Needles from EtOH. M.p. 171-2°. B.p.
350-60°.

Schöpf, *Ber.*, 1892, 25, 3644.

Lespagmol, Dupos, *Bull. soc. chim.*, 1937,
4, 541.

2 : 8-Dimethylxanthone.

M.p. 172° corr. (166°). Spar. sol. C_6H_6 .

Zmerzlikar, *Monatsh.*, 1910, 31, 897.

3 : 7-Dimethylxanthone.

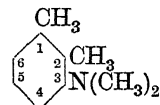
Yellow needles from EtOH.Aq. M.p. 143°.
 $\text{H}_2\text{SO}_4 \rightarrow$ sol. with bluish green fluor.

Sengoku, *Chem. Abstracts*, 1935, 29,
5445.

Bistrzyski, Kostanecki, *Ber.*, 1885, 18,
1988.

Schönberg, Asker, *J. Chem. Soc.*, 1946,
609.

N-Dimethyl-o-3-xylydine (3-Dimethyl-
amino-o-xylene)



$\text{C}_{10}\text{H}_{15}\text{N}$

MW, 149

B.p. 199-200°.

Picrate: m.p. 127-8°.

v. Braun, Arkuszewski, Köhler, *Ber.*,
1918, 51, 288.

N-Dimethyl-o-4-xylydine (4-Dimethyl-
amino-o-xylene).

B.p. 232°. D_4^{20} 0.9386. n_D^{20} 1.54810.

sym.-Trinitrobenzene add. comp.: dark violet
needles. M.p. 103°.

Ley, Pfeiffer, *Ber.*, 1921, 54, 377.

N-Dimethyl-m-2-xylidine (2-Dimethyl-amino-m-xylene).

B.p. 195-6°/749 mm., 77°/11 mm. D_4^{20} 0.912 (0.915). n_D^{20} 1.51310.

sym.-Trinitrobenzene add. comp.: scarlet plates. M.p. 108°.

Ley, Pfeiffer, *Ber.*, 1921, 54, 377.

N-Dimethyl-m-4-xylidine (4-Dimethyl-amino-m-xylene).

B.p. 205°. D_4^{20} 0.9164. n_D^{20} 1.52011.

Chloroplatinate: m.p. 219°.

Picrate: m.p. 123-4°.

sym.-Trinitrobenzene add. comp.: brownish cryst. M.p. 114°.

Fichter, Müller, *Helv. Chim. Acta*, 1925, 8, 298.

Ley, Pfeiffer, *Ber.*, 1921, 54, 377.

N-Dimethyl-m-5-xylidine (5-Dimethyl-amino-m-xylene).

B.p. 226.5-227.5°.

Noelting, Trautmann, *Ber.*, 1891, 24, 563.

N-Dimethyl-p-xylidine (2-Dimethylamino-p-xylene).

B.p. 204°, 103-5°/26 mm.

Chloroplatinate: m.p. 196°.

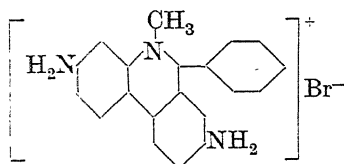
Picrate: m.p. 158°.

v. Braun, Arkuszewski, Köhler, *Ber.*, 1918, 51, 290.

Dimethynylheptane.

See 1 : 8-Nonadi-yne.

Dimidium bromide (Phenanthridium 1553, 2 : 7-Diamino-9-phenylphenanthridine metho-bromide)



$C_{20}H_{18}N_3Br$

MW, 380

Purple-black plates from EtOH.Aq. M.p. 241-3° decomp. Highly active against *Trypanosoma congolense* in cattle and, to a lesser extent, against *T. brucei*.

Walls, *J. Chem. Soc.*, 1945, 294; U.S.P. 2,397,391, (*Chem. Abstracts*, 1946, 40, 4086).

Barber et al., *J. Soc. Chem. Ind.*, 1950, 69, 82.

Foster, Grove, *Analyst*, 1946, 71, 287.

Dimidium chloride (2 : 7-Diamino-9-phenylphenanthridine methochloride).

Purple-black plates from EtOH.Aq. De-comp. at about 253°.

Diacetyl: yellow needles. M.p. 260°.

Walls, *J. Chem. Soc.*, 1945, 294.

Dict. of Org. Comp.—II.

Dimidium sulphate (2 : 7-Diamino-9-phenylphenanthridine methosulphate).

Orange plates. M.p. 278° decomp.

Walls, Browning, Calver, Leckie, *J. Chem. Soc.*, 1947, 67.

Dimyristin.

See under Glycerol.

Dinaphthacarbazole.

See Dibenzcarbazole.

Dinaphthacridine.

See Dibenzacridine.

Dinaphthanthracene.

See Dibenzanthracene.

Dinaphthanthraquinone.

See Dibenzanthraquinone.

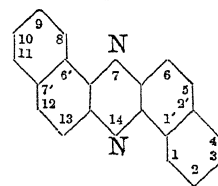
Dinaphthastilbene.

See sym.-Dinaphthylethylene.

Dinaphthaxanthone.

See Dibenz-xanthone.

1' : 2' : 6' : 7'-Dinaphthazine



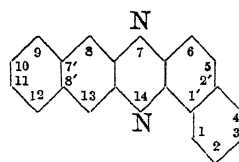
$C_{20}H_{12}N_2$

MW, 280

Yellow needles from AcOH. M.p. 284° (278°). Spar. sol. $CHCl_3$, CS_2 . Very spar. sol. Et_2O , EtOH, C_6H_6 . Bluish violet sol. in H_2SO_4 .

Meigen, Norman, *Ber.*, 1900, 33, 2717.

1' : 2' : 7' : 8'-Dinaphthazine



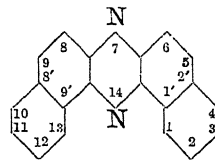
$C_{20}H_{12}N_2$

MW, 280

Brownish red needles from $CHCl_3$. M.p. 247°. Mod. sol. hot AcOH, C_6H_6 , $CHCl_3$. Spar. sol. EtOH. C_6H_6 sol. shows yellowish green fluor. Reddish violet sol. in H_2SO_4 .

Hinsberg, *Ann.*, 1901, 319, 265.

1' : 2' : 8' : 9'-Dinaphthazine



$C_{20}H_{12}N_2$

MW, 280

Yellow needles from hot EtOH. M.p. 242-3°. EtOH and C_6H_6 sols. show blue fluor. AcOH sol. fluoresces green.

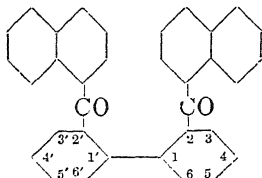
Matthes, *Ber.*, 1890, 23, 1333.

Dinaphthol.

See Dihydroxydinaphthyl.

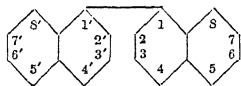
Dinaphthoyl.

See Naphthil.

2 : 2'-Di-1-naphthoyldiphenyl (2 : 2'-Di-phenyl 1 : 1'-dinaphthyl diketone) $C_{34}H_{22}O_2$

MW, 462

Plates from AcOH. M.p. 204.5–205°.

Jezierski, *Chem. Zentr.*, 1933, I, 2544.Bachmann, Ju-Hwa-Chu, *J. Am. Chem. Soc.*, 1935, 57, 1095.**1 : 1'-Dinaphthyl** $C_{20}H_{14}$

MW, 254

M.p. 160.5° (156°). B.p. 240–4°/12 mm. Sol. C_6H_6 , CS_2 . Mod. sol. Et_2O , hot EtOH. Distills undecomp. above 360°.

Picrate : m.p. 145°.

Bennett, Turner, *J. Chem. Soc.*, 1914, 105, 1061.Spencer, Price, *J. Chem. Soc.*, 1910, 97, 388.I.G., B.P. 356,189, (*Chem. Abstracts*, 1932, 26, 4342).Hodgson, Marsden, *J. Chem. Soc.*, 1945, 274.See also Gump, *J. Am. Chem. Soc.*, 1931, 53, 380; Kuhn, Albrecht, *Ann.*, 1928, 465, 282.**1 : 2'-Dinaphthyl.**Plates from ligroin. M.p. 79–80° (76°). Spar. sol. EtOH, Et_2O .

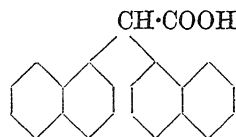
Picrate : orange cryst. M.p. 127–7.5° corr.

Hooker, Fieser, *J. Am. Chem. Soc.*, 1936, 58, 1216.**2 : 2'-Dinaphthyl.**Plates with faint blue fluor. M.p. 187–8° (181°). B.p. 452°. Sol. CS_2 , hot C_6H_6 . Spar. sol. cold EtOH, Et_2O , AcOH. Sublimes. Sols. fluoresce. HNO_3 or $KMnO_4 \rightarrow$ phthalic acid.

Picrate : m.p. 184°.

Meyer, Hofmann, *Monatsh.*, 1916, 37, 708.I.G., B.P. 356,189, (*Chem. Abstracts*, 1932, 26, 4342).Hviid, D.R.P. 698,793, (*Chem. Abstracts*, 1941, 35, 6603).**N-Dinaphthylacetamide.**

See under 1 : 1'-Dinaphthylamine.

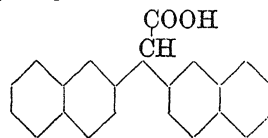
Di-1-naphthylacetic Acid $C_{22}H_{16}O_2$

MW, 312

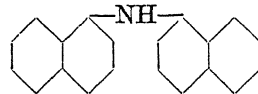
Needles from AcOH or C_6H_6 . M.p. 228.5°. Sol. $CHCl_3$, AcOH, C_6H_6 . Spar. sol. EtOH, ligroin, pet. ether. Decomp. at 260°. Oleum \rightarrow di-1-naphthylcarbinol.

Cu salt : blue needles. M.p. 205° decomp.

Ag salt : needles. M.p. 205° decomp.

Chloride : $C_{22}H_{15}OCl$. MW, 330.5. M.p. 167–9° decomp. Sol. $CHCl_3$, C_6H_6 .I.G., B.P. 330,916, (*Chem. Abstracts*, 1930, 24, 6031).Schmidlin, Massini, *Ber.*, 1909, 42, 2385.Burtner, Cusic, *J. Am. Chem. Soc.*, 1943, 65, 262.**Di-2-naphthylacetic Acid** $C_{22}H_{16}O_2$

MW, 312

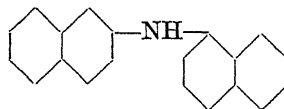
Needles from AcOH. M.p. 182–3° (190°). Sol. C_6H_6 , $CHCl_3$, Me_2CO , hot AcOH. Spar. sol. EtOH, Et_2O . Insol. pet. ether, ligroin.Schmidlin, Huber, *Ber.*, 1910, 43, 2834.Burtner, Cusic, *J. Am. Chem. Soc.*, 1943, 65, 262.**1 : 1'-Dinaphthylamine** ($\alpha\alpha$ -Dinaphthylamine) $C_{20}H_{15}N$

MW, 269

Leaflets from EtOH or C_6H_6 . M.p. 115°. B.p. 310–15°/15 mm. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , AcOH. Insol. H_2O .

N-Acetyl : N-di-1-naphthylacetamide. Yellow needles from EtOH. M.p. 217°.

Picrate : m.p. 168–9°.

sym-Trinitrobenzene add. comp. : brown plates from $CHCl_3$. M.p. 156–7°.Benz, *Ber.*, 1883, 16, 16.Clifford, B.P. 310,871, (*Chem. Abstracts*, 1930, 24, 626).**1 : 2'-Dinaphthylamine** ($\alpha\beta$ -Dinaphthylamine) $C_{20}H_{15}N$

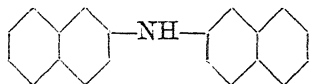
MW, 269

Prisms. M.p. 111°. Sol. EtOH, Et₂O, hot C₆H₆. Spar. sol. ligroin.
Picrate: m.p. 172-3°.

Benz, *Ber.*, 1883, 16, 16.

Clifford, B.P. 310,871, (*Chem. Abstracts*, 1930, 24, 626).

2 : 2'-Dinaphthylamine ($\beta\beta$ -Dinaphthylamine)



C₂₀H₁₅N MW, 269

Leaflets from C₆H₆. M.p. 171°. B.p. 471°. Sol. hot AcOH. Mod. sol. hot C₆H₆. Spar. sol. EtOH. Sols. show blue fluor.

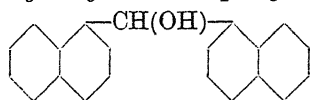
Picrate: m.p. 164-5°.

sym.-Trinitrobenzene add. comp.: brown cryst. from toluene. M.p. 147°.

Benz, *Ber.*, 1883, 16, 16.

Clifford, B.P. 310,871, (*Chem. Abstracts*, 1930, 24, 626).

1 : 1'-Dinaphthylcarbinol ($\alpha\alpha$ -Dinaphthylcarbinol, α -hydroxy-1 : 1'-dinaphthylmethane)



C₂₁H₁₆O MW, 284

Needles. M.p. 147° (144°). Sol. Me₂CO, Et₂O, CHCl₃, C₆H₆. Mod. sol. hot EtOH, hot AcOH. Spar. sol. ligroin. Greenish blue sol. in conc. H₂SO₄. CrO₃ → 1 : 1'-dinaphthyl ketone.

Me ether: α -methoxydi-1-naphthylmethane. C₂₃H₁₈O. MW, 298. M.p. 138°.

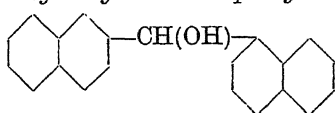
Et ether: α -ethoxydi-1-naphthylmethane. C₂₃H₂₀O. MW, 312. M.p. 136° (134-5°).

Phenyl ether: α -phenoxydi-1-naphthylmethane. C₂₇H₂₀O. MW, 360. M.p. 217-19°.

Acetyl: m.p. 143-4°.

Blicke, *J. Am. Chem. Soc.*, 1927, 49, 2848.

1 : 2'-Dinaphthylcarbinol ($\alpha\beta$ -Dinaphthylcarbinol, α -hydroxy-1 : 2'-dinaphthylmethane)

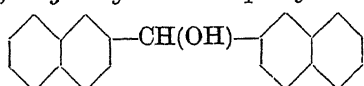


C₂₁H₁₆O MW, 284

Needles from ligroin. M.p. 112-13° (108-9°). Sol. Et₂O, CHCl₃, C₆H₆. Mod. sol. hot EtOH. Blue sol. in conc. H₂SO₄. Red. → 1 : 2-dinaphthylmethane.

Migita, *Bull. Chem. Soc. Japan*, 1933, 8, 25.

2 : 2'-Dinaphthylcarbinol ($\beta\beta$ -Dinaphthylcarbinol, α -hydroxy-2 : 2'-dinaphthylmethane)



C₂₁H₁₆O MW, 284

Cryst. from pet. ether with solvent of cryst., m.p. 91°. Cryst. + 2C₆H₁₄ from hexane, m.p. 116-5° corr. Sol. Et₂O, C₆H₆, CHCl₃, Me₂CO, hot EtOH. Spar. sol. ligroin.

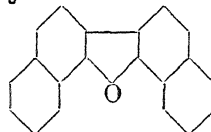
Schmidlin, Huber, *Ber.*, 1910, 43, 2830.

Tschitschibabin, *Ber.*, 1911, 44, 449.

Dinaphthylenebutane.

See Diacenaphthyl.

α -Dinaphthylene oxide



C₂₀H₁₂O MW, 268

Needles from C₆H₆. M.p. 184°. Sol. Et₂O, CS₂. Spar. sol. EtOH. Insol. H₂O.

Di-picrate: dark red needles. M.p. 173°.

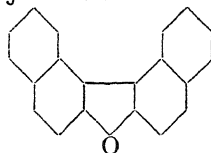
Merz, Weith, *Ber.*, 1881, 14, 196.

Wichelhaus, *Ber.*, 1903, 36, 2943.

Ioffe, Krichevtsov, *J. Gen. Chem.*

U.S.S.R., 1939, 9, 1136, (*Chem. Abstracts*, 1939, 33, 8603).

β -Dinaphthylene oxide



C₂₀H₁₂O MW, 268

Plates or needles. M.p. 158-5° corr. (154°). B.p. about 500°. Sol. Et₂O, Me₂CO, C₆H₆, CHCl₃, CS₂. Spar. sol. EtOH. H₂SO₄ → red sol. → dark blue col. on heating.

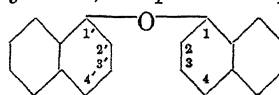
Monopicrate: red cryst. from C₆H₆. M.p. 163° corr.

Di-picrate: red cryst. powder from C₆H₆. M.p. 168°.

Eckstein, *Ber.*, 1905, 38, 3661.

Lundin, *J. Gen. Chem. U.S.S.R.*, 1939, 9, 682, (*Chem. Abstracts*, 1940, 34, 414).

1 : 1'-Dinaphthyl Ether ($\alpha\alpha$ -Dinaphthyl ether, $\alpha\alpha$ -dinaphthyl oxide, α -naphthol α -naphthyl ether)



C₂₀H₁₄O MW, 270

Leaflets. M.p. 110°. Sol. Et₂O, C₆H₆. Mod. sol. hot EtOH, hot AcOH. Sols. show feeble blue fluor.

Di-picrate: m.p. 115°.

Ullmann, Sponagel, *Ann.*, 1906, 350, 93.

1 : 2'-Dinaphthyl Ether ($\alpha\beta$ -Dinaphthyl ether, $\alpha\beta$ -dinaphthyl oxide, α -naphthol β -naphthyl ether, β -naphthol α -naphthyl ether).

Needles from EtOH-Et₂O. M.p. 81°. B.p. 264°/15 mm. Sol. Et₂O, CHCl₃, C₆H₆. Mod. sol. hot EtOH, hot AcOH.

Di-picrate: m.p. 121–2°.

Ullmann, Sponagel, *Ann.*, 1906, 350, 94.

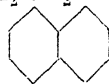
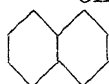
2 : 2'-Dinaphthyl Ether ($\beta\beta$ -Dinaphthyl ether, $\beta\beta$ -dinaphthyl oxide, β -naphthol β -naphthyl ether).

Leaflets from EtOH. M.p. 105°. B.p. 250°/20 mm., part. decomp. Sol. Et₂O, C₆H₆, hot EtOH, hot AcOH.

Di-picrate: m.p. 122°.

Rodionow, Manzow, *J. Soc. Chem. Ind.*, 1923, 42, 509t.

2 : 2'-Di- α -naphthylethylamine



C₂₄H₂₃N

MW, 325

B.p. above 320°/200 mm.

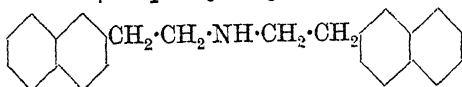
B,HCl: leaflets from AcOH. M.p. 222°.

N-Nitroso: leaflets from AcOH. M.p. 114–5°.

Picrate: leaflets from EtOH. M.p. 179°.

Mayer, Schnecko, *Ber.*, 1923, 56, 1413.

2 : 2'-Di- β -naphthylethylamine



C₂₄H₂₃N

MW, 325

Needles from ligroin. M.p. 87°. B.p. 270–280°/28 mm.

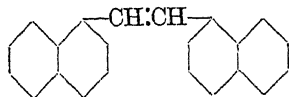
B,HCl: leaflets from AcOH. M.p. 179°.

N-Nitroso: leaflets from AcOH. M.p. 179°.

Picrate: yellow needles from EtOH. M.p. 138–9°.

Mayer, Schnecko, *Ber.*, 1923, 56, 1413.

sym.-Di-1-naphthylethylene (*Di-1-naphthylstilbene*)



C₂₂H₁₆

MW, 280

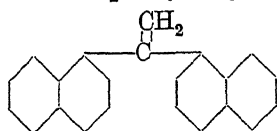
Pale yellow needles from EtOH. M.p. 161°. Sol. C₆H₆, CHCl₃. Mod. sol. hot AcOH, Et₂O. Spar. sol. EtOH. Sols. show violet fluor. CrO₃ → 1-naphthoic acid.

Tri-picrate: m.p. 210°.

Friedmann, *Ber.*, 1916, 49, 282.

Wood *et al.*, *J. Am. Chem. Soc.*, 1941, 63, 1334.

unsym.-Di-1-naphthylethylene



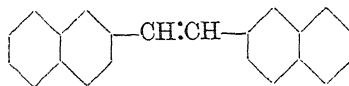
C₂₂H₁₆

MW, 280

Needles from AcOH. M.p. 107°. Conc. H₂SO₄ → green sol.

Pfeiffer, Schneider, *J. prakt. Chem.*, 1931, 129, 136.

sym.-Di-2-naphthylethylene (*Di-2-naphthylstilbene*)



C₂₂H₁₆

MW, 280

Leaflets from C₆H₆. M.p. 254–5°. Sols. fluoresce blue.

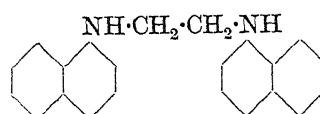
Tri-picrate: m.p. 215°.

Friedmann, *Ber.*, 1916, 49, 1354.

Hagemann, *Z. angew. Chem.*, 1929, 42, 360.

Wood *et al.*, *J. Am. Chem. Soc.*, 1941, 63, 1334.

sym. - Di - 1 - naphthylethylenediamine (*Ethylenedi- α -naphthyldiamine*)



C₂₂H₂₀N₂

MW, 312

Cryst. from EtOH or C₆H₆. M.p. 133–4°.

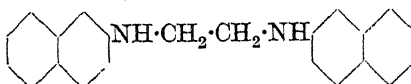
B,HBr: needles from EtOH. M.p. 236–7°.

B,2HBr: m.p. 205–7°.

Diacetyl: plates from EtOH. M.p. 239–40°.

Bischoff, *Ber.*, 1904, 37, 4356.

sym. - Di - 2 - naphthylethylenediamine (*Ethylenedi- β -naphthyldiamine*)



C₂₂H₂₀N₂

MW, 312

Cryst. from EtOH or xylene. M.p. 149–50°.

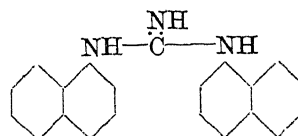
Diacetyl: plates from EtOH. M.p. 175–6°.

Dibenzoyl: needles from C₆H₆. M.p. 202–3°.

Goodyear, B.P. 296,398 (*Chem. Zentr.*, 1929, I, 155).

Bischoff, Hausdörfer, *Ber.*, 1890, 23, 1985.

sym.-Di-1-naphthylguanidine



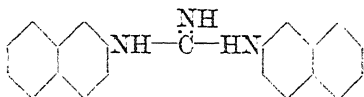
C₂₁H₁₇N₃

MW, 311

M.p. 200° (197.5–198°).

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378t.

sym.-Di-2-naphthylguanidine

 $C_{21}H_{17}N_3$

MW, 311

Needles from EtOH. M.p. 200–200.5° (197°).

Johnson, Chernoff, *J. Am. Chem. Soc.*, 1912, 34, 170.Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.

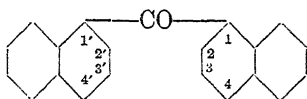
Dinaphthylhydrazine.

See Hydrazonaphthalene.

Dinaphthyl.

See 1 : 1'-Diamino-2 : 2'-dinaphthyl.

1 : 1'-Dinaphthyl Ketone

 $C_{21}H_{14}O$

MW, 282

Needles. M.p. 104° (97°). Sol. $CHCl_3$, C_6H_6 . Mod. sol. Et_2O , hot EtOH, hot AcOH. Spar. sol. ligroin. Orange sol. in conc. H_2SO_4 .

Oxime : m.p. 200°.

Anil : yellow prisms from EtOH. M.p. 155°.

 α -Naphthil : greenish yellow prisms from EtOH. M.p. 211°.

Picrate : m.p. 121.5–122°.

Blicke, *J. Am. Chem. Soc.*, 1927, 49, 2847.Tschitschibabin, Korjagin, *Chem. Zentr.*, 1914, I, 1658.

1 : 2'-Dinaphthyl Ketone.

Needles from C_6H_6 -ligroin. M.p. 136–7°. B.p. 235°/0.6 mm.

Oxime : m.p. 171°.

Migita, *Bull. Chem. Soc. Japan*, 1933, 8, 24.Tschitschibabin, Korjagin, *Chem. Zentr.*, 1914, I, 1658.Martin, *J. Chem. Soc.*, 1941, 679.

2 : 2'-Dinaphthyl Ketone.

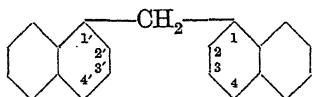
Exists in two forms. (1) Needles, m.p. 125–5°. Spar. sol. cold EtOH. (2) Leaflets from $CHCl_3$ - Et_2O , m.p. 164–5°. Sol. $CHCl_3$. Prac. insol. EtOH.

Oxime : m.p. 180–1°.

Hydrazone : needles from EtOH. M.p. 148°.

Tschitschibabin, Korjagin, *Chem. Zentr.*, 1914, I, 1658.

1 : 1'-Dinaphthylmethane

 $C_{21}H_{16}$

MW, 268

Prisms from EtOH. M.p. 109° (107–8°). B.p. 270°/14 mm. Distills above 360° undecomp. at ord. press. Sol. Et_2O , $CHCl_3$, C_6H_6 . Mod. sol. hot EtOH. Spar. sol. pet. ether.

Picrate : m.p. 142°.

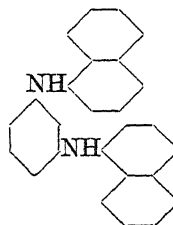
sym.-Trinitrobenzene add. comp. : m.p. 141.5°.

Schmidlin, Huber, *Ber.*, 1910, 43, 2828.Blicke, *J. Am. Chem. Soc.*, 1927, 49, 2848.Blythe, B.P. 446,450, (*Chem. Abstracts*, 1936, 30, 6760).

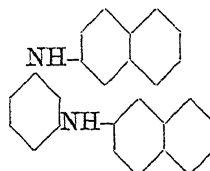
1 : 2'-Dinaphthylmethane.

Prisms from EtOH. M.p. 98°. Sol. C_6H_6 , AcOEt.Migita, *Bull. Chem. Soc. Japan*, 1933, 8, 24.Tschitschibabin, *Ber.*, 1911, 44, 449.

2 : 2'-Dinaphthylmethane.

Needles from EtOH or Et_2O . M.p. 93°. Sol. C_6H_6 . Spar. sol. EtOH.Tschitschibabin, *Ber.*, 1911, 44, 450.sym.-Di-1-naphthyl-*m*-phenylenedi-amine (m-Phenylenedi-1-naphthylidiamine) $C_{26}H_{20}N_2$

MW, 360

Needles from EtOH. M.p. 102°. After heating \rightarrow prisms, m.p. 137.5–138°. Mod. sol. C_6H_6 with blue fluor. Spar. sol. EtOH, Et_2O .Merz, Strasser, *J. prakt. Chem.*, 1899, 60, 546.sym.-Di-2-naphthyl-*m*-phenylenedi-amine (m-Phenylenedi-2-naphthylidiamine) $C_{26}H_{20}N_2$

MW, 360

Needles from C_6H_6 -aniline. M.p. 192°. B.p. 460°/48 mm. part. decomp. Mod. sol. Me_2CO , aniline. Spar. sol. EtOH, C_6H_6 , AcOH, $CHCl_3$, ligroin. Insol. HCl.

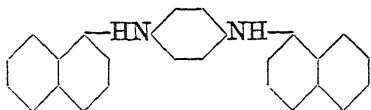
Diacetyl : plates from EtOH. M.p. 175°.

Dibenzoyl : prisms from Me_2CO -EtOH. M.p. 215°.Fischer, Schütte, *Ber.*, 1893, 26, 3086.

Dahl, D.R.P. 74,782.

Knoevenagel, *J. prakt. Chem.*, 1914, 89, 27.

sym. - Di - 1 - naphthyl - p - phenylenedi - amine (p-Phenylenedi-1-naphthylhydramine)



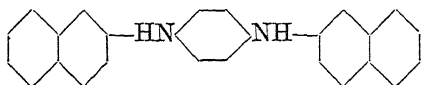
$C_{26}H_{20}N_2$ MW, 360

Needles from C_6H_6 . M.p. 205.5°. B.p. 355°/5 mm. Sol. hot aniline. Spar. sol. ord. org. solvents.

Merz, Strasser, *J. prakt. Chem.*, 1899, 60, 559.

Knoevenagel, *J. prakt. Chem.*, 1914, 89, 27.

sym. - Di - 2 - naphthyl - p - phenylenedi - amine (p-Phenylenedi-2-naphthylhydramine)



$C_{26}H_{20}N_2$ MW, 360

Leaflets from hot aniline. M.p. 235°. Sol. hot $PhNO_2$. Mod. sol. hot AcOH. Spar. sol. EtOH, Et_2O , C_6H_6 .

Diacetyl: leaflets from C_6H_6 . M.p. 210°.

Dibenzoyl: leaflets from C_6H_6 . M.p. 220°.

Di-picrate: m.p. 217° decomp.

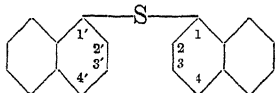
Rueff, *Ber.*, 1889, 22, 1080.

Goodyear, B.P. 296,398 (*Chem. Zentr.*, 1929, I, 155).

Goodrich, U.S.P. 1,885,355 (*Chem. Zentr.*, 1933, I, 674).

Knoevenagel, *J. prakt. Chem.*, 1914, 89, 26.

1 : 1'-Dinaphthyl sulphide



$C_{20}H_{14}S$ MW, 286

Prisms from EtOH. M.p. 110° (106-7°). B.p. 290°/15 mm. Sol. AcOH, CS_2 , C_6H_6 . Spar. sol. EtOH.

Rosenmund, Harms, *Ber.*, 1920, 53, 2238.

Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

1 : 2'-Dinaphthyl sulphide.

Leaflets from EtOH.Aq. M.p. 60-1°. B.p. 290-1°/15 mm. Sol. CS_2 , AcOH, C_6H_6 .

Krafft, *Ber.*, 1890, 23, 2368.

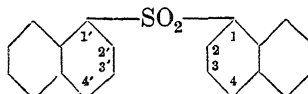
2 : 2'-Dinaphthyl sulphide.

Leaflets from C_6H_6 . M.p. 151°. B.p. 296°/15 mm. Sol. CS_2 , AcOH, C_6H_6 . Prac. insol. cold EtOH.

Lange, Haupt, *J. Am. Chem. Soc.*, 1929, 51, 2277.

Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

1 : 1'-Dinaphthyl sulphone



$C_{20}H_{14}O_2S$ MW, 318

Cryst. from hot EtOH. M.p. 187°. Mod. sol. hot AcOH. Spar. sol. Et_2O , EtOH.

Krafft, *Ber.*, 1890, 23, 2367.

Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

1 : 2'-Dinaphthyl sulphone.

M.p. 123°. Mod. sol. hot AcOH, hot C_6H_6 . Spar. sol. Et_2O , EtOH, CS_2 .

Krafft, *Ber.*, 1890, 23, 2369.

2 : 2'-Dinaphthyl sulphone.

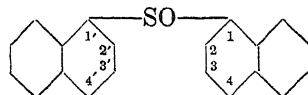
Needles from EtOH. M.p. 177°. Mod. sol. hot AcOH, hot C_6H_6 . Spar. sol. EtOH, Et_2O , CS_2 .

Lange, Haupt, *J. Am. Chem. Soc.*, 1929, 51, 2278.

Kuczynski et al., *Chem. Abstracts*, 1940, 34, 3246.

Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

1 : 1'-Dinaphthyl sulphoxide



$C_{20}H_{14}OS$ MW, 302

Prisms from EtOH. M.p. 166°. Sol. hot C_6H_6 , ligroin. Spar. sol. EtOH.

Krafft, *Ber.*, 1890, 23, 2367.

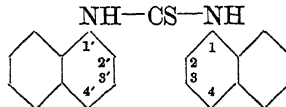
Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

2 : 2'-Dinaphthyl sulphoxide.

M.p. 137.5-138.5°.

Courtot, Paivar, *Chem. Abstracts*, 1943, 37, 2366.

sym.-Di-1-naphthylthiourea



$C_{21}H_{16}N_2S$ MW, 328

Cryst. from $PhNO_2$. M.p. 207-8° (197.5°). Spar. sol. hot EtOH. Insol. CS_2 , Et_2O , C_6H_6 .

S-Me: prisms from EtOH. M.p. 136°.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 377T.

Brass, Oppelt, Weichert, *J. prakt. Chem.*, 1937, 148, 44.

sym.-Di-2-naphthylthiourea.

Leaflets from $PhNO_2$. M.p. 203° (198.5°). Spar. sol. EtOH, Et_2O , C_6H_6 .

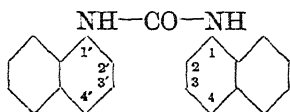
S-*Me* : needles. M.p. 110°.

Hunter, James, *J. Chem. Soc.*, 1930, 945.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 377r.

Brass, Oppelt, Weichert, *J. prakt. Chem.*, 1937, 148, 45.

sym.-Di-1-naphthylurea



$C_{21}H_{16}ON_2$

MW, 312

Needles from AcOH. M.p. 296° (280°). Sublimes.

Brady, Ridge, *J. Chem. Soc.*, 1923, 123, 2169.

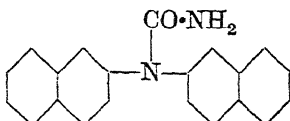
Jadhav, *J. Indian Chem. Soc.*, 1933, 10, 391 (*Bibl.*).

sym.-Di-2-naphthylurea.

Needles. M.p. 310° (295°). Mod. sol. AcOEt, amyl alcohol, hot AcOH. Spar. sol. EtOH, Et_2O , C_6H_6 , hot $PhNO_2$.

Jadhav, *J. Indian Chem. Soc.*, 1933, 10, 392 (*Bibl.*).

unsym.-Di-2-naphthylurea



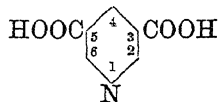
$C_{21}H_{16}ON_2$

MW, 312

Needles from EtOH. M.p. 192-3°. Spar. sol. EtOH, C_6H_6 , AcOH.

Kym, *Ber.*, 1890, 23, 428.

Dinicotinic Acid (*Pyridine-3 : 5-dicarboxylic acid*)



$C_7H_5O_4N$

MW, 167

M.p. 323° decomp. Prac. insol. H_2O . Heat above m.p. \rightarrow nicotinic acid.

Di-Me ester : $C_9H_9O_4N$. MW, 195. M.p. 84-5°.

Monochloride : $C_7H_4O_3NCl$. MW, 185.5. M.p. 66°.

Dichloride : $C_7H_3O_2NCl_2$. MW, 204. *Hydrochloride* : decomp. at 110-15°.

Diamide : $C_7H_7O_2N_3$. MW, 165. M.p. 303-4° decomp.

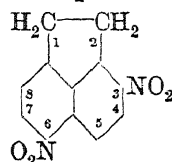
Diazide : leaflets from Et_2O . M.p. 83°.

Dürkopf, Göttisch, *Ber.*, 1890, 23, 1114.

Meyer, Tropsch, *Monatsh.*, 1914, 35, 207.

Eckert, Loria, *Monatsh.*, 1917, 38, 239.

3 : 6-Dinitroacenaphthene



$C_{12}H_8O_4N_2$

MW, 244

Yellow needles from AcOH. Decomp. at 205-6°. Spar. sol. hot EtOH.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 419r.

3 : 8-Dinitroacenaphthene.

Brownish yellow needles from AcOH. M.p. 155-6°.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 419r.

5 : 6-Dinitroacenaphthene.

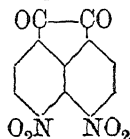
Needles from toluene. M.p. 216° (220-4°). Spar. sol. EtOH.

Sachs, Mosebach, *Ber.*, 1911, 44, 2860.

Morgan, Harrison, *J. Soc. Chem. Ind.*, 1930, 49, 419r.

Monti, Martello, Franco, *Gazz. chim. ital.*, 1936, 66, 31.

5 : 6-Dinitroacenaphthenequinone



$C_{12}H_4O_6N_2$

MW, 272

Orange yellow needles from AcOH. Does not melt below 300°. Reddish brown sols in alkalis.

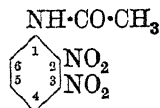
Monophenylhydrazone : lustrous brown plates from AcOH. Darkens about 260°. M.p. 287°.

Rule, Brown, *J. Chem. Soc.*, 1934, 171.

Rowe, Davies, *J. Chem. Soc.*, 1920, 117, 1350.

Mayer, Kaufmann, *Ber.*, 1920, 53, 297.

2 : 3-Dinitroacetanilide (*N-Acetyl-2 : 3-dinitroaniline*)



$C_8H_7O_5N_3$

MW, 225

Needles from EtOH. M.p. 186°. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 , cold EtOH.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1740.

2 : 4-Dinitroacetanilide (*N-Acetyl-2 : 4-dinitroaniline*).

Needles from EtOH. M.p. 121°. Sol. hot EtOH. Insol. cold H_2O .

Pinnow, Wiskott, *Ber.*, 1899, 32, 900.

Borsch, *Ber.*, 1917, 50, 1355.

Ganapati, *J. Indian Chem. Soc.*, 1938, 15, 80.

2 : 5-Dinitroacetanilide (*N*-Acetyl-2 : 5-dinitroaniline).

Needles from EtOH. M.p. 121°. Sol. hot EtOH.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1740.

2 : 6-Dinitroacetanilide (*N*-Acetyl-2 : 6-dinitroaniline).

Needles from AcOH. M.p. 197°.

Salkowski, *Ber.*, 1877, 10, 1695.

3 : 4-Dinitroacetanilide (*N*-Acetyl-3 : 4-dinitroaniline).

Yellow cryst. from EtOH. M.p. 144-5°. Sol. hot EtOH.

Witt, Witte, *Ber.*, 1908, 41, 3095.

3 : 5-Dinitroacetanilide (*N*-Acetyl-3 : 5-dinitroaniline).

Yellow needles from H₂O. M.p. 191°. Sol. EtOH, hot AcOH. Spar. sol. H₂O. Insol. Et₂O.

Curtius, Riedel, *J. prakt. Chem.*, 1907, 76, 250.

Blanksma, Verberg, *Rec. trav. chim.*, 1934, 53, 989.

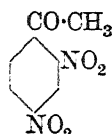
Dinitro-acetanilide.

See under Dinitro-aminophenol.

Dinitroacetnaphthalide.

See under Dinitronaphthylamine.

2 : 4-Dinitroacetophenone



C₈H₆O₅N₂ MW, 210
Cryst. from MeOH. M.p. 41-2°. B.p. 192°/7 mm.

Oxime : m.p. 121° (124°).

Phenylhydrazone : m.p. 165-6°.

Reich, Nicolaeva, *Helv. Chim. Acta*, 1919, 2, 86.

Ford, Moore, Rydon, *J. Chem. Soc.*, 1946, 679.

3 : 5-Dinitroacetophenone.

Needles from ligroin or leaflets from EtOH. M.p. 82-4°. Sol. CHCl₃, AcOH, Me₂CO. Spar. sol. Et₂O.

Oxime : m.p. 122°.

Berend, Heymann, *J. prakt. Chem.*, 1904, 69, 468.

Dinitro-acetphenetide.

See under Dinitro-aminophenol.

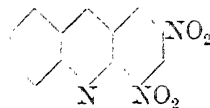
Dinitro-acet-toluidide.

See under Dinitrotoluidine.

Dinitro-acet-xylidide.

See under Dinitroxylidine.

1 : 3-Dinitroacridine



C₁₃H₇O₄N₃

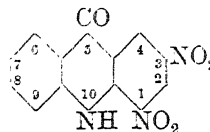
MW, 269

Brownish orange needles from Py. M.p. 284° corr.

Mayer, Stein, *Ber.*, 1917, 50, 1314.

Albert, Linnell, *J. Chem. Soc.*, 1938, 25.

1 : 3-Dinitroacridone



C₁₃H₇O₅N₃

MW, 285

Orange yellow plates from PhNO₂. Does not melt below 360°. Sol. Py, AcOH. Spar. sol. EtOH, C₆H₆. Red sols. in dil. alkalis.

Cohn, *Monatsh.*, 1901, 22, 391.

Ullmann, Bader, Labhardt, *Ber.*, 1907, 40, 4798.

Schroeter, Eisleb, *Ann.*, 1909, 367, 115.

1 : 6-Dinitroacridone.

Yellow needles from Py.Aq. M.p. 332-4°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 595.

1 : 7-Dinitroacridone.

Yellow needles from AcOH or xylene. M.p. 301-2°. Spar. sol. EtOH. Red sol. in NaOH.

Lehmstedt, *Ber.*, 1931, 64, 2385.

Albert, Linnell, *J. Chem. Soc.*, 1938, 25.

2 : 4-Dinitroacridone.

Brown infusible needles from Py-C₆H₆. Prac. insol. other org. solvents.

Albert, Linnell, *J. Chem. Soc.*, 1938, 25.

Drozdov, Bekhli, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 1505; *Chem. Abstracts*, 1939, 33, 4596.

2 : 6-Dinitroacridone.

Yellow powder. Sublimes. Prac. insol. org. solvents.

Albert, Linnell, *J. Chem. Soc.*, 1936, 91.

2 : 7-Dinitroacridone.

Orange needles from Py-EtOH or H₂O. M.p. 360-366°. Sol. Py, PhNO₂.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1616.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 102.

2 : 8-Dinitroacridone.

Yellow cryst.

Albert, Linnell, *J. Chem. Soc.*, 1936, 92.

2 : 9-Dinitroacridone.

Brownish orange cryst. from Py-EtOH or AcOH. M.p. 318-20°.

Albert, Linnell, *J. Chem. Soc.*, 1936, 1617.

3 : 6-Dinitroacridone.

Golden-brown plates from Py.Aq. M.p. 388-390°.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 162.

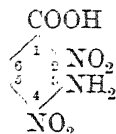
3 : 7-Dinitroacridone.

Yellow needles from Py.Aq. Blood red sols. in alc. alkalis.

Lehmstedt, *Ber.*, 1931, 64, 2384.

Dinitro-2-aminobenzoic Acid.

See Dinitroanthranilic Acid.

2 : 4-Dinitro-3-aminobenzoic Acid

$C_7H_5O_6N_3$

MW, 227

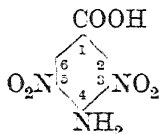
NH_4 salt : m.p. 240° decomp.

Giua, *Gazz. chim. ital.*, 1915, 45, i, 358.

4 : 6-Dinitro-3-aminobenzoic Acid.

Reddish yellow needles from H_2O . M.p. 270° decomp. Sol. EtOH, Me_2CO . Spar. sol. $CHCl_3$, C_6H_6 , pet. ether.

Giua, *Gazz. chim. ital.*, 1915, 45, i, 358.

3 : 5-Dinitro-4-aminobenzoic Acid (Chrys-anisic acid)

$C_7H_5O_6N_3$

MW, 227

Yellow leaflets from EtOH. M.p. 259°. Sol. hot EtOH. Spar. sol. H_2O . Hot caustic alkalis \rightarrow 3 : 5-dinitro-4-hydroxybenzoic acid. Red. \rightarrow 3 : 4 : 5-triaminobenzoic acid. HCl at 200° \rightarrow 3 : 4 : 5-trichlorobenzoic acid.

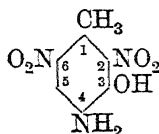
Me ester : $C_8H_7O_6N_3$. MW, 241. M.p. 144°.

Et ester : $C_9H_9O_6N_3$. MW, 255. M.p. 114°.

N-Me : 3 : 5-dinitro-4-methylaminobenzoic acid. $C_8H_7O_6N_3$. MW, 241. Yellow needles from EtOH.Aq. M.p. 223-4° (218°). *Me ester* : $C_9H_9O_6N_3$. MW, 255. Orange leaflets from EtOH. M.p. 123-4°.

N-Di-Me : 3 : 5-dinitro-4-dimethylaminobenzoic acid. $C_9H_9O_6N_3$. MW, 255. Orange-yellow needles. M.p. 246°.

Friederici, *Ber.*, 1878, 11, 1977.

2 : 6-Dinitro-4-amino-*m*-cresol

$C_7H_7O_5N_3$

MW, 213

Red needles from EtOH. M.p. 160°.

N-Acetyl : yellow cryst. M.p. 225°.

Nietzki, Ruppert, *Ber.*, 1890, 23, 3479.

2 : 4-Dinitro-6-amino-*m*-cresol.

Red plates from 50% EtOH. M.p. 167° corr. Spar. sol. H_2O .

B.HCl : pale yellow plates from dil. HCl. Decomp. at 200°.

N-Acetyl : orange yellow plates from AcOH. M.p. 231° decomp. corr.

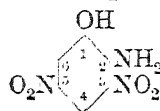
Bogert, Connitt, *J. Am. Chem. Soc.*, 1929, 51, 907.

3 : 5-Dinitro-2-amino-*p*-cresol.

Brownish red needles from EtOH. M.p. 141-2°.

N-Me : yellow needles from EtOH. M.p. 177°.

Sommer, *J. prakt. Chem.*, 1903, 67, 551.

3 : 5-Dinitro-*o*-aminophenol

$C_6H_5O_5N_3$

MW, 199

Golden needles from EtOH. M.p. 218°.

N-Acetyl : 4 : 6-dinitro-*o*-hydroxyacetanilide. M.p. 171°.

1 : 2-Diacetyl : needles from AcOH. M.p. 180°.

1-p-Toluenesulphonyl : m.p. 186°.

1 : 2-Di-p-toluenesulphonyl : m.p. 188°.

Me ether : 3 : 5-dinitro-*o*-anisidine.

$C_7H_7O_5N_3$. MW, 213. M.p. 181°. *N-Acetyl* : 3 : 5-dinitro-*o*-acetanilide. M.p. 202°.

Et ether : 3 : 5-dinitro-*o*-phenetidine. $C_8H_9O_5N_3$. MW, 227. M.p. 195°.

Bell, *J. Chem. Soc.*, 1931, 2348.

4 : 5-Dinitro-*o*-aminophenol.

Me ether : 4 : 5-dinitro-*o*-anisidine. Orange needles from EtOH.Aq. M.p. 186-8°. *N-Acetyl* : 4 : 5-dinitro-*o*-acetanilide. M.p. 162-3°. *N-Benzoyl* : m.p. 185-6°.

Et ether : 4 : 5-dinitro-*o*-phenetidine. *N-Acetyl* : 4 : 5-dinitro-*o*-acetphenetidine. M.p. 143°.

Meldola, Wechsler, *J. Chem. Soc.*, 1900, 77, 1172.

4 : 6-Dinitro-*o*-aminophenol.

See Picramic Acid.

2 : 4-Dinitro-*m*-aminophenol.

M.p. 220-2° (225°).

Me ether : 2 : 4-dinitro-*m*-anisidine. $C_7H_7O_5N_3$. MW, 213. M.p. 167°.

Et ether : 2 : 4-dinitro-*m*-phenetidine. $C_8H_9O_5N_3$. MW, 227. M.p. 130°.

Bamberger, *Ber.*, 1916, 49, 1257.

Borsche, Feske, *Ber.*, 1928, 61, 697.

Macciotta, *Gazz. chim. ital.*, 1941, 71, 81.

2 : 6-Dinitro-*m*-aminophenol.

Brownish red cryst. from $CHCl_3$. M.p. 225°. Mod. sol. EtOH, Et_2O . Spar. sol. H_2O , $CHCl_3$. Aq. alkalis \rightarrow 2 : 4-dinitroresorcinol.

N-Di-*Me* : 2 : 6-dinitro-*m*-dimethylamino-phenol. $C_8H_9O_5N_3$. MW, 227. Yellow cryst. M.p. 195°.

Lippmann, Fleissner, *Monatsh.*, 1886, 7, 95.

4 : 6-Dinitro-*m*-aminophenol.

Orange needles from EtOH. M.p. 231° (227°). Mod. sol. EtOH, Et₂O, orange sols. in alkalis. Prac. insol. H₂O.

N-Acetyl : 4 : 6-dinitro-*m*-hydroxyacetanilide. Needles. M.p. 168°.

1 : 3-Di-*p*-toluenesulphonyl : m.p. 158°.

Me ether : 4 : 6-dinitro-*m*-anisidine. Yellow needles. M.p. 208°. *N*-Acetyl : 4 : 6-dinitro-*m*-acetaniside. M.p. 146°.

Bell, *J. Chem. Soc.*, 1931, 2352.

See also Bamberger, *Ber.*, 1916, 49, 1257.

2 : 3-Dinitro-*p*-aminophenol.

Unstable reddish cryst.

N-Acetyl : 2 : 3-dinitro-*p*-hydroxyacetanilide. M.p. 199.5° decomp.

Me ether : 2 : 3-dinitro-*p*-anisidine. $C_7H_7O_5N_3$. MW, 213. M.p. 188°. *N*-Acetyl : 2 : 3-dinitro-*p*-acetaniside. M.p. 231°. *N*-Benzoyl : m.p. 185°. *N*-*p*-Toluenesulphonyl : m.p. 165-7°.

Et ether : 2 : 3-dinitro-*p*-phenetidine. $C_8H_9O_5N_3$. MW, 227. Brown prisms from EtOH. M.p. 145°. *N*-Acetyl : 2 : 3-dinitro-*p*-acetphenetidine. M.p. 206°.

Meldola, Hay, *J. Chem. Soc.*, 1907, 91, 1482.

2 : 5-Dinitro-*p*-aminophenol.

Purple needles from EtOH. M.p. 166-7°. Sol. H₂O, EtOH, C₆H₆, AcOH, Me₂CO. Insol. ligroin.

N-Acetyl : 2 : 5-dinitro-*p*-hydroxyacetanilide. M.p. 144-5°.

Me ether : 2 : 5-dinitro-*p*-anisidine. Red needles from C₆H₆-ligroin. M.p. 153°. *N*-Acetyl : 2 : 5-dinitro-*p*-acetaniside. M.p. 176°.

Et ether : 2 : 5-dinitro-*p*-phenetidine. Scarlet needles. M.p. 139-139.5°.

Girard, *Bull. soc. chim.*, 1924, 35, 776.

Reverdin, Roethlisberger, *Helv. Chim. Acta*, 1922, 5, 304.

2 : 6-Dinitro-*p*-aminophenol.

See Isopicramic Acid.

3 : 5-Dinitro-*p*-aminophenol.

Red needles or leaflets. M.p. 230-1°. Sol. EtOH, hot H₂O. Mod. sol. C₆H₆. Insol. ligroin. Sublimes above 150°. Violet sol. in alkalis.

N-Acetyl : 2 : 6-dinitro-*p*-hydroxyacetanilide. M.p. 182°.

1-Acetyl : m.p. 185-6°.

1 : 4-Diacetyl : m.p. 223-4°.

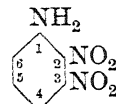
1-Propionyl : m.p. 172-3°.

1-Acetyl-4-benzoyl : m.p. 215°.

Me ether : 3 : 5-dinitro-*p*-anisidine. Red prisms. M.p. 163°. *N*-Acetyl : 3 : 5-dinitro-*p*-acetaniside. M.p. 196°.

Meldola, Hollely, *J. Chem. Soc.*, 1914, 105, 410.

2 : 3-Dinitroaniline



$C_6H_5O_4N_3$ MW, 183

Orange needles. M.p. 127°. Sol. EtOH. Mod. sol. Et₂O.

N-Acetyl : see 2 : 3-Dinitroacetanilide.

Wender, *Gazz. chim. ital.*, 1889, 19, 226.

2 : 4-Dinitroaniline.

Yellow needles from Me₂CO.Aq. M.p. 180° (188°). Spar. sol. cold EtOH, hot H₂O. Conc. caustic alkalis → 2 : 4-dinitrophenol. $(NH_4)_2S \rightarrow$ 4-nitro-*o*-phenylenediamine + 2-nitro-*p*-phenylenediamine. Forms no salts.

N-Acetyl : see 2 : 4-Dinitroacetanilide.

N-Diacetyl : m.p. 112-13°.

N-Benzylidene : m.p. 133°.

N-Benzyl : 2 : 4-dinitrophenylbenzylamine. $C_{13}H_{11}O_4N_3$. MW, 273. Yellow plates from AcOH. M.p. 116° (126°). Sol. EtOH, Me₂CO, C₆H₆.

Dey, Doraiswami, *J. Indian. Chem. Soc.*, 1933, 10, 309.

Pfister, U.S.P. 1,752,998, (*Chem. Abstracts*, 1930, 24, 2468).

Meisenheimer, Patzog, *Ber.*, 1906, 39, 2538.

Wells, Allen, *Organic Syntheses*, 1935, XV, 22.

Cullinane, Embrey, Davies, *J. Chem. Soc.*, 1932, 2364.

Macciotta, *Gazz. chim. ital.*, 1941, 71, 81.

2 : 5-Dinitroaniline.

Orange needles from EtOH. M.p. 137°. Sol. EtOH.

N-Acetyl : see 2 : 5-Dinitroacetanilide.

Wender, *Gazz. chim. ital.*, 1889, 19, 226, 232.

2 : 6-Dinitroaniline.

Yellow needles from EtOH. M.p. 138° (141-2°). Sol. hot C₆H₆. Spar. sol. cold EtOH. Prac. insol. H₂O.

N-Acetyl : see 2 : 6-Dinitroacetanilide.

Salkowski, *Ann.*, 1874, 174, 273.

Borsche, Rantschegg, *Ann.*, 1911, 379, 162.

Macciotta, *Gazz. chim. ital.*, 1941, 71, 81.

Gunstone, Tucker, *J. appl. Chem.*, 1952, 2, 206.

3 : 4-Dinitroaniline.

Yellow needles from H₂O. M.p. 154°. Sol. EtOH. Mod. sol. Et₂O.

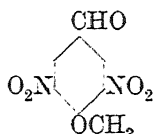
N-Acetyl : see 3 : 4-Dinitroacetanilide.

Wender, *Gazz. chim. ital.*, 1889, 19, 233.

3 : 5-Dinitroaniline.

Yellow needles from EtOH.Aq. M.p. 163° (161°). Sol. EtOH, Et₂O. Spar. sol. C₆H₆.

Flürscheim, *J. prakt. Chem.*, 1905, 71, 537.
Blanksma, Verberg, *Rec. trav. chim.*, 1934, 53, 988.

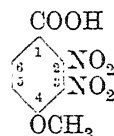
3 : 5-Dinitroanisaldehyde

C₈H₆O₆N₂ MW, 226

Pale yellow needles from pet. ether. M.p. 86°. Sol. EtOH, Et₂O, CHCl₃, AcOH, C₆H₆. Spar. sol. pet. ether.

Oxime : *Me ether*, m.p. 129°.

Wörner, *Ber.*, 1896, 29, 157.

2 : 3-Dinitroanisic Acid

C₈H₆O₇N₂ MW, 242

Needles from H₂O. M.p. 248–50° decomp.

Me ester : C₉H₈O₇N₂. MW, 256. Needles from MeOH. M.p. 156°.

Dadswell, Kenner, *J. Chem. Soc.*, 1927, 587.

3 : 5-Dinitroanisic Acid.

Needles from EtOH.Aq. M.p. 181–2°. Sol. EtOH, AcOH, C₆H₆, hot H₂O. Boiling caustic alkali → 3 : 5-dinitro-4-hydroxybenzoic acid. NH₃ → 3 : 5-dinitro-*p*-aminobenzoic acid. H₂O at 170–80° → 2 : 6-dinitrophenol.

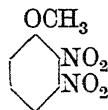
Me ester : m.p. 55–61°.

Et ester : C₁₀H₁₀O₇N₂. MW, 270. Pale yellow cryst. M.p. 79°.

Körner, Contardi, *Atti accad. Lincei*, 1914, 23, ii, 468.

Dinitroanisidine.

See under Dinitro-aminophenol.

2 : 3-Dinitroanisole

C₇H₆O₅N₂ MW, 198

Cryst. from EtOH or toluene. M.p. 119°. Mod. sol. hot EtOH. Spar. sol. hot H₂O, hot ligroin. D₂₀ 1.524. Alc. NH₃ at 150° → 3-nitro-*o*-anisidine.

Vermeulen, *Rec. trav. chim.*, 1906, 25, 14.

2 : 4-Dinitroanisole.

Needles from H₂O or EtOH. M.p. 95° (86°, 89°). Sol. Et₂O, hot EtOH. Spar. sol. hot H₂O. Sublimes. D₁₅ 1.546. NH₃.Aq. at 120° → 2 : 4-dinitroaniline. Na₂S₂ → 4-nitro-*o*-anisidine.

Tröger, Eicker, *J. prakt. Chem.*, 1927, 116, 23, 25.

Raiford, Colbert, *Chem. Abstracts*, 1926, 20, 2319.

Desvergnes, *Chem. Abstracts*, 1925, 19, 1700.

Pohlmann, *Rec. trav. chim.*, 1936, 55, 738.

Dey, Doraiswami, *J. Indian Chem. Soc.*, 1933, 10, 309.

Bogoslovskii, Tsil'man, *Chem. Abstracts*, 1940, 34, 2360.

Blanksma, Weyden, *Rec. trav. chim.*, 1940, 59, 629.

2 : 5-Dinitroanisole.

Needles from C₆H₆-ligroin. M.p. 97°. Mod. sol. hot EtOH, C₆H₆. Spar. sol. hot ligroin. D₁₈ 1.476. Volatile in steam.

Henriques, *Ann.*, 1882, 215, 339.

Vermeulen, *Rec. trav. chim.*, 1906, 25, 14.

2 : 6-Dinitroanisole.

Needles from EtOH. M.p. 117.5° (118°). Mod. sol. hot EtOH. Sublimes. D₂₀ 1.319. NH₃.Aq. at 130° → 2 : 6-dinitroaniline.

Holleman, ter Weel, *Rec. trav. chim.*, 1916, 35, 50.

3 : 4-Dinitroanisole.

Yellow needles. M.p. 70°. Mod. sol. hot EtOH. Alc. NH₃ at 190° → 4-nitro-*m*-anisidine.

Vermeulen, *Rec. trav. chim.*, 1906, 25, 14.

Topchiev, *Chem. Abstracts*, 1936, 30, 3820.

3 : 5-Dinitroanisole.

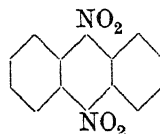
Cryst. from EtOH. M.p. 105–6° (104.7°). Sol. C₆H₆, Me₂CO, AcOEt. Mod. sol. hot EtOH, hot AcOEt. Spar. sol. H₂O, EtOH, MeOH. D₁₂ 1.558. Alc. (NH₄)₂S → 5-nitro-*m*-anisidine.

Devergnes, *Chem. Abstracts*, 1929, 23, 4207.

Reverdin, *Organic Syntheses*, Collective Vol. I, 214.

Degiori, Zappi, *Bull. soc. chim.*, 1937, 4, 1638.

Verkade, Witjens, *Rec. trav. chim.*, 1946, 65, 631.

9 : 10-Dinitroanthracene

C₁₄H₈O₄N₂

MW, 268

Yellow needles from AcOH. M.p. 264° (263°, 258-99°). Spar. sol. hot aniline, hot PhNO₂. Prac. insol. EtOH, C₆H₆, AcOH. Ox. → anthraquinone.

Chem. Fabrik. Griesheim-Elektron, D.R.P. 292,247, (*Chem. Zentr.*, 1916, II, 117).

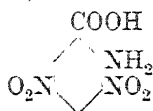
Meisenheimer, Connerade, *Ann.*, 1904, 330, 167.

Shorygin, Tepochiev, Anan'ina, *Chem. Abstracts*, 1939, 33, 3781.

Dinitroanthraflavic Acid.

See Dinitro-2 : 6-dihydroxyanthraquinone.

3 : 5-Dinitroanthranilic Acid (3 : 5-Dinitro-2-aminobenzoic acid)



C₇H₅O₆N₃ MW, 227

Yellow cryst. from EtOH. M.p. 268° (256°). Spar. sol. EtOH. Hot caustic alkalis → 3 : 5-dinitrosalicylic acid.

Me ester: C₈H₅O₆N₃. MW, 241. Yellow leaflets. M.p. 167°.

Et ester: C₉H₇O₆N₃. MW, 255. Yellow leaflets. M.p. 135°.

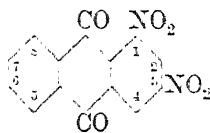
Nitrile: C₇H₄O₄N₄. MW, 208. Yellow cryst. M.p. 219° (217°).

N-Me: 3 : 5-dinitro-*o*-methylaminobenzoic acid. C₈H₇O₆N₃. MW, 241. Orange needles. M.p. 233°.

N-Di-Me: 3 : 5-dinitro-*o*-dimethylaminobenzoic acid. C₉H₉O₆N₃. MW, 255. Orange needles. M.p. 185°.

Cohn, *Monatsh.*, 1901, 22, 387.

1 : 3-Dinitroanthraquinone



C₁₄H₆O₆N₂ MW, 298

Yellow needles from HNO₃. M.p. 240°.

Dhar, *J. Chem. Soc.*, 1920, 117, 1003.

1 : 5-Dinitroanthraquinone.

Pale yellow needles from PhNO₂ or xylene. M.p. 384-5°. Sol. hot PhNO₂. Mod. sol. hot xylene. Spar. sol. AcOH. Very spar. sol. EtOH, Et₂O, C₆H₆. Bluish red sol. in conc. H₂SO₄. Na₂S → 1 : 5-diaminoanthraquinone. *Monoxime*: reddish prisms. M.p. 253° decomp.

Hefti, *Helv. Chim. Acta*, 1931, 14, 1415 (*Bibl.*).

Sequi, *Chem. Zentr.*, 1934, II, 2389.

1 : 6-Dinitroanthraquinone.

Yellowish needles from AcOH. M.p. 255-7° (257-9°). Sol. PhNO₂.

Hefti, *Helv. Chim. Acta*, 1931, 14, 1418.

1 : 7-Dinitroanthraquinone.

Yellow needles from chlorobenzene. M.p. 295°.

Hefti, *Helv. Chim. Acta*, 1931, 14, 1405.

1 : 8-Dinitroanthraquinone.

Yellow prisms from Ac₂O. M.p. 311-12°. Spar. sol. ord. org. solvents. Na₂S → 1 : 8-diaminoanthraquinone.

Hefti, *Helv. Chim. Acta*, 1931, 14, 1416.

Sequi, *Chem. Zentr.*, 1934, II, 2389.

2 : 6-Dinitroanthraquinone.

Pale yellow cryst. from PhNO₂. Does not melt below 330°. Spar. sol. most ord. org. solvents.

M.L.B., D.R.P. 167,699, (*Chem. Zentr.*, 1906, I, 1070).

2 : 7-Dinitroanthraquinone (*Fritzsché's reagent*).

Pale yellowish cryst. M.p. 280° (262°). Spar. sol. ord. org. solvents. Na₂S → 2 : 7-diaminoanthraquinone. Forms add. comps. with many hydrocarbons, etc.

Schmidt, Stein, U.S.P. 1,738,855, (*Chem. Abstracts*, 1930, 24, 3251).

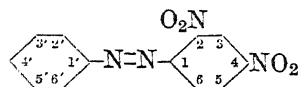
I.G., D.R.P. 497,503, (*Chem. Abstracts*, 1931, 25, 525), B.P. 291,886, (*Chem. Abstracts*, 1929, 23, 1143).

Börnstein, Schlievinsky, Szczesny-Heyl, *Ber.*, 1926, 59, 2812.

Dinitroanthrarufin.

See Dinitro-1 : 5-dihydroxyanthraquinone.

2 : 4-Dinitroazobenzene



C₁₂H₈O₄N₄ MW, 272

Red needles from EtOH. M.p. 119° (116-17°).

Willgerodt, Ferko, *J. prakt. Chem.*, 1888, 37, 352.

2 : 2'-Dinitroazobenzene.

Yellow needles. M.p. 217-18° (209-10°, 194-5°).

Goldschmidt, Strohmenger, *Ber.*, 1922, 55, 2460, 2462.

2 : 4'-Dinitroazobenzene.

Orange leaflets from EtOH. M.p. 131-2°.

Borsche, *Ann.*, 1907, 357, 185.

3 : 3'-Dinitroazobenzene.

Cis-.

M.p. 144°.

Trans.

Orange needles. M.p. 153° (150-1°). Mod. sol. hot C₆H₆. Spar. sol. EtOH, Et₂O.

Goldschmidt, Strohmenger, *Ber.*, 1922, 55, 2463.

Cook, Jones, *J. Chem. Soc.*, 1939, 1313.

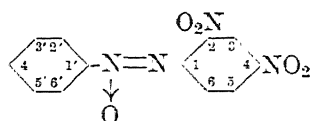
4 : 4'-Dinitroazobenzene.

Orange red needles from Me₂CO. M.p. 222-3° (216°). Mod. sol. hot Me₂CO, hot AcOH, hot C₆H₆. Prac. insol. EtOH, Et₂O, ligroin.

Goldschmidt, Strohmenger, *Ber.*, 1922, 55, 2459.

Szgo, *Ber.*, 1929, 62, 744.

Antener, *Helv. Chim. Acta*, 1938, 21, 816.

2 : 4-Dinitroazoxybenzene

C₁₂H₈O₅N₄ MW, 288
M.p. 141°.

Valori, *Atti accad. Lincei*, 1914, 22, ii, 125.

2 : 6-Dinitroazoxybenzene.

Leaflets from C₆H₆. M.p. 172°.

Valori, *Atti accad. Lincei*, 1914, 22, ii, 125.

3 : 5-Dinitroazoxybenzene.

M.p. 171-3°.

Meisenheimer, *Ber.*, 1920, 53, 363.

2 : 2'-Dinitroazoxybenzene.

Yellow needles. M.p. 175-5°. Sol. Me₂CO, CHCl₃, hot C₆H₆. Spar. sol. EtOH, ligroin.

Bamberger, Hübner, *Ber.*, 1903, 36, 3803, 3805, 3813.

3 : 3'-Dinitroazoxybenzene.

Needles from formic acid. M.p. 146-5° (143°). Sol. C₆H₆, toluene. Mod. sol. Et₂O, CS₂. Spar. sol. EtOH.

Hofer, Jakob, *Ber.*, 1908, 41, 3195.

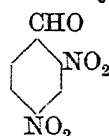
4 : 4'-Dinitroazoxybenzene.

Yellow needles from C₆H₆. M.p. 200°.

Bamberger, Hübner, *Ber.*, 1903, 36, 3808, 3810.

Szgo, *Ber.*, 1929, 62, 744.

Antener, *Helv. Chim. Acta*, 1938, 21, 815.

2 : 4-Dinitrobenzaldehyde

C₇H₄O₅N₂ MW, 196

Pale yellow cryst. from EtOH. M.p. 72°. B.p. 190-210°/10-20 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Spar. volatile in steam.

Reduces Fehling's and NH₃.AgNO₃. Decomp. by alkalis. Forms bisulphite comp.

Di-Me acetal: b.p. 183-5°/13 mm.

Oxime: m.p. 127-8°. Sol. EtOH, Et₂O, C₆H₆.

Semicarbazone: m.p. 265° decomp.

Phenylhydrazone: reddish brown needles. M.p. 227-8°.

2 : 4-Dinitrophenylhydrazone: m.p. 258°.

Day, *Chem. Abstracts*, 1930, 24, 3983 (Review).

Bennett, Bell, *Organic Syntheses*, 1932, XII, 30 (Bibl.).

2 : 6-Dinitrobenzaldehyde.

Leaflets from AcOH.Aq. M.p. 123°. Sol. EtOH, Et₂O, C₆H₆, AcOH, CHCl₃, hot H₂O. Spar. sol. CS₂, ligroin.

Oxime: needles. M.p. 115°.

Semicarbazone: yellow cryst. M.p. 217° (207-8°).

Phenylhydrazone: dark red needles. M.p. 159°.

p-Bromophenylhydrazone: m.p. 176° decomp.

p-Nitrophenylhydrazone: reddish brown cryst. M.p. 223-5° (206-7°).

2 : 4-Dinitrophenylhydrazone: yellow needles from EtOH. M.p. 233-5°.

Auwers, Frese, *Ber.*, 1925, 58, 1371.

Reich, Pinczewski, *Chem.-Zig.*, 1913, 36, 349.

3 : 4-Dinitrobenzaldehyde.

Yellow needles. M.p. 62-5° (64°).

Phenylhydrazone: violet-red needles from C₆H₆. M.p. 184-6°.

Chardonnens, Heinrich, *Helv. Chim. Acta*, 1939, 22, 1471.

Goldstein, Voegeli, *Helv. Chim. Acta*, 1943, 26, 1125.

3 : 5-Dinitrobenzaldehyde.

Yellow prisms from H₂O. M.p. 85°.

Oxime: m.p. 159°.

Semicarbazone: m.p. 256°.

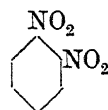
Phenylhydrazone: m.p. 210°.

p-Bromophenylhydrazone: m.p. 250°.

p-Nitrophenylhydrazone: m.p. 295° decomp.

2 : 4-Dinitrophenylhydrazone: m.p. 295°.

Hodgson, Smith, *J. Chem. Soc.*, 1933, 315.

o-Dinitrobenzene

C₆H₄O₄N₂ MW, 168

Plates from EtOH. M.p. 118°. B.p. 319°/773 mm., 276°/311 mm., 194°/30 mm., 182°/18 mm. Sol. CHCl₃, C₆H₆. Mod. sol. MeOH. Spar. sol. H₂O. D¹⁷ 1.565. Volatile in steam. Heat of comb. C_p 703.5 Cal. Alc. NH₃ or (NH₄)₂S → o-nitroaniline. Hot NaOH.Aq.

→ *o*-nitrophenol. Na_2S in EtOH → *o*-nitrothiophenol.

Wyler, *Helv. Chim. Acta*, 1932, 15, 23.

Körner, Contardi, *Atti accad. Lincei*, 1914, 23, i, 283.

Kuhn, Klavaren, *Ber.*, 1938, 71, 779.

***m*-Dinitrobenzene.**

Plates. M.p. 89-57°. B.p. 302.8°/770 mm. (291°), 275°/420 mm., 222°/108 mm., 167°/14 mm. Sol. C_6H_6 , toluene, CHCl_3 , AcOEt, hot EtOH. Mod. sol. MeOH. 100 parts H_2O diss. 0.32 parts at b.p. Triboluminescent. Volatile in steam. D_4^{20} 1.5656. Heat of comb. C_p 697 Cal. Na_2S or $(\text{NH}_4)_2\text{S}$ → *m*-nitroaniline. $\text{Fe} + \text{HCl}$ → *m*-phenylenediamine.

Wyler, *Helv. Chim. Acta*, 1932, 15, 23 (Bibl.).

Ihrig, U.S.P. 1,838,311, (*Chem. Abstracts*, 1932, 26, 1300).

***p*-Dinitrobenzene.**

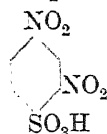
Needles or prisms. M.p. 173-4°. B.p. 299°/777 mm., 230°/153 mm., 183°/34 mm. Mod. sol. C_6H_6 , AcOH, CHCl_3 . Prac. insol. cold H_2O , EtOH. Sublimes. Volatile in steam. Heat of comb. C_p 695.4 Cal. NaOH.Aq. → *p*-nitrophenol. NaOH in EtOH → *p*-nitrophenetole. Na_2S in EtOH → 4 : 4'-dinitroazobenzene.

Wyler, *Helv. Chim. Acta*, 1932, 15, 23.

Chapas, *Bull. soc. chim.*, 1927, 41, 193 (Bibl.).

Sterkey, *Organic Syntheses*, 1939, XIX, 40.

1 : 3-Dinitrobenzene-4-sulphonic Acid
(2 : 4-Dinitrobenzenesulphonic acid)



$\text{C}_6\text{H}_4\text{O}_7\text{N}_2\text{S}$ MW, 248

Cryst. + 3 H_2O . M.p. 106-8°, anhyd. 130°. Sol. H_2O , EtOH. Insol. ligroin, C_6H_6 . Hot caustic alkalis → 2 : 4-dinitrophenol.

Chloride : $\text{C}_6\text{H}_3\text{O}_6\text{N}_2\text{ClS}$. MW, 266.5. M.p. 102°.

Amide : $\text{C}_6\text{H}_5\text{O}_6\text{N}_3\text{S}$. MW, 247. M.p. 154°. Hydrazide : m.p. 110°.

Elgersma, *Rec. trav. chim.*, 1929, 48, 757.

Davies, Storrie, Tucker, *J. Chem. Soc.*, 1931, 626.

1 : 3-Dinitrobenzene-5-sulphonic Acid
(3 : 5-Dinitrobenzenesulphonic acid).

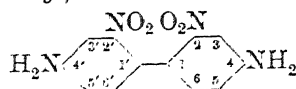
Cryst. Red. → *m*-phenylenediamine-5-sulphonic acid.

Chloride : prisms from CHCl_3 -ligroin. M.p. 98-9°.

Amide : prisms from EtOH.Aq. M.p. 234-5°.

Jackson, Earle, *Am. Chem. J.*, 1903, 29, 218.

2 : 2'-Dinitrobenzidine (2 : 2'-Dinitro-4 : 4'-diaminodiphenyl)



$\text{C}_{12}\text{H}_{10}\text{O}_4\text{N}_4$ MW, 274

Yellow leaflets from EtOH. M.p. 214° (200-2°).

Täuber, *Ber.*, 1890, 23, 795.

Porai-Koshits, *J. Gen. Chem. U.S.S.R.*, 1944, 14, 1019.

2 : 3'-Dinitrobenzidine.

Red cryst. M.p. 236-7°.

4 : 4'-N-Diformyl : brownish yellow cryst. from AcOH. M.p. 188°.

4 : 4'-N-Diacetyl : cryst. from AcOH. M.p. 220-2°.

4 : 4'-N-Dibenzoyl : yellow cryst. from PhNO_2 . M.p. 290°.

Le Fèvre, Moir, Turner, *J. Chem. Soc.*, 1927, 2330.

3 : 3'-Dinitrobenzidine.

Red cryst. M.p. 275° (281-2°). Sol. Et_2O . Insol. H_2O .

4 : 4'-N-Diformyl : yellow cryst. from PhNO_2 . M.p. 282° decomp.

4 : 4'-N-Diacetyl : yellow needles. M.p. above 300°.

4 : 4'-N-Dibenzoyl : yellow needles from PhNO_2 . M.p. 298°.

Le Fèvre, Moir, Turner, *J. Chem. Soc.*, 1927, 2334.

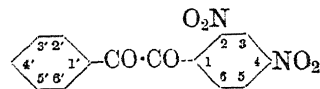
3 : 5'-Dinitrobenzidine.

Scarlet needles. M.p. 275°.

4 : 4'-N-Diacetyl : m.p. 310°.

Cain, Coulthard, Mickelthwait, *J. Chem. Soc.*, 1912, 101, 2301.

2 : 4-Dinitrobenzil



$\text{C}_{14}\text{H}_8\text{O}_6\text{N}_2$ MW, 300

Yellow plates from EtOH. M.p. 105°.

α -Monoxime : cryst. powder from C_6H_6 -pet. ether. M.p. 159°.

β -Monoxime : leaflets from EtOH. M.p. 181°.

Monosemicarbazone : cryst. powder from EtOH. M.p. 215°.

β -Phenylhydrazone : red prisms from MeOH or EtOH. M.p. 210° decomp.

Brady, Bishop, *J. Chem. Soc.*, 1922, 121, 2368.

2 : 2'-Dinitrobenzil.

Pale yellow prisms from Me_2CO or AcOH. M.p. 208°. Spar. sol. boil. EtOH. Cryst. become green in light.

Monophenylhydrazone : yellow octahedra from AcOH. M.p. 199°.

Ruggli, Zaeslin, *Helv. Chim. Acta*, 1935, 18, 848.

Chattaway, Coulson, *J. Chem. Soc.*, 1928, 1085; 1926, 1073.

2 : 3'-Dinitrobenzil.

Prisms from Me₂CO. M.p. 149°. Cryst. become green in light.

Monophenylhydrazone : yellow prisms from AcOH. M.p. 193° decomp.

Chattaway, Coulson, *J. Chem. Soc.*, 1928, 1084; 1926, 1073.

2 : 4'-Dinitrobenzil.

Pale yellow needles from AcOH or Me₂CO. M.p. 135°. Cryst. become green in light.

Monophenylhydrazone : two forms. (i) Yellow needles from AcOH. M.p. 224°. (ii) Orange plates or prisms from AcOH. M.p. 201°.

Chattaway, Coulson, *J. Chem. Soc.*, 1928, 1087.

3 : 3'-Dinitrobenzil.

Prisms from Me₂CO or AcOH. M.p. 132°.

Monophenylhydrazone : yellow prisms from AcOH. M.p. 171°.

Osazone : yellow prisms + 1AcOH from AcOH. M.p. 269°.

Chattaway, Coulson, *J. Chem. Soc.*, 1927, 577; 1926, 1072.

3 : 4'-Dinitrobenzil.

Dimorphous. (i) Stable form. Pale yellow needles or plates from CHCl₃. M.p. 137°. (ii) Unstable form. Deep yellow rhombic cryst. Opaque at 100°. M.p. 127° (rapid heat.), immediately solidifies and re-melts at 137°. Slowly → (i) on standing at room temp.

Monophenylhydrazone : orange needles from EtOH. M.p. 182°.

Osazone : orange red plates from Ac₂O. M.p. 287° decomp.

Chattaway, Coulson, *J. Chem. Soc.*, 1928, 1085.

4 : 4'-Dinitrobenzil.

Yellow plates from AcOH or Me₂CO. M.p. 213°.

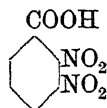
Monoxime : m.p. 193-4° decomp.

Monophenylhydrazone : orange hair-like cryst. from AcOH. M.p. 257°.

Osazone : red plates from Ac₂O. M.p. 293° decomp.

Chattaway, Coulson, *J. Chem. Soc.*, 1928, 1363.

2 : 3-Dinitrobenzoic Acid



C₇H₄O₆N₂

MW, 212

M.p. 201°. Sol. EtOH, Et₂O, AcOH. Spar. sol. C₆H₆. $k = 1.44 \times 10^{-2}$ at 25°.

Me ester : C₈H₆O₆N₂. MW, 226. M.p. 134°.

Et ester : C₉H₅O₆N₂. MW, 240. F.p. 88-4°. D¹¹¹ 1.2825.

Grell, *Ber.*, 1895, 28, 2564.

Brady, Day, Allan, *J. Chem. Soc.*, 1928, 981.

2 : 4-Dinitrobenzoic Acid.

Cryst. from H₂O. M.p. 182-3°. Sol. hot H₂O, hot EtOH. $k = 3.85 \times 10^{-2}$ at 25°. Zn + HCl → *m*-phenylenediamine.

Me ester : m.p. 70°.

Et ester : needles. M.p. 41°.

Chloride : C₇H₃O₅N₂Cl. MW, 230.5. M.p. 42-6°.

Amide : C₇H₅O₅N₃. MW, 211. Greenish needles. M.p. 203-4°.

Anhydride : C₁₄H₆O₁₁N₄. MW, 406. M.p. 160°.

Nitrile : C₇H₃O₄N₃. MW, 193. Brownish cryst. from EtOH. M.p. 104-5°. Sol. EtOH, Et₂O.

Curtius, Bollenbach, *J. prakt. Chem.*, 1907, 76, 287.

Brown, Campbell, *J. Chem. Soc.*, 1937, 1701.

Storrie, *J. Chem. Soc.*, 1937, 1746.

2 : 5-Dinitrobenzoic Acid.

Prisms from H₂O. M.p. 177°. Sol. EtOH, Et₂O, hot H₂O. $k = 2.64 \times 10^{-2}$ at 25°. Zn + HCl → 2 : 5-diaminobenzoic acid.

Me ester : m.p. 94-5°.

Et ester : m.p. 70°.

Ihrig, U.S.P. 1,838,311, (*Chem. Abstracts*, 1932, 26, 1300).

Brady, Day, Allan, *J. Chem. Soc.*, 1928, 982.

Langley, *Organic Syntheses*, 1942, XXII, 44.

2 : 6-Dinitrobenzoic Acid.

Needles from H₂O. M.p. 202-3°. Sol. EtOH, Et₂O, hot H₂O. $k = 8.15 \times 10^{-2}$ at 25°. Zn + HCl → *m*-phenylenediamine. Decomp. on dist. → *m*-dinitrobenzene.

Me ester : m.p. 147°.

Et ester : m.p. 75-5°.

Chloride : m.p. 98°.

Nitrile : needles. M.p. 58° (145°). Volatile in steam.

Brady, Day, Allan, *J. Chem. Soc.*, 1928, 980.

Häussermann, *Z. angew. Chem.*, 1891, 4, 661 (Footnote).

3 : 4-Dinitrobenzoic Acid.

Needles. M.p. 165° (161°). Sol. EtOH, Et₂O. Mod. sol. hot H₂O. Sublimes. $k = 1.63 \times 10^{-3}$ at 25°.

Me ester : m.p. 87°.

Et ester : C₈H₅O₆N₂. MW, 240. F.p. 71.0°. D¹¹¹ 1.2791.

Chloride: b.p. 188°/17 mm. Explodes above 225°. M.p. 50-1°.

Amide: m.p. 165-6°.

Anilide: m.p. 188-9°.

Häussermann, Grell, *Ber.* 1894, 27, 2209.

3 : 5-Dinitrobenzoic Acid.

Cryst. M.p. 204-5°. Sol. EtOH, AcOH. Mod. sol. H₂O. Spar. sol. Et₂O, C₆H₆, CS₂. Sublimes. $k = 1.57 \times 10^{-3}$ (1.63×10^{-3}) at 25°. $Zn + HCl \rightarrow$ 3 : 5-diaminobenzoic acid.

Me ester: C₈H₆O₆N₂. MW, 226. Needles. M.p. 107-8° (112°). Sol. hot H₂O, hot EtOH.

Et ester: needles. M.p. 92-7° (94°). Sol. hot EtOH.

n-Propylester: C₁₀H₁₀O₆N₂. MW, 254. M.p. 73°.

n-Butyl ester: C₁₁H₁₂O₆N₂. MW, 268. M.p. 62-5°.

Isobutyl ester: m.p. 85°.

Phenyl ester: C₁₃H₈O₆N₂. MW, 288. M.p. 145-6°.

o-Tolyl ester: C₁₄H₁₀O₆N₂. MW, 302. M.p. 133-4°.

m-Tolyl ester: m.p. 160-2°.

p-Tolyl ester: m.p. 180-2°.

Chloride: C₇H₃O₅N₂Cl. MW, 230.5. Needles. M.p. 74°. B.p. 196°/11 mm.

Amide: C₇H₅O₅N₂. MW, 211. Leaflets. M.p. 183° (177°).

Anhydride: C₁₄H₆O₁₁N₄. MW, 406. M.p. 109°.

Phillips, Keenan, *J. Am. Chem. Soc.*, 1931, 53, 1924.

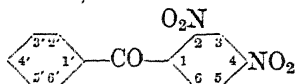
Malone, Reid, *J. Am. Chem. Soc.*, 1929, 51, 3424.

Brady, Day, Allan, *J. Chem. Soc.*, 1928, 982.

Saunders, Stacey, Wilding, *Biochem. J.*, 1942, 36, 370.

Brewster, Williams, *Organic Syntheses*, 1942, XXII, 48.

2 : 4-Dinitrobenzophenone (Phenyl 2 : 4-dinitrophenyl ketone)



C₁₃H₈O₅N₂ MW, 272

Cryst. from EtOH. M.p. 167°.

Tanasescu, Macarovici, *Bull. soc. chim.*, 1933, 53, 597.

3 : 5-Dinitrobenzophenone (Phenyl 3 : 5-dinitrophenyl ketone).

Yellow prisms from EtOH. M.p. 131°. Sol. most org. solvents. Insol. H₂O.

Waters, *J. Chem. Soc.*, 1929, 2110.

Chardonens, *Helv. Chim. Acta*, 1929, 12, 657.

2 : 2'-Dinitrobenzophenone (Di-o-nitro-phenyl ketone).

Needles from AcOH. M.p. 188-9°.

Staedel, *Ann.*, 1894, 283, 165.

2 : 3'-Dinitrobenzophenone.

Cryst. from toluene. M.p. 126°.

Staedel, *Ann.*, 1894, 283, 164.

2 : 4'-Dinitrobenzophenone.

Prisms from AcOH. M.p. 197°. Spar. sol. EtOH, C₆H₆.

Staedel, *Ann.*, 1894, 283, 166, 169.

3 : 3'-Dinitrobenzophenone.

Cryst. from AcOH. M.p. 155°.

Oxime: yellow needles. M.p. 205-7°.

Barnett, Matthews, *J. Chem. Soc.*, 1924, 125, 767 (*Bibl.*).

3 : 4'-Dinitrobenzophenone.

Needles from AcOH. M.p. 175°.

Oxime: prisms. M.p. 130-5°.

Staedel, *Ann.*, 1894, 283, 167, 169.

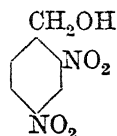
4 : 4'-Dinitrobenzophenone.

Cryst. M.p. 189°. H₂O₂ in conc. H₂SO₄ \rightarrow *p*-nitrobenzoic acid and *p*-nitrophenol.

Oxime: m.p. 195° decomp.

Staedel, *Ann.*, 1894, 283, 168.

2 : 4-Dinitrobenzyl Alcohol



C₇H₆O₅N₂ MW, 198

Yellow needles from H₂O. M.p. 114-5°. Sol. EtOH, AcOH. Insol. ligroin.

Acetyl: pale yellow plates from MeOH. M.p. 96-7°.

Benzoyl: m.p. 141°.

Salicyloyl: m.p. 168°.

p-Nitrophenyl ether: m.p. 202-4°

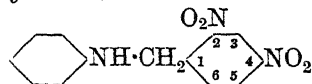
Friedländer, Cohn, *Ber.*, 1902, 35, 1266.

2 : 6-Dinitrobenzyl Alcohol.

Brown plates from Et₂O. M.p. 94°.

Reich, Wetter, Widmer, *Ber.*, 1912, 45, 3058.

2 : 4-Dinitrobenzyl-aniline (N-Phenyl-2 : 4-dinitrobenzylamine)



C₁₃H₁₁O₄N₃ MW, 273

Yellow plates from EtOH. M.p. 95° corr. Spar. sol. H₂O, ligroin.

B,HCl: needles or plates from dil. HCl or EtOH-HCl. M.p. 187° corr.

Picrate: yellow needles from EtOH. M.p. 136° corr.

Cohn, Friedländer, *Ber.*, 1902, 35, 1266.

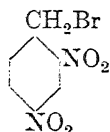
Sachs, Everding, *Ber.*, 1902, 35, 1236.

2 : 6-Dinitrobenzyl-aniline (*N*-Phenyl-2 : 6-dinitrobenzylamine).

Yellowish red needles from EtOH. M.p. 105°. Becomes dark red in light.

Reich, *Ber.*, 1912, 45, 806.

2 : 4-Dinitrobenzyl bromide (α -Bromo-2 : 4-dinitrotoluene)



$C_7H_5O_4N_2Br$ MW, 261

Needles from Et₂O. M.p. 46-7°.

Baker, Nathan, *J. Chem. Soc.*, 1935, 1843.

Davies, Oxford, *J. Chem. Soc.*, 1931, 221.

2 : 6-Dinitrobenzyl bromide (α -Bromo-2 : 6-dinitrotoluene).

Pale brown cryst. from EtOH or Et₂O. M.p. 81°.

Reich, *Ber.*, 1912, 45, 805.

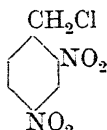
Reich, Oganessian, *Bull. soc. chim.*, 1917, 21, 118.

3 : 5-Dinitrobenzyl bromide (α -Bromo-3 : 5-dinitrotoluene).

Plates from ligroin. M.p. 65-6°. B.p. 177°/0.3 mm.

Kröhnke, Schmeiss, *Ber.*, 1939, 72, 445.

2 : 4-Dinitrobenzyl chloride (α -Chloro-2 : 4-dinitrotoluene)

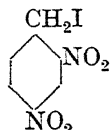


$C_7H_5O_4N_2Cl$ MW, 216.5

Prisms from Et₂O. M.p. 34°. Sol. ord. org. solvents except ligroin. Insol. H₂O.

Friedländer, Cohn, *Ber.*, 1902, 35, 1266.

2 : 4-Dinitrobenzyl iodide (α -Iodo-2 : 4-dinitrotoluene)



$C_7H_5O_4N_2I$ MW, 308

Cryst. from CHCl₃-EtOH. M.p. 78°.

Neber, Burgard, *Ann.*, 1932, 493, 293.

Poggi, *Chem. Abstracts*, 1926, 20, 905.

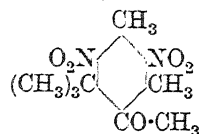
2 : 6-Dinitrobenzyl iodide (α -Iodo-2 : 6-dinitrotoluene).

Pale yellow cryst. from EtOH. M.p. 100-1°.

Reich, Oganessian, *Bull. soc. chim.*, 1917, 21, 118.

Dict. of Org. Comp.—II.

2 : 6-Dinitro-5-tert.-butyl-4-aceto-m-xylene (2 : 4-Dinitro-5-tert.-butyl-6-acetyl-m-xylene, "Ketone Musk")



$C_{14}H_{18}O_5N_2$ MW, 294

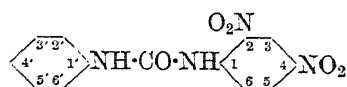
Needles. M.p. 137°. Sol. EtOH, Et₂O, C₆H₆. Artificial musk perfume.

Baur-Thurgau, *Ber.*, 1898, 31, 1346.

Dyson, *Chem. Age*, 1931, 24, 491.

Fabriques de produits chimiques de Thaun et de Mulhouse, D.R.P. 87,130.

2 : 4-Dinitrocarbanilide



$C_{13}H_{10}O_5N_4$ MW, 302

Yellow needles from EtOH. M.p. 176°.

Naegeli, Tyabji, Conrad, *Helv. Chim. Acta*, 1938, 21, 1127.

3 : 5-Dinitrocarbanilide.

Greenish yellow plates from AcOEt. M.p. 226-7°. Spar. sol. EtOH, C₆H₆.

Sah, Ma, *Chem. Zentr.*, 1934, II, 3015.

Naegeli, Tyabji, Conrad, *Helv. Chim. Acta*, 1938, 21, 1127.

2 : 2'-Dinitrocarbanilide (Di-[o-nitrophenyl]-urea, oo'-dinitro-sym.-diphenylurea).

Pale yellow cryst. from C₆H₆. M.p. 225°. Mod. sol. EtOH, C₆H₆, CHCl₃. Insol. H₂O, Et₂O.

Vittenet, *Bull. soc. chim.*, 1899, 21, 156.

2 : 3'-Dinitrocarbanilide.

Yellow needles from Me₂CO. M.p. 227-8°.

Naegeli, Tyabji, Conrad, *Helv. Chim. Acta*, 1938, 21, 1127.

Meng, Sah, *Chem. Zentr.*, 1936, II, 1715.

2 : 4'-Dinitrocarbanilide.

M.p. 270-5° decomp.

Naegeli, Tyabji, Conrad, *Helv. Chim. Acta*, 1938, 21, 1127.

3 : 3'-Dinitrocarbanilide.

Yellow needles from AcOH. M.p. 241-2°. Spar. sol. CHCl₃, C₆H₆. Mod. sol. EtOH.

Loh, Dehn, *J. Am. Chem. Soc.*, 1926, 48, 2958 (*Bibl.*).

Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 794.

Jadhav, *J. Indian Chem. Soc.*, 1933, 10, 391 (*Bibl.*).

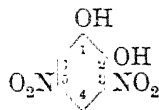
Meng, Sah, *Chem. Zentr.*, 1936, II, 1715.

3 : 4'-Dinitrocarbanilide.

M.p. 270-1° (273°).

Naegeli, Tyabji, Conrad, *Helv. Chim. Acta*, 1938, **21**, 1127.Meng, Sah, *Chem. Zentr.*, 1936, **II**, 1715.**4 : 4'-Dinitrocarbanilide.**Yellow needles from EtOH. M.p. 312° decomp. (310°). (Sublimes above 310°). Mod. sol. hot PhNO₂. Spar. sol. EtOH. Insol. H₂O, Et₂O, C₆H₆, CHCl₃, Me₂CO.M.L.B., B.P. 17,123, (*Chem. Abstracts*, 1915, **9**, 383).Mistry, Guha, *J. Indian Chem. Soc.*, 1930, **7**, 794.Jadhav, *J. Indian Chem. Soc.*, 1933, **10**, 391 (*Bibl.*).**Dinitrocarbostyryl.**

See 6 : 8-Dinitro-2-hydroxyquinoline.

3 : 5-DinitrocatecholC₆H₄O₆N₂

MW, 200

Yellow needles from EtOH. M.p. 164°.

1-Me ether : see 3 : 5-Dinitroguaiacol.

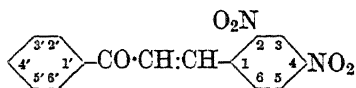
2-Me ether : see 4 : 6-Dinitroguaiacol.

Di-Me ether : see 3 : 5-Dinitroveratrol.

1-Et ether : 3 : 5-dinitroguäthol. C₈H₆O₆N₂. MW, 228. Yellow needles from EtOH. M.p. 155°.Di-Et ether : C₁₀H₁₂O₆N₂. MW, 256. M.p. 78° (94-5°).

Acetyl deriv. : m.p. 120°.

Diacetyl : m.p. 112-14°.

Gilbert, Louton, Prideaux, *J. Chem. Soc.*, 1927, 2297.Nietzki, Moll, *Ber.*, 1893, **26**, 2183.**4 : 5-Dinitrocatechol.**Canary yellow cryst. from C₆H₆-nitroethane. M.p. 166.5-7.5°. Sol. H₂O, EtOH, Me₂CO, Et₂O, nitroethane. Spar. sol. C₆H₆, xylene.Ehrlich, Bogert, *J. Org. Chem.*, 1947, **12**, 522.**2 : 4-Dinitrochalkone**C₁₅H₁₀O₅N₂

MW, 298

Yellowish brown cryst. M.p. 151°.

Borsche, Wagner-Roemmich, *Ann.*, 1940, **544**, 280.**2 : 2'-Dinitrochalkone.**

M.p. 152-3°.

Tanasesev, Baciv, *Bull. soc. chim.*, 1937, **4**, 1742.**2 : 3'-Dinitrochalkone.**

Pale yellow cryst. M.p. 195-6° decomp.

Dilthey, Neuhaus, Reis, Schommer, *J. prakt. chem.*, 1930, **124**, 81.**2 : 4'-Dinitrochalkone.**

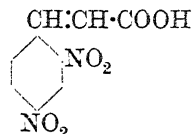
M.p. 179°.

Tanasesev, Baciv, *Bull. soc. chim.*, 1937, **4**, 1742.**3 : 3'-Dinitrochalkone.**Yellow needles from AcOH. M.p. 210°. Sol. C₆H₆, CHCl₃. Spar. sol. H₂O, EtOH, Et₂O, ligroin.Rupe, Wasserzug, *Ber.*, 1901, **34**, 3527.**4 : 3'-Dinitrochalkone.**

Cryst. from MeOH. M.p. 205.5°.

van der Lee, *Rec. trav. chim.*, 1928, **47**, 920.**Dinitrochrysazin.**

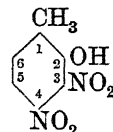
See Dinitro-1 : 8-dihydroxyanthraquinone.

2 : 4-Dinitrocinnamic AcidC₉H₆O₆N₂

MW, 238

Pale yellow needles from C₆H₆. M.p. 179°. Sol. EtOH, AcOH, hot H₂O. Dry salts decompose explosively when heated.Me ester : C₁₀H₈O₆N₂. MW, 252. Yellow needles. M.p. 86-8°.Et ester : C₁₁H₁₀O₆N₂. MW, 266. Pale yellow needles. M.p. 94°. Sol. EtOH, C₆H₆.Pfeiffer, *Ann.*, 1916, **411**, 100, 152.Böck, Lock, Schmidt, *Monatsh.*, 1934, **64**, 409.**2 : 6-Dinitrocinnamic Acid.**Needles from H₂O. M.p. 181°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆, CHCl₃, ligroin, CS₂.

Et ester : needles. M.p. 82°.

Reich, *Ber.*, 1912, **45**, 808.Reich, Pinczewski, *Chem.-Ztg.*, 1912, **36**, 349.**3 : 4-Dinitro-o-cresol**C₇H₆O₅N₂

MW, 198

M.p. 89.5°.

Datta, Varma, *J. Am. Chem. Soc.*, 1919, **41**, 2040.**3 : 5-Dinitro-o-cresol.**Yellow prisms from EtOH. M.p. 86.5°. Sol. Et₂O, EtOH, Me₂CO. Spar. sol. H₂O, ligroin. Mod. volatile in steam. NH₃.Aq. at

180° \rightarrow 3 : 5-dinitro-*o*-toluidine. The NH_4 , Na, K, and Ca salts are readily sol. H_2O . The Na salt (Elgetol) is used as an insecticide.

Me ether : $\text{C}_8\text{H}_8\text{O}_5\text{N}_2$. MW, 212. M.p. 72° (67°).

Et ether : $\text{C}_9\text{H}_{10}\text{O}_5\text{N}_2$. MW, 226. M.p. 58-4° (46°).

Acetyl : m.p. 95-6°.

Benzoyl : m.p. 132°.

Bureš, *Chem. Abstracts*, 1928, 22, 63.

Datta, Varma, *J. Indian. Chem. Soc.*, 1927, 4, 321.

Monti, *Gazz. chim. ital.*, 1937, 67, 628.

Bovini, *Chem. Zentr.*, 1928, II, 112.

4 : 5-Dinitro-*o*-cresol.

Needles from C_6H_6 . M.p. 115°.

Me ether : needles from MeOH. M.p. 80-1°.

Curd, Robertson, *J. Chem. Soc.*, 1933, 1166.

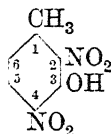
4 : 6-Dinitro-*o*-cresol.

Yellow prisms from EtOH. M.p. 85°. Sol. Me_2CO , Et_2O . Spar. sol. H_2O , pet. ether.

Noelting, Kohn, *Ber.*, 1884, 17, 371.

Noelting, De Salis, *Ber.*, 1881, 14, 987.

2 : 4-Dinitro-*m*-cresol



$\text{C}_7\text{H}_6\text{O}_5\text{N}_2$

MW, 198

Orange needles. M.p. 99° (101°).

Me ether : $\text{C}_8\text{H}_8\text{O}_5\text{N}_2$. MW, 212. M.p. 86°.

Will, *Ber.*, 1914, 47, 712.

2 : 6-Dinitro-*m*-cresol.

Cryst. from C_6H_6 . M.p. 133° (74°).

Me ether : needles. M.p. 115°.

Drew, *J. Chem. Soc.*, 1920, 117, 1617.

4 : 6-Dinitro-*m*-cresol.

M.p. 101° (60°).

Me ether : m.p. 115°.

Et ether : $\text{C}_9\text{H}_{10}\text{O}_5\text{N}_2$. MW, 226. M.p. 97° (95-6°).

Benzoyl : m.p. 95°.

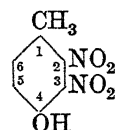
p-Toluenesulphonyl : m.p. 110-11°.

de Capeller, *Helv. Chim. Acta*, 1928, 11, 426.

Sane, Joshi, *J. Indian Chem. Soc.*, 1928, 5, 299; 1932, 9, 64.

Gibbs, Robertson, *J. Chem. Soc.*, 1914, 105, 1869.

2 : 3-Dinitro-*p*-cresol



$\text{C}_7\text{H}_6\text{O}_5\text{N}_2$

MW, 198

Yellow needles. M.p. 159°. Volatile in steam. *Me ether* : $\text{C}_8\text{H}_8\text{O}_5\text{N}_2$. MW, 212. Needles from MeOH. M.p. 126-8° (132-3°).

Holleman, Hoeflake, *Rec. trav. chim.*, 1916, 36, 276.

Kaufler, Wenzel, *Ber.*, 1901, 34, 2239.

Robinson, *J. Chem. Soc.*, 1916, 109, 1089.

Dadswell, Kenner, *J. Chem. Soc.*, 1927, 584.

2 : 5-Dinitro-*p*-cresol.

Pale brown needles. M.p. 112-13°.

Me ether : m.p. 123-4°.

Dadswell, Kenner, *J. Chem. Soc.*, 1927, 584.

2 : 6-Dinitro-*p*-cresol.

Pale yellow needles from toluene. M.p. 154-5°.

Me ether : needles from 75% AcOH. M.p. 103-4°.

Curd, Robertson, *J. Chem. Soc.*, 1933, 440.

3 : 5-Dinitro-*p*-cresol.

Yellow needles from pet. ether. M.p. 84°. Sol. Et_2O , C_6H_6 . Mod. sol. EtOH. Spar. sol. H_2O .

Me ether : cryst. M.p. 122°.

Et ether : $\text{C}_9\text{H}_{10}\text{O}_5\text{N}_2$. MW, 226. Needles. M.p. 78° (71°).

Datta, Varma, *J. Am. Chem. Soc.*, 1919, 41, 2041.

Hodgson, Smith, *J. Chem. Soc.*, 1930, 2035.

Monti, *Gazz. chim. ital.*, 1937, 67, 628.

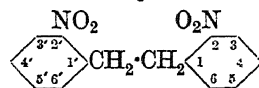
Dinitrocresotinic Acid.

See 2 : 6-Dinitro-3-hydroxy-*p*-toluic Acid.

Dinitro-diamino-dimethyldiphenyl.

See Dinitrotoluidine.

2 : 2'-Dinitrodibenzyl



$\text{C}_{14}\text{H}_{12}\text{O}_4\text{N}_2$

MW, 272

Prisms from AcOH. M.p. 127° (122°). Sol. Et_2O , C_6H_6 . Mod. sol. hot EtOH.

Lapworth, *J. Chem. Soc.*, 1901, 79, 1275.

2 : 4'-Dinitrodibenzyl.

Needles. M.p. 74-5°. CrO_3 in AcOH \rightarrow *p*-nitrobenzoic acid.

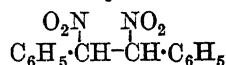
Leppert, *Ber.*, 1876, 9, 75.

4 : 4'-Dinitrodibenzyl.

Yellow needles from C_6H_6 . M.p. 180-5°. Spar. sol. Et_2O , C_6H_6 , CHCl_3 , hot EtOH. CrO_3 in AcOH \rightarrow *p*-nitrobenzoic acid.

Rinkenbach, Aaronson, *J. Am. Chem. Soc.*, 1930, 52, 5041 (*Bibl.*).

α : β -Dinitrodibenzyl



$\text{C}_{14}\text{H}_{12}\text{O}_4\text{N}_2$

MW, 272

Two forms:

(a) Needles from AcOH. M.p. 235-6°. Spar. sol. EtOH, Et₂O, AcOH.

(b) Prisms from AcOH. M.p. 151-3°. Sol. EtOH, Et₂O, Me₂CO, AcOH, CHCl₃, C₆H₆. Mod. sol. ligroin.

Schmidt, *Ber.*, 1901, **34**, 625, 3540.

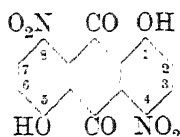
Brown, Shriner, *J. Org. Chem.*, 1937, **2**, 376.

 α : 4-Dinitrodibenzyl.

M.p. 141-2°. Alc.KOH \rightarrow purple col. Heat above m.p. \rightarrow 4-nitrostilbene.

Weisler, Helmkamp, *J. Am. Chem. Soc.*, 1945, **67**, 1167.

4:8-Dinitro-1:5-dihydroxyanthraquinone (4:8-Dinitroanthrarufin)



C₁₄H₆O₈N₂ MW, 330

Yellow cryst. from PhNO₂. Does not melt below 330°. Spar. sol. most ord. org. solvents. Mod. sol. alkalis. Na₂S \rightarrow 4:8-diaminoanthrarufin. Na sulphite or bisulphite \rightarrow 2:6-disulphonic acid. Hot conc. H₂SO₄ + boric acid \rightarrow 1:4:5:8-tetrahydroxyanthraquinone.

Di-Me ether: yellow needles from PhNO₂.

Schmidt, Gattermann, *Ber.*, 1896, **29**, 2940.

Bayer, D.R.P. 170,728, (*Chem. Zentr.*, 1906, II, 474); 163,042, (*Chem. Zentr.*, 1905, II, 1062).

4:5-Dinitro-1:8-dihydroxyanthraquinone (4:5-Dinitrochrysazin).

Pale yellow cryst. powder from PhNO₂. Spar. sol. ord. org. solvents. Sol. alkalis and NH₃. Aq. to red sols. Sol. conc. H₂SO₄ to pale yellow sol. Na₂S \rightarrow diaminochrysazin. Na sulphite or bisulphite \rightarrow 2:7-disulphonic acid.

Bayer, D.R.P. 170,728, (*Chem. Zentr.*, 1906, II, 474).

1:4-Dinitro-2:3-dihydroxyanthraquinone (1:4-Dinitrohystazarin).

Pale yellow cryst. from EtOH. M.p. 224° decomp. Prac. insol. H₂SO₄. Blue sol. in dil. alkalis.

Waldmann, Wider, *J. prakt. Chem.*, 1938, **150**, 107.

1:5-Dinitro-2:6-dihydroxyanthraquinone (1:5-Dinitroanthraflavic acid).

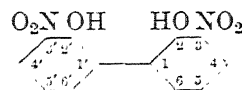
Yellow needles from EtOH or AcOH. De-comp. at 350-75°.

Heller, Müller, Mertz, *Z. angew. Chem.*, 1929, **42**, 170.

Dinitrodihydroxy-p-benzoquinone.

See Nitranilic Acid.

3:3'-Dinitro-2:2'-dihydroxydiphenyl



C₁₂H₈O₆N₂ MW, 276

Dark yellow needles. M.p. 189-90°. Sol. AcOH, C₆H₆. Spar. sol. Et₂O, EtOH. Red sols. in dil. alkalis.

Diacetyl: plates. M.p. 103-5°.

Diels, Bibergeil, *Ber.*, 1902, **35**, 307.

3:5'-Dinitro-2:2'-dihydroxydiphenyl.

Yellow needles from EtOH. M.p. 210-11°.

Diacetyl: m.p. 122-5°.

Di-Me ether: C₁₄H₁₂O₆N₂. MW, 304. M.p. 133-5°.

Calvet, Seijo, *Chem. Zentr.*, 1934, II, 936.

5:5'-Dinitro-2:2'-dihydroxydiphenyl.

Yellow needles from hot EtOH. M.p. 301°. Sol. EtOH, AcOH, hot Me₂CO. Spar. sol. CHCl₃, hot H₂O. Prac. insol. C₆H₆, pet. ether.

Me ether: C₁₃H₁₀O₆N₂. MW, 290. Needles from Me₂CO. M.p. 224°.

Di-Me ether: C₁₄H₁₂O₆N₂. MW, 304. Yellow needles. M.p. 263°.

Et ether: C₁₄H₁₂O₆N₂. MW, 304. Needles from Me₂CO. M.p. 224° corr.

Di-Et ether: C₁₆H₁₆O₆N₂. MW, 332. Needles from Me₂CO. M.p. 271°.

Diacetyl: m.p. 204°.

Borsche, Scholten, *Ber.*, 1917, **50**, 607.

van Alphen, *Rec. trav. chim.*, 1932, **51**, 718.

Calvet, Seijo, *Chem. Zentr.*, 1934, II, 936.

3:3'-Dinitro-4:4'-dihydroxydiphenyl.

Brownish needles from EtOH. M.p. 280° (283°). Spar. sol. AcOH. Prac. insol. EtOH.

Di-Me ether: C₁₄H₁₂O₆N₂. MW, 304. Yellow needles from EtOH. M.p. 221°.

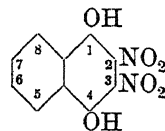
Sol. C₆H₆, Me₂CO, CHCl₃. Mod. sol. EtOH.

Di-Et ether: C₁₆H₁₆O₆N₂. MW, 332. M.p. 192°.

Diacetyl: m.p. 215°.

van Alphen, *Rec. trav. chim.*, 1930, **49**, 773, 780, 781.

2:3-Dinitro-1:4-dihydroxynaphthalene



C₁₀H₆O₆N₂ MW, 250

Yellow needles from EtOH. M.p. 357°.

Di-Me ether: C₁₂H₁₀O₆N₂. MW, 278. Red micro-cryst. from PhNO₂. M.p. 190°.

Hodgson, Elliott, *J. Chem. Soc.*, 1936, 1152.

2 : 4-Dinitro-1 : 5-dihydroxynaphthalene.
Golden brown cryst. M.p. 247° decomp.
 $\text{CH}_2\text{N}_2 \longrightarrow$ 2 : 4-dinitro-1 : 5-dimethoxynaphthalene. $\text{Me}_2\text{SO}_4 \longrightarrow$ 2 : 4-dinitro-5-methoxy-1-naphthol.

Thomson, Race, Rowe, *J. Chem. Soc.*, 1947, 350.

2 : 6-Dinitro-1 : 5-dihydroxynaphthalene.
Orange cryst. M.p. 246° decomp.
Di-Me ether : straw col. cryst. M.p. 222° .

Thomson, Race, Rowe, *J. Chem. Soc.*, 1947, 350.

2 : 4-Dinitro-1 : 8-dihydroxynaphthalene.
Red prisms from MeOH or H_2O . M.p. $180-2^{\circ}$ decomp. Sternutatory.

1-Me ether : $\text{C}_{11}\text{H}_8\text{O}_6\text{N}_2$. MW, 264. Yellow needles from EtOH. M.p. $170-1^{\circ}$. *Acetyl* : pale yellow plates from MeOH or EtOH. M.p. $115-7^{\circ}$.

8-Me ether : yellow plates from EtOH. M.p. $179-80^{\circ}$.

Di-Me ether : yellow prisms or needles from MeOH. M.p. $137-9^{\circ}$.

8-Acetyl : yellow prisms from AcOH. M.p. 200° decomp.

Calvert, Carnero, *J. Chem. Soc.*, 1936, 558.

1 : 5-Dinitro-2 : 6-dihydroxynaphthalene.
Di-Me ether : yellow needles from Py. M.p. 265° .

Chakravarti, Pasupati, *J. Chem. Soc.*, 1937, 1860.

1 : 8-Dinitro-2 : 7-dihydroxynaphthalene.
Yellow cryst. from anisole. Decomp. about. 250° .

Di-Me ether : cryst. from Py. M.p. 286° .

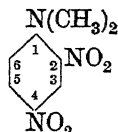
Chakravarti, Pasupati, *J. Chem. Soc.*, 1937, 1860.

Kaufer, *Ber.*, 1907, 40, 3275.

Dinitro-dimethylaminobenzoic Acid.

See under 3 : 5-Dinitro-4-aminobenzoic Acid and 3 : 5-Dinitroanthranilic Acid.

2 : 4-Dinitrodimethylaniline



$\text{C}_8\text{H}_9\text{O}_4\text{N}_3$ MW, 211

Yellow prisms from C_6H_6 . M.p. 87° . Sol. CHCl_3 . Mod. sol. CS_2 . Spar. sol. Et_2O , EtOH, hot H_2O . KOH.Aq. \longrightarrow 2 : 4-dinitrophenol + dimethylamine.

Gallas, Alonso, *Chem. Abstracts*, 1930, 24, 4276.

Romburgh, *Chem.-Ztg.*, 1911, 35, 200.

2 : 5-Dinitrodimethylaniline.

Needles from EtOH. M.p. 112° . Exhibits chromoisomerism.

Romburgh, *Rec. trav. chim.*, 1887, 6, 253; 1889, 8, 253.

Forster, Coulson, *J. Chem. Soc.*, 1922, 121, 1997.

2 : 6-Dinitrodimethylaniline.

Orange yellow needles from EtOH.Aq. M.p. 78° .

Borsche, Rantschegg, *Ann.*, 1911, 379, 165.

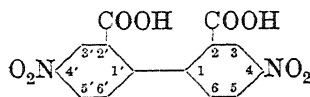
3 : 4-Dinitrodimethylaniline.

Orange needles from EtOH. M.p. 176° .

Hodgson, Smith, *J. Chem. Soc.*, 1931, 1508.

Forster, Coulson, *J. Chem. Soc.*, 1922, 121, 1988 (*Bibl.*).

4 : 4'-Dinitrodiphenic Acid (4 : 4'-Dinitrodiphenyl-2 : 2'-dicarboxylic acid)



$\text{C}_{14}\text{H}_8\text{O}_8\text{N}_2$ MW, 332

Leaflets from EtOH.Aq. M.p. $257-8^{\circ}$. Sol. EtOH, hot H_2O . Spar. sol. Et_2O .

Di-Me ester : $\text{C}_{16}\text{H}_{12}\text{O}_8\text{N}_2$. MW, 360. Yellow prisms. M.p. 177° . Spar. sol. EtOH.

Dichloride : $\text{C}_{14}\text{H}_6\text{O}_8\text{N}_2\text{Cl}_2$. MW, 369. Cryst. from C_6H_6 . M.p. 138° .

Mono-nitrile : $\text{C}_{14}\text{H}_7\text{O}_8\text{N}_3$. MW, 313. Leaflets from AcOH. M.p. $217-19^{\circ}$. *Me ester* : prisms from AcOH. M.p. $149-50^{\circ}$.

Kuhn, Albrecht, *Ann.*, 1927, 455, 289.

4 : 6'-Dinitrodiphenic Acid.

d.

M.p. $303-4^{\circ}$ (296°). $[\alpha]_D^{25} - 212.6^{\circ}$ in NaOH.Aq.

l.

$[\alpha]_D^{25} + 176^{\circ}$ in NaOH.Aq.

Christie, Holderness, Kenner, *J. Chem. Soc.*, 1926, 671.

Kuhn, Albrecht, *Ann.*, 1927, 455, 289.

5 : 5'-Dinitrodiphenic Acid.

Yellow needles from AcOH. M.p. $285-7^{\circ}$ decomp.

Di-Me ester : yellow needles from CCl_4 . M.p. 161° .

Anhydride : $\text{C}_{14}\text{H}_6\text{O}_7\text{N}_2$. MW, 314. M.p. 265° .

Pufahl, *Ber.*, 1929, 62, 2818.

6 : 6'-Dinitrodiphenic Acid.

d.

M.p. $230-1^{\circ}$. $[\alpha]_D^{25} + 101.4^{\circ}$ in NaOH.Aq., $[\alpha]_D^{25} + 135^{\circ}$ in MeOH.

l.

M.p. 229° corr. $[\alpha]_D^{25} - 126^{\circ}$ in MeOH, $[\alpha]_D^{25} - 134^{\circ}$ in MeOH.

4l.

M.p. 259°. Sol. EtOH, Et₂O, Me₂CO, C₆H₆.
Di-Me ester : m.p. 131-2° (132-3°).

Di-Et ester : C₁₅H₁₆O₈N₂. MW, 388. M.p. 140-2°.

Dichloride : C₁₄H₆O₆N₂Cl₂. MW, 369. M.p. 157°.

Diamide : C₁₄H₁₀O₆N₄. MW, 330. M.p. 276°.

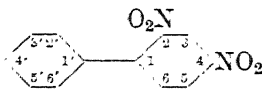
Dianilide : m.p. 232-4°.

Kuhn, Albrecht, *Ann.*, 1927, 455, 288.

Christie, Kenner, *J. Chem. Soc.*, 1922, 121, 617.

Ingersoll, Little, *J. Am. Chem. Soc.*, 1934, 56, 2124.

2 : 4-Dinitrodiphenyl



C₁₂H₈O₄N₂ MW, 244

Yellow plates. M.p. 110°.

Gull, Turner, *J. Chem. Soc.*, 1929, 496.

3 : 4-Dinitrodiphenyl.

Cryst. from MeOH. M.p. 87-8°.

Case, *J. Am. Chem. Soc.*, 1942, 64, 1848.

2 : 2'-Dinitrodiphenyl.

Yellowish needles from EtOH. M.p. 124°. Sol. hot EtOH, hot AcOH, hot C₆H₆. Mod. sol. Et₂O, EtOH. Spar. sol. ligroin. Zn + HCl → 2 : 2'-diaminodiphenyl.

Gull, Turner, *J. Chem. Soc.*, 1929, 496.

Sako, *Chem. Abstracts*, 1932, 26, 3246.

Fuson, Cleveland, *Organic Syntheses*, 1940, XX, 45.

2 : 3'-Dinitrodiphenyl.

Yellowish needles from AcOH. M.p. 110°.

Cain, Coulthard, Mickelthwait, *J. Chem. Soc.*, 1912, 101, 2303.

2 : 4'-Dinitrodiphenyl.

Cryst. M.p. 93-4°. Sol. hot EtOH, hot AcOH, hot C₆H₆. Mod. sol. Et₂O.

Gull, Turner, *J. Chem. Soc.*, 1929, 494.

Finzi, Bellavita, *Gazz. chim. ital.*, 1934, 64, 335.

3 : 3'-Dinitrodiphenyl.

Yellow needles from EtOH. M.p. 200°. Sol. hot AcOH, hot C₆H₆. Zn + HCl → 3 : 3'-diaminodiphenyl.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

Emde, *Chem. Zentr.*, 1915, II, 275.

3 : 4'-Dinitrodiphenyl.

Pale yellow needles from Me₂CO. M.p. 189°.

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 664.

Scarborough, Waters, *J. Chem. Soc.*, 1927, 1139.

Waters, *J. Chem. Soc.*, 1940, 474.

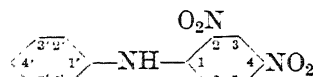
4 : 4'-Dinitrodiphenyl.

Needles. M.p. 237° (239-43°). Sol. hot C₆H₆. Mod. sol. hot EtOH, hot AcOH. Zn + HCl → benzidine.

Gull, Turner, *J. Chem. Soc.*, 1929, 494.

Bryd, *Chem. Abstracts*, 1928, 22, 2372.

2 : 4-Dinitrodiphenylamine



C₁₂H₉O₄N₃ MW, 259

Yellowish red needles from C₆H₆. M.p. 157°. Sol. Me₂CO, CHCl₃, Py, hot EtOH. Alc. (NH₄)₂S → 4-nitro-2-aminodiphenylamine.

Dey, Doraiswami, *J. Indian Chem. Soc.*, 1933, 10, 316.

Talen, *Rec. trav. chim.*, 1928, 47, 789.

2 : 6-Dinitrodiphenylamine.

Orange leaflets. M.p. 107-8°. Sol. hot EtOH, hot AcOH.

Borsche, Rantscheff, *Ann.*, 1911, 379, 167.

2 : 2'-Dinitrodiphenylamine.

Golden yellow cryst. from EtOH. M.p. 166-7°. Sol. Me₂CO.

Ryan, Ryan, *Chem. Abstracts*, 1919, 13, 1210.

2 : 3'-Dinitrodiphenylamine.

Orange needles. M.p. 158°.

Evans, Smiles, *J. Chem. Soc.*, 1935, 187.

2 : 4'-Dinitrodiphenylamine.

Red cryst. from AcOH. M.p. 219°. Sol. toluene.

Ryan, Ryan, *Chem. Abstracts*, 1919, 13, 957.

3 : 3'-Dinitrodiphenylamine.

Orange cryst. from PhNO₂-AcOH. M.p. 186-5° corr. Mod. sol. Et₂O, hot EtOH. Alc. KOH → orange col.

Albert, Linnell, *J. Chem. Soc.*, 1936, 91.

3 : 4'-Dinitrodiphenylamine.

Pale yellow cryst. from CHCl₃ or Py.Aq. Softens at 205°. M.p. 217°.

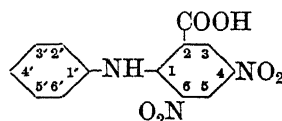
Ryan, Glover, *Chem. Abstracts*, 1918, 12, 2542.

4 : 4'-Dinitrodiphenylamine.

Yellow needles from EtOH. M.p. 216° (214-5°). Spar. sol. EtOH, C₆H₆.

Ryan, Ryan, *Chem. Abstracts*, 1919, 13, 1210.

4 : 6-Dinitrodiphenylamine-2-carboxylic Acid



C₁₃H₉O₆N₃

MW, 303

4 : 3'-Dinitrodiphenylamine-2-carboxylic Acid 375

Yellow needles from EtOH.Aq. M.p. 215°. Sol. hot AcOH. Spar. sol. H₂O, Et₂O, CHCl₃. Insol. CS₂, ligroin.

Aniline salt: red needles. M.p. 253° (192°). *Nitrile*: C₁₃H₈O₄N₄. MW, 284. Yellow needles. M.p. 183°.

Acetyl: yellow needles from EtOH. M.p. 209-10°.

Benzoyl: needles from EtOH. M.p. 120-21°.

Ullmann, *Ann.*, 1909, 366, 83.

Cohn, *Monatsh.*, 1901, 22, 389.

4 : 3'-Dinitrodiphenylamine-2-carboxylic Acid.

Pale brownish-yellow cryst. from AcOH. M.p. 229°. Spar. sol. most org. solvents. Bright orange sodium salt.

Albert, Linnell, *J. Chem. Soc.*, 1938, 24.

5 : 3'-Dinitrodiphenylamine-2-carboxylic Acid.

Orange-brown needles from EtOH.Aq. M.p. 262°.

Goldberg, Kelly, *J. Chem. Soc.*, 1946, 107.

6 : 2'-Dinitrodiphenylamine-2-carboxylic Acid.

Yellow needles from EtOH.Aq. M.p. 252-4°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 597.

6 : 3'-Dinitrodiphenylamine-2-carboxylic Acid.

Yellow prisms from EtOH.Aq. M.p. 196-8°.

Goldberg, Kelly, *J. Chem. Soc.*, 1947, 596.

2' : 4'-Dinitrodiphenylamine-2-carboxylic Acid.

Yellow needles from EtOH-AcOH. M.p. 264°. Spar. sol. most solvents. Readily sol. phenol.

Et ester: C₁₅H₁₃O₆N₃. MW, 331. Cryst. from EtOH. M.p. 164-6°.

Chloride: C₁₃H₈O₅N₃Cl. MW, 321.5. Orange cryst. from toluene. M.p. 179° decomp.

Amide: C₁₃H₁₀O₅N₄. MW, 302. Orange yellow needles from AcOH. M.p. 248°.

Schroeter, Eisleb, *Ann.*, 1909, 367, 114.

Ullmann, *Chem. Zentr.*, 1908, I, 1115.

3' : 5'-Dinitrodiphenylamine-2-carboxylic Acid.

Brownish-orange cryst. from AcOH. M.p. 263°. Spar. sol. most org. solvents. H₂SO₄ + trace of HNO₃ → orange col. Orange-brown sodium salt.

Albert, Linnell, *J. Chem. Soc.*, 1938, 24.

2' : 4'-Dinitrodiphenylamine-3-carboxylic Acid.

Pale yellow needles from AcOH-phenol. Does not melt below 225°. Insol. H₂O, EtOH, Et₂O, HCl. Red sols. in alkalis.

Me ester: C₁₄H₁₁O₆N₃. MW, 317. Orange needles from MeOH. M.p. 126°.

2 : 4-Dinitrodiphenyl Ether

Et ester: pale yellow needles from EtOH. M.p. 105°.

Linke, *J. prakt. Chem.*, 1915, 91, 208.

2 : 6-Dinitrodiphenylamine-4-carboxylic Acid.

Orange yellow needles or prisms from EtOH-C₆H₆. M.p. 239°. Sol. Et₂O, AcOEt.

Et ester: orange plates from EtOH-C₆H₆. M.p. 154°.

Jackson, Ittner, *Am. Chem. J.*, 1897, 19, 18.

2' : 4'-Dinitrodiphenylamine-4-carboxylic Acid.

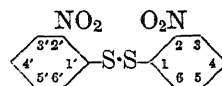
Yellow powder from AcOH-phenol. Explodes on rapid heating. Does not melt below 225° on slow heating. Red sols. in alkalis. Orange red sol. in H₂SO₄.

Me ester: orange needles from MeOH. Explodes on rapid heating. Red at 75°, pale yellow at 178° on slow heating.

Et ester: yellow needles from EtOH. Explodes on rapid heating. Red at 72°, pale yellow at 172° on slow heating.

Linke, *J. prakt. Chem.*, 1915, 91, 202.

2 : 2'-Dinitrodiphenyl disulphide



C₁₂H₈O₄N₂S₂ MW, 308

Yellow needles from C₆H₆ or AcOH. M.p. 198-9°. Spar. sol. EtOH, AcOH, Me₂CO. Zn + HCl + AcOH → o-aminothiophenol.

Bogert, Stull, *Organic Syntheses*, Collective Vol. I, 215.

3 : 3'-Dinitrodiphenyl disulphide.

Yellow needles or rhombohedra from EtOH. M.p. 84°. Sol. Et₂O. NaHg → m-aminothiophenol.

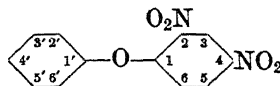
Leuckart, Holtzapfel, *J. prakt. Chem.*, 1890, 41, 198.

4 : 4'-Dinitrodiphenyl disulphide.

Needles from AcOH. M.p. 182°. Red. → p-nitrothiophenol. Alc. NaOH → bluish red col.

Zincke, Lenhardt, *Ann.*, 1913, 400, 7.

2 : 4-Dinitrodiphenyl Ether



C₁₂H₈O₅N₂ MW, 260

Needles from EtOH. M.p. 71°. B.p. 230-50°/27 mm. Sol. EtOH.

Raiford, Colbert, *J. Am. Chem. Soc.*, 1926, 48, 2660.

Cook, *J. Am. Chem. Soc.*, 1910, 32, 1291.

2 : 6-Dinitrodiphenyl Ether.

Leaflets from EtOH. M.p. 99-100°.

Borsche, Rantscheff, *Ann.*, 1911, 379, 159.**3 : 4-Dinitrodiphenyl Ether.**

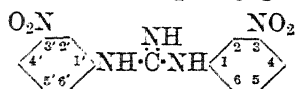
Yellow leaflets. M.p. 89°.

Westf. Anhalt Sprengstoff, D.R.P. 281,053, (*Chem. Zentr.*, 1915, I, 74).**2 : 2'-Dinitrodiphenyl Ether.**

Cryst. from EtOH. M.p. 114.5°. Sol. hot EtOH.

Häussermann, Bauer, *Ber.*, 1896, 29, 2084.**2 : 4'-Dinitrodiphenyl Ether.**

Needles from EtOH. M.p. 103.5°. Sol. hot EtOH.

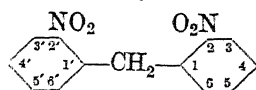
Ryan, Drumm, *Chem. Abstracts*, 1924, 18, 1655.**3 : 4'-Dinitrodiphenyl Ether.**Cryst. from C₆H₆. M.p. 123°.Ravick, Brewster, Dains, *J. Am. Chem. Soc.*, 1933, 55, 1289.Brewster, Strain, *J. Am. Chem. Soc.*, 1934, 56, 117.**4 : 4'-Dinitrodiphenyl Ether.**M.p. 142-3°. Sol. AcOH, C₆H₆. Mod. sol. hot EtOH. Spar. sol. Et₂O.Sevewetz, Mounier, *Compt. rend.*, 1928, 186, 955.Ryan, Drumm, *Chem. Abstracts*, 1924, 18, 1655.**3 : 3'-Dinitro-sym.-diphenylguanidine**C₁₃H₁₁O₄N₅

MW, 301

M.p. 196-7°.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.Brückner, *Ber.*, 1874, 7, 1235.**4 : 4'-Dinitro-sym.-diphenylguanidine.**

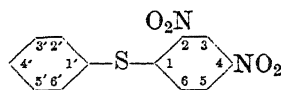
Prisms from EtOH. M.p. 222°. Solidifies and does not melt again below 285°.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.**2 : 2'-Dinitrodiphenylmethane**C₁₃H₁₀O₄N₂

MW, 258

Needles or leaflets from H₂O. M.p. 159°. Sol. EtOH, Et₂O. Insol. ligroin. SnCl₂ + HCl → 2 : 2'-diaminodiphenylmethane. Ox. → 2 : 2'-dinitrobenzophenone.Schnitzspahn, *J. prakt. Chem.*, 1902, 65, 322.**2 : 4'-Dinitrodiphenylmethane.**Yellowish cryst. from C₆H₆. M.p. 118°. Ox. → 2 : 4'-dinitrobenzophenone.Staedel, *Ann.*, 1894, 283, 156.**3 : 3'-Dinitrodiphenylmethane.**Leaflets from AcOH. M.p. 175.5°. Sol. hot C₆H₆, hot AcOH. Mod. sol. EtOH. Spar. sol. Et₂O. SnCl₂ + HCl → 3 : 3'-diaminodiphenylmethane. Ox. → 3 : 3'-dinitrobenzophenone.Thorp, Wildman, *J. Am. Chem. Soc.*, 1915, 37, 373 (*Bibl.*).**3 : 4'-Dinitrodiphenylmethane.**

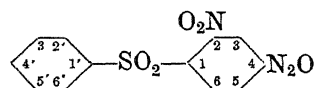
Needles from hot EtOH. M.p. 103-4°.

Staedel, *Ann.*, 1894, 283, 159.**4 : 4'-Dinitrodiphenylmethane.**Needles from C₆H₆. M.p. 183°. Sol. hot AcOH, hot C₆H₆. Spar. sol. Et₂O. Prac. insol. cold EtOH. SnCl₂ + HCl → 4 : 4'-diaminodiphenylmethane. Ox. → 4 : 4'-dinitrobenzophenone.Staedel, *Ann.*, 1894, 283, 153.**2 : 4-Dinitrodiphenyl sulphide**C₁₂H₈O₄N₂S

MW, 276

Cryst. from C₆H₆. M.p. 121° (117°). Sol. C₆H₆, Me₂CO. Mod. sol. EtOH. Insol. H₂O.Bost, Turner, Norton, *J. Am. Chem. Soc.*, 1932, 54, 1986.Bogert, Evans, *Ind. Eng. Chem.*, 1926, 18, 301.**2 : 2'-Dinitrodiphenyl sulphide.**Golden yellow leaflets from AcOH. M.p. 122-3°. Hot HNO₃ → 2 : 2'-dinitrodiphenyl sulphone.de Bruyn, Blanksma, *Rec. trav. chim.*, 1901, 20, 116.**2 : 4'-Dinitrodiphenyl sulphide.**

Yellow plates from EtOH. M.p. 158°.

Evans, Smiles, *J. Chem. Soc.*, 1935, 185.**4 : 4'-Dinitrodiphenyl sulphide.**Orange plates from AcOH. M.p. 154° (156-7°). CrO₃ in AcOH → 4 : 4'-dinitrodiphenyl sulphone.Waldron, Reid, *J. Am. Chem. Soc.*, 1923, 45, 2408.**2 : 4-Dinitrodiphenyl sulphone**C₁₂H₈O₆N₂S

MW, 308

Needles. M.p. 161° (157°). Sol. hot C₆H₆, hot AcOH. Spar. sol. EtOH. Insol. Et₂O.Bost, Turner, Norton, *J. Am. Chem. Soc.*, 1932, 54, 1986.

2 : 2'-Dinitrodiphenyl sulphone.

M.p. 164°. Sol. hot AcOH. Spar. sol. Et₂O. Prac. insol. EtOH.

de Bruyn, Blanksma, *Rec. trav. chim.*, 1901, 20, 118.

Claasz, *Ber.*, 1911, 44, 1419.

3 : 3'-Dinitrodiphenyl sulphone.

Plates. M.p. 197° (201°).

Lacroix, *Bull. soc. chim.*, 1924, 35, 1436.

Martinet, Haehl, *Compt. rend.*, 1921, 173, 777.

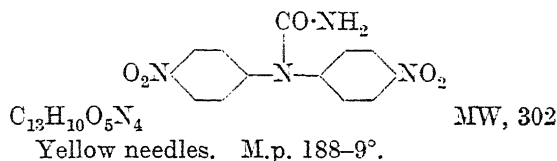
4 : 4'-Dinitrodiphenyl sulphone.

Needles from AcOH. M.p. 282° (245°).

Waldron, Reid, *J. Am. Chem. Soc.*, 1923, 45, 2410.

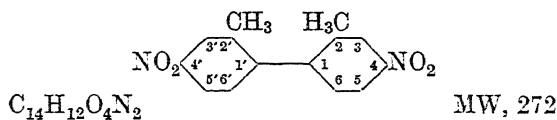
Dinitro-sym.-diphenylurea.

See Dinitrocarbanilide.

4 : 4'-Dinitro-unsym.-diphenylurea

Yellow needles. M.p. 188-9°.

Reudler, *Rec. trav. chim.*, 1914, 33, 50.

4 : 4'-Dinitro-2 : 2'-ditolyl (4 : 4'-Dinitro-2 : 2'-dimethyldiphenyl)

Yellow plates from ligroin. M.p. 170°. Sol. AcOH, C₆H₆. Spar. sol. Et₂O, hot EtOH.

Ullmann, Frentzel, *Ber.*, 1905, 38, 729.

5 : 5'-Dinitro-2 : 2'-ditolyl (5 : 5'-Dinitro-2 : 2'-dimethyldiphenyl).

Brownish yellow needles from AcOH. M.p. 173°. Spar. sol. Et₂O, ligroin, EtOH.

Ullmann, Frentzel, *Ber.*, 1905, 38, 728.

Mascarelli, Longo, *Gazz. chim. ital.*, 1937, 67, 812.

6 : 6'-Dinitro-2 : 2'-ditolyl (6 : 6'-Dinitro-2 : 2'-dimethyldiphenyl).

Yellow needles from EtOH. M.p. 110°. Spar. sol. ligroin.

Ullmann, Frentzel, *Ber.*, 1905, 38, 728.

4 : 4'-Dinitro-3 : 3'-ditolyl (4 : 4'-Dinitro-3 : 3'-dimethyldiphenyl).

Pale yellow needles from EtOH. M.p. 228°.

Schultz, Rohde, Vicari, *Ber.*, 1904, 37, 1401; *Ann.*, 1907, 352, 119.

6 : 6'-Dinitro-3 : 3'-ditolyl (6 : 6'-Dinitro-3 : 3'-dimethyldiphenyl).

Cryst. from AcOH. M.p. 161°.

Täuber, Löwenherz, *Ber.*, 1891, 24, 2597.

2 : 2'-Dinitro-4 : 4'-ditolyl (2 : 2'-Dinitro-4 : 4'-dimethyldiphenyl).

Yellow needles from EtOH. M.p. 140°. Sol. hot AcOH, C₆H₆. Spar. sol. Et₂O, ligroin. Darkens in light.

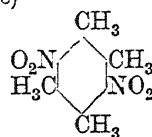
Ullmann, Forgan, *Ber.*, 1901, 34, 3804.

Mascarelli, Longo, *Gazz. chim. ital.*, 1937, 67, 812.

3 : 3'-Dinitro-4 : 4'-ditolyl (3 : 3'-Dinitro-4 : 4'-dimethyldiphenyl).

Pale brown cryst. from AcOH. M.p. 175.5°. Sol. hot C₆H₆. Spar. sol. EtOH, Et₂O, ligroin.

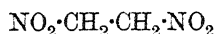
Ullmann, Frentzel, *Ber.*, 1905, 38, 727.

Dinitrodurene (3 : 6-Dinitro-1 : 2 : 4 : 5-tetramethylbenzene)

$C_{10}H_{12}O_4N_2$ MW, 224

Cryst. from MeOH-EtOH. M.p. 207-8°. Sublimes in needles. Sol. Et₂O. Spar. sol. C₆H₆.

Smith, Dobrovolsky, *J. Am. Chem. Soc.*, 1926, 48, 1421.

sym.-Dinitroethane

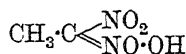
$C_2H_4O_4N_2$ MW, 120

M.p. 39-40°. B.p. 94-6°/5 mm., 88°/1 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D_4^{20} 1.4597. n_D^{20} 1.4468. Stable to heat. Acid to litmus. $Sn + HCl \rightarrow$ ethylenediamine.

Ipatow, *Chem. Abstracts*, 1923, 17, 3158.

unsym.-Dinitroethane

or



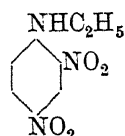
$C_2H_4O_4N_2$ MW, 120

B.p. 185-6°, 72°/12 mm. Sol. EtOH, Et₂O. Spar. sol. H₂O. D_{25}^{25} 1.3503. Forms K, Ag, etc. salts (isonitro structure, above). $k = 5.8 \times 10^{-6}$ at 25°.

Wieland, Sakellarios, *Ber.*, 1919, 52, 904.

Dinitroethoxybenzoic Acid.

See under 3 : 5-Dinitro-4-hydroxybenzoic Acid and Dinitrosalicylic Acid.

2 : 4-Dinitro-N-ethylaniline

$C_8H_9O_4N_3$

MW, 211

Yellow needles from EtOH. Orange plates from Me_2CO . M.p. 113–4° (111°). Sol. CHCl_3 , C_6H_6 . Spar. sol. Et_2O , CS_2 .

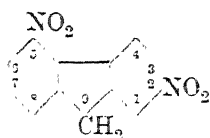
Norton, Allen, *Ber.*, 1885, 18, 1997.

2 : 5-Dinitro-N-ethylaniline.

Red needles. M.p. 120°.

van Romburgh, Jansen. *Chem. Zentr.*, 1911, I, 1412.

2 : 5-Dinitrofluorene



$\text{C}_{13}\text{H}_9\text{O}_4\text{N}_2$

MW, 256

Yellow leaflets from AcOH. M.p. 207°.

Courtot, *Ann. chim.*, 1930, 14, 81, 83.

Morgan, Thomason, *J. Chem. Soc.*, 1926, 2693.

Courtot, Moreaux, *Compt. rend.*, 1943, 217, 453.

2 : 7-Dinitrofluorene.

Needles from PhNO_2 . M.p. 334°. Mod. sol. hot AcOH. Prac. insol. EtOH. Ox. \rightarrow 2 : 7-dinitrofluorenone. $\text{H}_2\text{S} \rightarrow$ 7-nitro-2-amino-fluorene.

Courtot, *Ann. chim.*, 1930, 14, 80, 83 (Bibl.).

Monti, Martello, Franco, *Gazz. chim. ital.*, 1936, 66, 31.

2 : 9-Dinitrofluorene.

Needles from C_6H_6 . M.p. 136°. Sol. ord. org. solvents. Insol. H_2O , pet. ether.

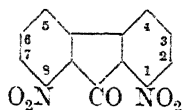
Wislicenus, Weitemeyer, *Ann.*, 1924, 436, 4.

9 : 9-Dinitrofluorene.

Cryst. from C_6H_6 . M.p. 128° decomp. Sol. EtOH, Et_2O , CHCl_3 , Me_2CO . Insol. pet. ether.

Wieland, Reisenegger, *Ann.*, 1913, 401, 247.

1 : 8-Dinitrofluorenone



$\text{C}_{13}\text{H}_7\text{O}_5\text{N}_2$

MW, 270

Yellow prisms from EtOH. M.p. 196–7°. Mod. sol. EtOH, AcOH, CHCl_3 . Spar. sol. Et_2O , C_6H_6 . $\text{H}_2\text{SO}_4 \rightarrow$ brownish red sol.

Oxime : yellow clusters of cryst. from EtOH. M.p. 250°. Me ether : pale yellow cryst. from EtOH. M.p. about 150° decomp. Acetyl : brownish yellow needles from EtOH. M.p. 178°. Benzoyl : yellow needles from EtOH. M.p. 218–20°.

Semicarbazone : brown powder. M.p. above 300°.

Phenylhydrazone : scarlet needles from EtOH. M.p. 206–7°.

Schmidt, Stützel, *Ann.*, 1909, 370, 22.

2 : 4-Dinitrofluorenone.

Yellow needles from AcOH. M.p. 197°. Sol. C_6H_6 , CHCl_3 . Spar. sol. EtOH, Et_2O .

Ullmann, Broido, *Ber.*, 1906, 39, 360.

2 : 5-Dinitrofluorenone.

Yellow needles from AcOH. M.p. 241° (243°).

Phenylhydrazone : red needles. M.p. 241° decomp.

Oxime : m.p. 265°.

Morgan, Thomason, *J. Chem. Soc.*, 1926, 2694.

2 : 7-Dinitrofluorenone.

Yellow needles from AcOH. M.p. 290°. Sol. xylene. Spar. sol. hot EtOH.

Oxime : pale yellow needles from EtOH. M.p. 285–6° decomp.

Semicarbazone : pale yellow needles from EtOH. M.p. above 350°.

Phenylhydrazone : dark red cryst. from EtOH or AcOH. M.p. 263–4° decomp.

Morgan, Thomason, *J. Chem. Soc.*, 1926, 2694.

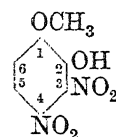
Schmidt, Retzlaff, Haid, *Ann.*, 1912, 390, 224.

4 : 5-Dinitrofluorenone.

Orange needles from AcOH. M.p. 273–5°.

Ray, Francis, *J. Org. Chem.*, 1943, 8, 52.

3 : 4-Dinitroguaiacol (3 : 4-Dinitrocatechol 1-methyl ether)



$\text{C}_7\text{H}_6\text{O}_6\text{N}_2$

MW, 214

Pale yellow prisms from toluene. M.p. 205–8° decomp. Mod. sol. EtOH, AcOEt. Spar. sol. CS_2 , CHCl_3 , C_6H_6 .

Me ether : see 3 : 4-Dinitroveratrol.

Acetyl : m.p. 124–5°.

Pollekoff, Robinson, *J. Chem. Soc.*, 1918, 113, 650.

3 : 5-Dinitroguaiacol.

Yellow needles or leaflets. M.p. 123°.

Me ether : see 3 : 5-Dinitroveratrol.

Et ether : $\text{C}_9\text{H}_{10}\text{O}_6\text{N}_2$. MW, 242. M.p. 91°.

Acetyl : m.p. 114°.

p-Toluenesulphonyl : m.p. 137–8°.

Borsche, *Ber.*, 1917, 50, 1347.

Pollekoff, Robinson, *J. Chem. Soc.*, 1918, 113, 648.

3 : 6-Dinitroguaiacol.

Yellow prisms from pet. ether. M.p. 69-70°. Sol. H₂O. Spar. sol. pet. ether, CS₂.

Me ether : see 3 : 6-Dinitroveratrol.

Acetyl : m.p. 56°.

Oxford, *J. Chem. Soc.*, 1926, 2008.

4 : 5-Dinitroguaiacol.

Pale yellow needles from EtOH or xylene. M.p. 177° (172°, 179°).

Me ether : see 4 : 5-Dinitroveratrol.

Acetyl : sinters at 114°. M.p. 123-4°.

Parijs, *Rec. trav. chim.*, 1930, 49, 41.

4 : 6-Dinitroguaiacol.

Pale yellow needles from C₆H₆. M.p. 80° (123-4°). Sol. EtOH, AcOEt. Spar. sol. cold CS₂, CHCl₃, C₆H₆.

Me ether : see 3 : 5-Dinitroveratrol.

Carbonate : needles from C₆H₆. M.p. 148°.

Pollekoff, Robinson, *J. Chem. Soc.*, 1918, 113, 649.

Pearl, *J. Am. Chem. Soc.*, 1946, 68, 1100.

5 : 6-Dinitroguaiacol.

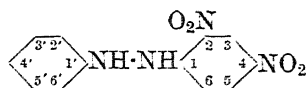
Plates from CCl₄. M.p. 109.5-110°. Mod. sol. ord. org. solvents. Spar. sol. H₂O, CS₂, CCl₄, pet. ether.

Me ether : see 3 : 4-Dinitroveratrol.

Acetyl : m.p. 99-100.5°.

Benzoyl : m.p. 132-3°.

Oxford, *J. Chem. Soc.*, 1926, 2009.

2 : 4-Dinitrohydrazobenzene

C₁₂H₁₀O₄N₄ MW, 274

Orange red leaflets from EtOH. M.p. 120° (117°).

Willgerodt, Hermann, *J. prakt. Chem.*, 1889, 40, 252.

2 : 2'-Dinitrohydrazobenzene.

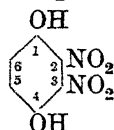
Yellowish brown powder from Me₂CO or EtOH. M.p. 188°.

Green, Rowe, *J. Chem. Soc.*, 1912, 101, 2449.

4 : 4'-Dinitrohydrazobenzene.

Yellow cryst. M.p. 228° (rapid heat.). Sol. alkalis to blue sols. in which it probably isomerises to HO·ON·C₆H₄·N·N·C₆H₄·NO·OH.

Green, Bearder, *J. Chem. Soc.*, 1911, 99, 1967.

2 : 3-Dinitrohydroquinone

C₆H₄O₆N₂

MW, 200 C₇H₄O₆N₂

Me ether : C₇H₆O₆N₂. MW, 214. Yellow plates from EtOH. M.p. 110°.

Di-Me ether : C₈H₆O₆N₂. MW, 228. Cryst. from AcOH. M.p. 177°.

Di-Et ether : C₁₀H₁₂O₆N₂. MW, 256. Yellow needles. M.p. 130°.

Nietzki, Rechberg, *Ber.*, 1890, 23, 1216.

Nietzki, *Ann.*, 1882, 215, 149.

2 : 5-Dinitrohydroquinone.

Di-Me ether : m.p. 200-2°.

Di-Et ether : yellow needles. M.p. 176°.

Robinson, *J. Chem. Soc.*, 1916, 109, 1087.

2 : 6-Dinitrohydroquinone.

Yellow leaflets + 1½H₂O from H₂O. M.p. anhyd. 135-6°. Sol. EtOH, Et₂O, hot H₂O. Sol. NH₃.Aq. and alkalis. *k* = 1 × 10⁻⁴ at 25°. Used as an indicator: greenish yellow in acid, orange in neutral, and purple in alkaline sols.

4-Me ether : C₇H₆O₆N₂. MW, 214. M.p. 102°.

Di-Me ether : m.p. 112°.

4-Acetyl : m.p. 95-6°.

1 : 4-Diacetyl : m.p. 135-6°.

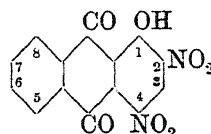
4-Benzoyl : yellow needles. M.p. 150-1°.

Gilbert, Laxton, Prideaux, *J. Chem. Soc.*, 1927, 2296.

Kehrmann, Sandoz, Monnier, *Helv. Chim. Acta*, 1921, 4, 948.

Dinitrohydroxyacetanilide.

See under Dinitroaminophenol.

2 : 4-Dinitro-1-hydroxyanthraquinone
(2 : 4-Dinitroerythroxyanthraquinone)

C₁₄H₆O₇N₂ MW, 314

Yellow needles from AcOH. M.p. 248° (243°).

M.L.B., D.R.P. 183,332, (*Chem. Zentr.*, 1907, I, 765).

1 : 3-Dinitro-2-hydroxyanthraquinone.

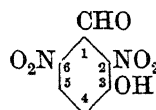
Yellow needles. M.p. 268-70°. Sol. aniline. Spar. sol. H₂O, EtOH, Et₂O.

Et ether : C₁₆H₁₀O₇N₂. MW, 342. M.p. 158°.

Simon, *Ber.*, 1882, 15, 692.

Dinitro-2-hydroxybenzaldehyde.

See Dinitrosalicylaldehyde.

2 : 6-Dinitro-3-hydroxybenzaldehyde

MW, 212

Needles from H_2O . M.p. 106° .

Me ether: $C_8H_6O_6N_2$. MW, 226. Prisms from C_6H_6 . M.p. $156-7^\circ$. *p*-Nitrophenylhydrazone: pale orange plates. Explodes about 260° . *p*-Bromophenylhydrazone: brownish red needles. M.p. $196-7^\circ$ decomp.

p-Bromophenylhydrazone: crimson needles. M.p. $249-51^\circ$.

p-Nitrophenylhydrazone: orange red needles. M.p. $252-3^\circ$.

Hodgson, Smith, *J. Chem. Soc.*, 1931, 1507.

4 : 6-Dinitro-3-hydroxybenzaldehyde.

Stellate clusters of cryst. from C_6H_6 -ligroin. M.p. 104° .

Me ether: prisms from C_6H_6 . M.p. 131° . *p*-Nitrophenylhydrazone: orange red needles. Does not melt below 300° . *p*-Bromophenylhydrazone: red needles. M.p. $254-6^\circ$ decomp.

p-Bromophenylhydrazone: scarlet needles from AcOH. M.p. $166-7^\circ$.

p-Nitrophenylhydrazone: scarlet needles from AcOH. M.p. $240-2^\circ$.

Hodgson, Smith, *J. Chem. Soc.*, 1931, 1507.

3 : 5-Dinitro-4-hydroxybenzaldehyde.

Needles from AcOH. M.p. $102-3^\circ$.

Me ether: see 3 : 5-Dinitroanisaldehyde.

Phenylhydrazone: m.p. 203° .

p-Bromophenylhydrazone: brownish red needles. Decomp. at $242-4^\circ$.

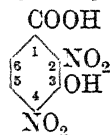
p-Nitrophenylhydrazone: orange micro-cryst. Slowly decomp. at $283-4^\circ$.

Hodgson, Beard, *J. Chem. Soc.*, 1927, 2379.

Dinitro-2-hydroxybenzoic Acid.

See Dinitrosalicilic Acid.

2 : 4-Dinitro-3-hydroxybenzoic Acid



$C_7H_4O_7N_2$

MW, 228

M.p. 204° .

Schaefer, *Chem. Abstracts*, 1937, 31, 7864.
Schmitt, *ibid.*, 8199.

4 : 6-Dinitro-3-hydroxybenzoic Acid.

M.p. 188° .

Schmitt, *Chem. Abstracts*, 1937, 31, 8199.

3 : 5-Dinitro-4-hydroxybenzoic Acid.

Leaflets from EtOH. M.p. $248-9^\circ$ (243°). Sol. EtOH, Et₂O, hot H₂O. Forms add. comps. with many aromatic hydrocarbons.

Me ester: $C_8H_6O_7N_2$. MW, 242. Needles. M.p. $115-16^\circ$.

Et ester: $C_9H_8O_7N_2$. MW, 256. Needles. M.p. $87-8^\circ$.

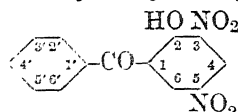
n-Butyl ester: $C_{11}H_{12}O_7N_2$. MW, 284. Needles from AcOH. M.p. 60° .

Me ether: see 3 : 5-Dinitroanisic Acid.

Et ether: 3 : 5-dinitro-*p*-ethoxybenzoic acid. $C_9H_8O_7N_2$. MW, 256. Prisms from EtOH. M.p. 192° . *Et ester*: $C_{11}H_{12}O_7N_2$. MW, 284. Needles from EtOH. M.p. 56° .

Ishihara, *Chem. Abstracts*, 1930, 24, 1361.
van Alphen, *Rec. trav. chim.*, 1930, 49, 158.

3 : 5-Dinitro-2-hydroxybenzophenone



$C_{13}H_5O_6N_2$

MW, 288

Yellow needles from EtOH. M.p. 116° . Sol. Et₂O, AcOH, C_6H_6 , $CHCl_3$.

Me ether: $C_{14}H_{10}O_6N_2$. MW, 302. Cryst. from MeOH. M.p. 83° .

Ullmann, *Broids, Ber.*, 1906, 39, 359.

3 : 5-Dinitro-4-hydroxybenzophenone.

Yellow needles from EtOH. M.p. 138° . Sol. AcOH, C_6H_6 . Spar. sol. hot H₂O.

Me ether: yellow needles from MeOH. M.p. 105° .

Blakey, Jones, Scarborough, *J. Chem. Soc.*, 1927, 2871.

3 : 3'-Dinitro-4-hydroxybenzophenone.

Faintly green prisms from EtOH. M.p. 165° .

Me ether: pale yellow needles from EtOH. M.p. 143° .

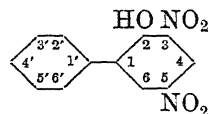
Blakey, Jones, Scarborough, *J. Chem. Soc.*, 1927, 2871.

3 : 4'-Dinitro-4-hydroxybenzophenone.

Me ether: prisms from EtOH. M.p. 174° .

Blakey, Jones, Scarborough, *J. Chem. Soc.*, 1927, 2872.

3 : 5-Dinitro-2-hydroxydiphenyl



$C_{12}H_8O_5N_2$

MW, 260

Yellow prisms from $CHCl_3$ -EtOH. M.p. $207-8^\circ$. Sublimes. Sol. $CHCl_3$, C_6H_6 , hot AcOH. Spar. sol. EtOH, AcOH, Et₂O, CS₂, hot H₂O. Insol. ligroin.

Me ether: $C_{13}H_{10}O_5N_2$. MW, 274. Leaflets from EtOH. M.p. $114-5^\circ$.

Borsche, *Ann.*, 1900, 312, 226.

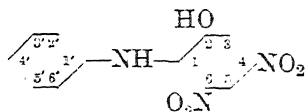
5 : 4'-Dinitro-2-hydroxydiphenyl.

Pale yellow needles from 50% EtOH. M.p. $224-5^\circ$ corr. Readily sol. EtOH, $CHCl_3$. Spar. sol. hot C_6H_6 . Insol. H₂O, ligroin.

Me ether: needles from EtOH. M.p. $222-3^\circ$.

Hill, Hale, *Am. Chem. J.*, 1905, 33, 19.

4 : 6-Dinitro-2-hydroxydiphenylamine



$C_{12}H_9O_5N_3$ MW, 275

Me ether: yellow needles from EtOH. M.p. 156°.

Borsche, *Ber.*, 1917, 50, 1347.

2' : 4'-Dinitro-2-hydroxydiphenylamine.

Orange cryst. from EtOH. M.p. 205° (190°). Sol. EtOH. Spar. sol. C_6H_6 .

Me ether: $C_{13}H_{11}O_5N_3$, MW, 289. Red needles. M.p. 151°.

Nietzki, Schündelen, *Ber.*, 1891, 24, 3588.

Kehrmann, Ramm, *Ber.*, 1920, 53, 2265.

2' : 6'-Dinitro-2-hydroxydiphenylamine.

Reddish violet needles from EtOH. M.p. 191°. Sol. hot Et_2O , hot AcOH, hot C_6H_6 .

Ullmann, *Ann.*, 1909, 366, 110.

A.G.F.A., D.R.P. 200,736, (*Chem. Zentr.*, 1908, II, 839).

4 : 6-Dinitro-3-hydroxydiphenylamine.

Yellow needles from EtOH. M.p. 139°.

Phenyl ether: $C_{18}H_{13}O_5N_3$, MW, 351. Orange red cryst. from $CHCl_3$. M.p. 151.5°.

Borsche, *Ber.*, 1917, 50, 1352, 1354.

2' : 4'-Dinitro-4-hydroxydiphenylamine.

Red leaflets. M.p. 195-6°. Sol. alkalis.

Me ether: red cryst. M.p. 141°.

O-Acetyl: m.p. 129°.

N-Acetyl: yellow scales from EtOH. M.p. 195°.

O:N-Diacetyl: pale yellow needles from EtOH. M.p. 140°.

Nietzki, Simon, *Ber.*, 1895, 28, 2973.

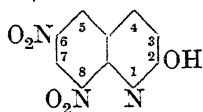
Cassella, D.R.P. 103,861, (*Chem. Zentr.*, 1899, II, 896).

Meldola, Foster, Brightman, *J. Chem. Soc.*, 1917, 111, 547.

4 : 6-Dinitro-3-hydroxydiphenyl Ether.

See under 4 : 6-Dinitroresorcinol.

6 : 8-Dinitro-2-hydroxyquinoline (6 : 8-Dinitrocarbostyryl)



$C_9H_5O_5N_3$ MW, 235

Cryst. from EtOH. M.p. 218°. Mod. sol. xylene.

Me ether: $C_{10}H_7O_5N_3$, MW, 249. Needles from C_6H_6 . M.p. 206°.

Kaufmann, de Petherd, *Ber.*, 1917, 50, 341.

6 : 8-Dinitro-5-hydroxyquinoline.

Cryst. M.p. 293° (decomp.).

Bennet, Grove, *J. Chem. Soc.*, 1945, 378.

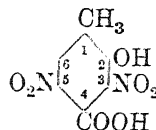
5 : 7-Dinitro-8-hydroxyquinoline.

Yellow plates from dil. HCl. M.p. 276° decomp. Spar. sol. most solvents.

Bedall, Fischer, *Ber.*, 1881, 14, 1368.

Schmitt, Engelmann, *Ber.*, 1887, 20, 2692.

3 : 5-Dinitro-2-hydroxy-p-toluic Acid



$C_8H_6O_7N_2$ MW, 242

Yellow leaflets from EtOH. M.p. 200°.

Amide: $C_8H_7O_6N_3$, MW, 241. Yellow cryst. from EtOH. M.p. 231°. Mod. sol. EtOH, hot H_2O . Insol. C_6H_6 .

Nitrile: $C_8H_5O_5N_3$, MW, 223. Yellow needles from dil. HNO_3 . M.p. 148°.

Borsche, Böcker, *Ber.*, 1903, 36, 4361.

2 : 6-Dinitro-3-hydroxy-p-toluic Acid (2 : 6-Dinitro-m-cresotinic acid).

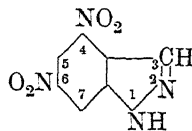
Cubes from AcOH.Aq. M.p. 185°.

Meldrum, Bamji, *J. Indian Chem. Soc.*, 1936, 13, 641.

Dinitrohystazarin.

See 1 : 4-Dinitro-2 : 3-dihydroxyanthraquinone.

4 : 6-Dinitroindazole



$C_7H_4O_4N_4$ MW, 208

Needles from AcOH. M.p. 203°. Yellow sols. in alkalis.

Brand, Eisenmenger, *J. prakt. Chem.*, 1913, 87, 498.

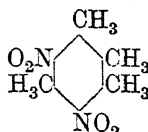
5 : 7-Dinitroindazole.

Yellow needles from EtOH. M.p. 215°. Sol. Me_2CO , AcOH, $CHCl_3$, hot EtOH. Spar. sol. Et_2O , C_6H_6 . Insol. H_2O .

N-Acetyl: m.p. 196°.

Zincke, *Ann.*, 1905, 339, 224.

4 : 6-Dinitroisodurene (4 : 6-Dinitro-1 : 2 : 3 : 5-tetramethylbenzene)

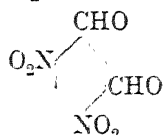


$C_{10}H_{12}O_4N_2$ MW, 224

Prisms from EtOH. M.p. 181° (156°).

Jacobsen, *Ber.*, 1882, 15, 1853.

4 : 6-Dinitroisophthalaldehyde

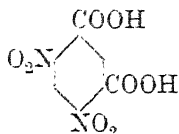
 $C_8H_4O_6N_2$

MW, 224

Pale yellow needles from EtOH. M.p. 132°.

Dioxime: yellow needles. M.p. 184°.*Disemicarbazone*: m.p. above 360° decomp.*Di-phenylhydrazone*: black needles. M.p. 251°.*Dianil*: yellow needles from EtOH. M.p. 164.5–165°.Borsche, *Ber.*, 1923, 56, 2357.Ruggli, Hinder mann, *Helv. Chim. Acta*, 1937, 20, 275.

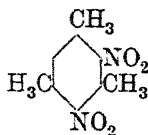
4 : 6-Dinitroisophthalic Acid

 $C_8H_4O_8N_2$

MW, 256

Yellow needles from $PhNO_2$. M.p. 234–5°.Sol. H_2O , Et_2O , Me_2CO , $AcOH$, $AcOEt$. Mod.sol. $PhNO_2$. Spar. sol. C_6H_6 , toluene, xylene.*Mono-Et ester*: $C_{10}H_8O_8N_2$. MW, 284. Yellow needles from C_6H_6 . M.p. 154°. Sol. hot EtOH, C_6H_6 , toluene.*Di-Et ester*: $C_{12}H_{12}O_8N_2$. MW, 312. Leaflets from EtOH. M.p. 124°.*Dichloride*: $C_8H_2O_6N_2Cl_2$. MW, 293. Cryst. from CCl_4 . M.p. 106°.Ruggli, Schmid, *Helv. Chim. Acta*, 1935, 18, 249.

2 : 4 - Dinitromesitylene (2 : 4 - Dinitro-1 : 3 : 5-trimethylbenzene)

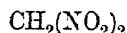
 $C_9H_{10}O_4N_2$

MW, 210

Cryst. from EtOH. M.p. 86°. Sol. hot EtOH.

Küster, Stallberg, *Ann.*, 1894, 278, 213.Pictet, Bouvier, *Ber.*, 1915, 48, 928.

Dinitromethane

 $CH_2O_4N_2$

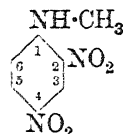
MW, 106

Unstable oil. Liq. at -15° . Shows acid reaction and forms salts which have the *isonitro* structure, e.g., $NO_2 \cdot CH \cdot NO \cdot OK$. These salts are sol. H_2O and decomp. more or less violently on heating.Duden, *Ber.*, 1893, 26, 3004.

Dinitro-methylaminobenzoic Acid.

See under 3 : 5-Dinitro-4-aminobenzoic Acid and 3 : 5-Dinitroanthranilic Acid.

2 : 4-Dinitro-N-methylaniline

 $C_7H_7O_4N_3$

MW, 197

Yellow cryst. from EtOH.Aq. M.p. 178° (176–7°). Sol. Me_2CO , Py. Insol. most other org. solvents. Spar. sol. H_2O .*N-Nitroso*: m.p. 86°.Romburgh, *Chem.-Ztg.*, 1911, 35, 200.Desvergnès, *Chem. Abstracts*, 1931, 25, 2980.

2 : 5-Dinitro-N-methylaniline.

Red needles from EtOH. M.p. 163°.

N-Nitroso: m.p. 132°.Macmillan, Reade, *J. Chem. Soc.*, 1929, 2867.

2 : 6-Dinitro-N-methylaniline.

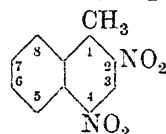
Orange needles. M.p. 106–7°.

N-Nitroso: m.p. 115–16°.Meldola, Hollely, *J. Chem. Soc.*, 1915, 107, 617.

3 : 4-Dinitro-N-methylaniline.

N-Nitroso: m.p. 108–9°.Smit, *Chem. Abstracts*, 1920, 14, 1970.

2 : 4-Dinitro-1-methylnaphthalene

 $C_{11}H_8O_4N_2$

MW, 232

Yellow needles from EtOH. M.p. 160–1°.

Vesely, Štursa, Olejníček, Rein, *Chem. Zentr.*, 1930, I, 3185.Vesely, Pastak, *Bull. soc. chim.*, 1925, 37, 1444.

4 : 5-Dinitro-1-methylnaphthalene.

Yellow needles from EtOH, Me_2CO , CCl_4 or Py. M.p. 142–3°.Vesely, Štursa, Olejníček, Rein, *Chem. Zentr.*, 1930, I, 3185.

4 : 8-Dinitro-1-methylnaphthalene.

Buff needles from EtOH. M.p. 122–3°.

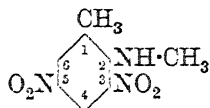
Thompson, *J. Chem. Soc.*, 1932, 2312.

1 : 5-Dinitro-2-methylnaphthalene.

Cryst. from EtOH. M.p. 134° (131°).

Vesely, Pac, *Chem. Zentr.*, 1930, II, 1548.Vesely, Kapp, *Chem. Zentr.*, 1924, II, 2751.

3 : 5-Dinitro-N-methyl-o-toluidine

 $C_8H_9O_4N_3$

MW, 211

Yellow needles from EtOH. M.p. 128°.

N-Nitroso : yellow cryst. M.p. 94-5°.

Stoermer, Hoffmann, *Ber.*, 1898, 31, 2534.

2 : 4-Dinitro-N-methyl-m-toluidine.

Orange needles from EtOH. M.p. 81°.

N-Nitroso : m.p. 65°.

Brady, Gibson, *J. Chem. Soc.*, 1921, 119, 101.

4 : 6-Dinitro-N-methyl-m-toluidine.

Yellow needles from EtOH. M.p. 173°.

N-Nitroso : m.p. 94°.

Kerkhof, *Rec. trav. chim.*, 1929, 48, 253.Brown, Campbell, *J. Chem. Soc.*, 1937, 1699.

2 : 3-Dinitro-N-methyl-p-toluidine.

Orange leaflets with blue cast from $CHCl_3$. M.p. 160°. Sol. C_6H_6 , AcOH, $CHCl_3$, hot Me_2CO . Mod. sol. Et_2O . Spar. sol. ligroin, cold EtOH.

N-Acetyl : m.p. 90-5°.

N-Benzoyl : m.p. 110-5°.

N-Nitroso : m.p. 128-128-5°.

Pinnow, *J. prakt. Chem.*, 1900, 62, 507.

2 : 5-Dinitro-N-methyl-p-toluidine.

Reddish brown prisms with green cast. M.p. 186°. Sol. $CHCl_3$, C_6H_6 , hot Me_2CO . Spar. sol. ligroin, Et_2O .

N-Acetyl : m.p. 151°.

N-Nitroso : yellow needles from EtOH. M.p. 126-7° (123-4°).

Pinnow, *J. prakt. Chem.*, 1900, 62, 507.

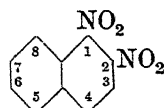
3 : 5-Dinitro-N-methyl-p-toluidine.

Yellow needles from EtOH. M.p. 129-30°.

N-Nitroso : m.p. 128° (125°).

Pinnow, *J. prakt. Chem.*, 1901, 63, 359.Morgan, Clayton, *J. Chem. Soc.*, 1911, 99, 1943.

1 : 2-Dinitronaphthalene

 $C_{10}H_6O_4N_2$

MW, 218

Brown needles from EtOH. M.p. 102-3°. Spar. sol. EtOH, C_6H_6 . $Na_2S \rightarrow$ 1-nitro-2-naphthylamine.Vesely, Dvorak, *Bull. soc. chim.*, 1923, 33, 326.Contardi, Mor, *Chem. Abstracts*, 1925, 19, 827.Reilova, *Chem. Abstracts*, 1927, 21, 2268.

1 : 3-Dinitronaphthalene.

Yellowish needles from C_6H_6 . M.p. 144-5°. Sublimes.Vesely, Dvorak, *Bull. soc. chim.*, 1923, 33, 325.Rindl, *J. Chem. Soc.*, 1913, 103, 1917.

1 : 4-Dinitronaphthalene.

Yellowish needles from EtOH. M.p. 131-2° (133-5°, 129°). Sol. H_2O and most ord. org. solvents.Vesely, Dvorak, *Bull. soc. chim.*, 1923, 33, 324.Contardi, Mor, *Chem. Abstracts*, 1925, 19, 827.Chudozilov, *Chem. Abstracts*, 1929, 23, 4212.

1 : 5-Dinitronaphthalene.

Needles from AcOH. M.p. 217-5°. Sol. hot C_6H_6 , hot Py. Insol. H_2O . $Sn + HCl$, or $(NH_4)_2S \rightarrow$ 1 : 5-naphthylenediamine. Stable to oxidising agents.M.L.B., D.R.P. 221,383, (*Chem. Zentr.*, 1910, I, 1768).Desvergues, *Chem. Abstracts*, 1926, 20, 2325.Finzi, *Chem. Abstracts*, 1925, 19, 2661.Kalle, D.R.P. 117,368, (*Chem. Zentr.*, 1901, I, 347).Hodgson, Walker, *J. Chem. Soc.*, 1933, 1348.

1 : 6-Dinitronaphthalene.

Pale yellow needles from EtOH. M.p. 161-2° (166-7°).

Vesely, Dvorak, *Bull. soc. chim.*, 1923, 33, 324.Reilova, *Chem. Abstracts*, 1927, 21, 2268.

1 : 7-Dinitronaphthalene.

Yellow cryst. M.p. 156° (150°). Sol. C_6H_6 , Me_2CO , AcOH. Spar. sol. EtOH.Vesely, Dvorak, *Bull. soc. chim.*, 1923, 33, 324.Reilova, *Chem. Abstracts*, 1927, 21, 2268.

1 : 8-Dinitronaphthalene (peri-Dinitro-naphthalene).

Plates from $CHCl_3$. M.p. 173-173-5°. Sol. Py. Spar. sol. EtOH, C_6H_6 , $CHCl_3$. Stable to oxidising agents.M.L.B., D.R.P. 221,383, (*Chem. Zentr.*, 1910, I, 1768).Desvergues, *Chem. Abstracts*, 1926, 20, 2325.Zakharov, *Chem. Abstracts*, 1931, 25, 4865.Finzi, *Chem. Abstracts*, 1925, 19, 2661.

2 : 3-Dinitronaphthalene.

Yellow cryst. M.p. 170-5-171°. Sol. EtOH.

Chudozilov, *Chem. Abstracts*, 1929, 23, 4212.

2 : 6-Dinitronaphthalene.

Reddish plates from Ac_2O . M.p. 268° .

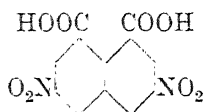
Vesely, Jakeš, *Bull. soc. chim.*, 1923, 33, 949.

2 : 7-Dinitronaphthalene.

Yellow cryst. from Ac_2O . M.p. 234° .

Rule, Brown, *J. Chem. Soc.*, 1934, 173.

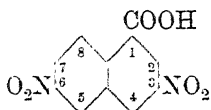
Hodgson, Ward, *J. Chem. Soc.*, 1945, 590.

3 : 6-Dinitronaphthalic Acid

$\text{C}_{12}\text{H}_6\text{O}_5\text{N}_2$ MW, 306

Leaflets from H_2O . M.p. $208-10^\circ$. Sol. hot EtOH , AcOH , AcOEt . Insol. Et_2O , C_6H_6 .

Francesconi, Bargellini, *Gazz. chim. ital.*, 1902, 32, 94.

3 : 6-Dinitro-1-naphthoic Acid

$\text{C}_{11}\text{H}_6\text{O}_6\text{N}_2$ MW, 262

Buff cryst. from AcOH . M.p. $273.5-274^\circ$.

Me ester: $\text{C}_{12}\text{H}_8\text{O}_6\text{N}_2$. MW, 276. Needles from EtOH . M.p. $196-7^\circ$.

Et ester: $\text{C}_{13}\text{H}_{10}\text{O}_6\text{N}_2$. MW, 290. Cryst. from EtOH . M.p. $145-6^\circ$.

Rule, Brown, *J. Chem. Soc.*, 1934, 173.

4 : 5-Dinitro-1-naphthoic Acid.

Cryst. from EtOH . M.p. 265° . Sol. hot EtOH , hot AcOH . Spar. sol. Et_2O , C_6H_6 , hot H_2O . Sublimes. $\text{Sn} + \text{HCl} \rightarrow 1 : 8\text{-naphthylenediamine}$.

Et ester: $\text{C}_{13}\text{H}_{10}\text{O}_6\text{N}_2$. MW, 290. Needles. M.p. 143° .

Ekstrand, *J. prakt. Chem.*, 1888, 38, 257, 267.

Rule, Pursell, Brown, *J. Chem. Soc.*, 1934, 171.

Sergievskaia, Elina, *J. Gen. Chem. U.S.S.R.*, 1943, 13, 868.

5 : 8-Dinitro-1-naphthoic Acid.

Yellow cryst. from EtOH . M.p. 218° decomp. Sol. EtOH , hot H_2O .

Et ester: m.p. 129° .

Ekstrand, *J. prakt. Chem.*, 1888, 38, 257, 267.

6 : 8-Dinitro-1-naphthoic Acid.

M.p. $267-8^\circ$ ($274-6^\circ$).

Me ester: m.p. $179-80^\circ$.

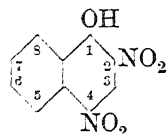
Koelsch, Hoffman, *J. Am. Chem. Soc.*, 1943, 65, 989.

4 : 5-Dinitro-2-naphthoic Acid.

Yellow prisms. M.p. 248° . Sol. Et_2O , AcOH , hot EtOH . Spar. sol. C_6H_6 .

Et ester: $\text{C}_{13}\text{H}_{10}\text{O}_6\text{N}_2$. MW, 290. M.p. 165° .

Ekstrand, *J. prakt. Chem.*, 1890, 42, 286.

2 : 4-Dinitro-1-naphthol

$\text{C}_{10}\text{H}_6\text{O}_5\text{N}_2$

MW, 234

Yellow needles from hot EtOH or CHCl_3 . M.p. 137.5° (132°). Spar. sol. Et_2O , EtOH , C_6H_6 . Prac. insol. H_2O . Non-volatile in steam. $\text{Sn} + \text{HCl} \rightarrow 2 : 4\text{-diamino-1-naphthol}$. Alc. NH_3 at $200^\circ \rightarrow 2 : 4\text{-dinitro-1-naphthylamine}$. Na salt is the dyestuff Martius Yellow.

Me ether: $\text{C}_{11}\text{H}_8\text{O}_5\text{N}_2$. MW, 248. Yellow needles. M.p. 97° .

Et ether: $\text{C}_{12}\text{H}_{10}\text{O}_5\text{N}_2$. MW, 262. Yellow needles. M.p. 92° .

Benzoyl: m.p. 174° .

Morgan, Evens, *J. Chem. Soc.*, 1919, 115, 1128.

Enz, Pfister, *Helv. Chim. Acta*, 1930, 13, 194.

Aleksandrov, Shtamm, *Chem. Abstracts*, 1930, 24, 3507.

Kerkhof, *Rec. trav. chim.*, 1932, 51, 745.

4 : 5-Dinitro-1-naphthol.

Yellow needles from EtOH . M.p. 230° (208° decomp., 198° decomp.). Sol. EtOH , Me_2CO , alkalis. Spar. sol. hot H_2O . Insol. ligroin, C_6H_6 .

Me ether: m.p. 216° .

Et ether: leaflets. M.p. 188° (182°).

m-Nitrobenzenesulphonyl: m.p. 174° .

Ullmann, Consonno, *Ber.*, 1902, 35, 2807.

Bell, *J. Chem. Soc.*, 1933, 286.

Hodgson, Hathway, *J. Chem. Soc.*, 1945, 543.

4 : 6-Dinitro-1-naphthol.

Yellow cryst. M.p. 240° . Sol. CHCl_3 .

Hodgson, Hathway, *J. Chem. Soc.*, 1945, 453.

4 : 8-Dinitro-1-naphthol.

Yellow needles from EtOH . Aq. M.p. 235° decomp. Sol. EtOH , AcOH , alkalis. Prac. insol. H_2O .

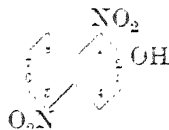
Et ether: m.p. 115° .

m-Nitrobenzenesulphonyl: prisms from AcOH . M.p. 165° .

Ullmann, Consonno, *Ber.*, 1902, 35, 2810.

Bell, *J. Chem. Soc.*, 1933, 286.

1 : 5-Dinitro-2-naphthol

 $C_{10}H_7O_5N_2$

MW, 234

Yellow cryst. M.p. 187° decomp.

m-Nitrobenzenesulphonyl: cryst. from AcOH. M.p. 153°.

Bell, *J. Chem. Soc.*, 1933, 288.

1 : 6-Dinitro-2-naphthol.

Pale yellow needles. M.p. 195° decomp. Sol. EtOH, $CHCl_3$, hot EtOH. Prac. insol. H_2O . Alc. NH_3 at 160° \rightarrow 1 : 6-dinitro-2-naphthylamine. Ox. \rightarrow 4-nitrophthalic acid.Me ether: $C_{11}H_8O_5N_2$. MW, 248. M.p. 204° (198°).Et ether: $C_{12}H_{10}O_5N_2$. MW, 262. Yellowish needles. M.p. 144°.

p-Toluenesulphonate: m.p. 181°.

Graebe, *Ann.*, 1904, 335, 142.Hutchison, Smiles, *J. Chem. Soc.*, 1914, 105, 1749.Ahmed, Hemphill, Ray, *J. Am. Chem. Soc.*, 1934, 56, 2403.

1 : 8-Dinitro-2-naphthol.

Yellow leaflets from EtOH.Aq. M.p. 198° decomp. Sol. EtOH, $CHCl_3$. Spar. sol. hot H_2O . Ox. \rightarrow 3-nitrophthalic acid.

Me ether: m.p. 190°.

Et ether: yellow needles. M.p. 215°.

Davies, *Chem. News*, 1896, 74, 302.

4 : 5-Dinitro-2-naphthol.

Orange red cryst. M.p. 237-8° (about 230°). m-Nitrobenzenesulphonyl: cryst. from AcOH. M.p. 212°.

Bell, *J. Chem. Soc.*, 1933, 288.

5 : 8-Dinitro-2-naphthol.

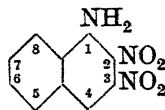
Et ether: yellow needles from EtOH. M.p. 215°.

Onufrowicz, *Ber.*, 1890, 23, 3360.

2 : 4-Dinitro-1-naphthol-7-sulphonic Acid.

See Flavianic Acid.

2 : 3-Dinitro-1-naphthylamine

 $C_{10}H_7O_4N_3$

MW, 233

Deep red cryst. M.p. 160-1°.

Hodgson, Turner, *J. Chem. Soc.*, 1943, 635.

2 : 4-Dinitro-1-naphthylamine.

Yellow needles from EtOH. M.p. 242° (239°). Sol. Me_2CO , Ac_2O . Spar. sol. EtOH, Et_2O , AcOH, C_6H_6 , $CHCl_3$. Prac. insol. H_2O , pet.

Dict. of Org. Comp.—II.

ether, CS_2 . Caustic alkalis \rightarrow 2 : 4-dinitro-1-naphthol.N-Et: $C_{12}H_{11}O_4N_3$. MW, 261. M.p. 172°.N-Acetyl: 2 : 4-dinitro-1-acetnaphthalide. $C_{12}H_9O_5N_3$. MW, 275. Pale yellow needles. M.p. 247°. Mod. sol. hot EtOH.

N-Benzoyl: m.p. 252°.

N-p-Toluenesulphonyl: pale yellow needles from EtOH. M.p. 165-6°.

B.D.C., B.P. 152,437, (*Chem. Abstracts*, 1921, 15, 761).Talen, *Rec. trav. chim.*, 1928, 47, 350.Vesely, Jakeš, *Bull. soc. chim.*, 1923, 33, 950.Morgan, Evens, *J. Chem. Soc.*, 1919, 115, 1128.

2 : 6-Dinitro-1-naphthylamine.

Deep yellow cryst. M.p. 226.5-8.5°.

Hodgson, Turner, *J. Chem. Soc.*, 1943, 391.

4 : 5-Dinitro-1-naphthylamine.

Red needles from amyl alcohol. Brownish-orange leaflets from AcOH. M.p. 246° (236°). Sol. EtOH.

N-Acetyl: 4 : 5-dinitro-1-acetnaphthalide. M.p. 245°.

Badische, D.R.P. 145,191, (*Chem. Zentr.*, 1905, II, 1097).Kerkhof, *Rec. trav. chim.*, 1932, 51, 752.Hodgson, Hathway, *J. Chem. Soc.*, 1945, 543.

4 : 6-Dinitro-1-naphthylamine.

Scarlet cryst. M.p. 178°.

Hodgson, Turner, *J. Chem. Soc.*, 1943, 391.

4 : 8-Dinitro-1-naphthylamine.

Red needles from AcOH.Aq. M.p. 197° decomp. Sol. AcOH, EtOH, hot C_6H_6 .N-Me: $C_{11}H_9O_4N_3$. MW, 247. M.p. 145°.

N-Acetyl: 4 : 8-dinitro-1-acetnaphthalide. Plates from AcOH. M.p. 231°.

N-Benzoyl: leaflets from EtOH.Aq. M.p. 224°.

Ullmann, Consonno, *Ber.*, 1902, 35, 2810.Hodgson, Crook, *J. Chem. Soc.*, 1936, 1338.

1 : 5-Dinitro-2-naphthylamine.

Yellow cryst. from EtOH. M.p. 191°.

N-Acetyl: 1 : 5-dinitro-2-acetnaphthalide. $C_{12}H_9O_5N_3$. MW, 275. M.p. 200-1°.Vesely, Jakeš, *Bull. soc. chim.*, 1923, 33, 950.

1 : 6-Dinitro-2-naphthylamine.

Cryst. from EtOH. M.p. 248° (238°). Spar. sol. EtOH, C_6H_6 , Me_2CO . Very spar. sol. H_2O .

N-Phenyl: m.p. 174° (195°).

N-p-Toluenesulphonyl: m.p. 197°.

Graebe, *Ann.*, 1904, 335, 142.

1 : 8-Dinitro-2-naphthylamine.

Yellowish needles from EtOH. M.p. 220-1°. Sol. Me₂CO. Spar. sol. EtOH, Et₂O, CHCl₃.

N-Acetyl: 1 : 8-dinitro-2-acetnaphthalide. Yellow cryst. M.p. 235° decomp.

Vesely, Jakeš, *Bull. soc. chim.*, 1923, 33, 950.

4 : 5-Dinitro-2-naphthylamine.

Orange cryst. M.p. 232°.

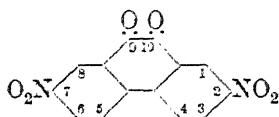
N-Acetyl: m.p. 296°.

Hodgson, Ward, *J. Chem. Soc.*, 1945, 794.

5 : 8-Dinitro-2-naphthylamine.

Needles from toluene. Blackens at 235° but does not melt. Spar. sol. C₆H₆.

Onufrowicz, *Ber.*, 1890, 23, 3362.

2 : 7-Dinitrophenanthraquinone

C₁₄H₆O₆N₂

MW, 298

Yellow needles from AcOH. M.p. 300-3°. Spar. sol. EtOH, AcOH.

Monoxime: m.p. 246-8° decomp.

Thiosemicarbazone: cryst. from AcOH. M.p. 258°.

Ghatak, *Chem. Zentr.*, 1933, II, 2391.

De, Dutt, *J. Indian Chem. Soc.*, 1930, I, 541.

4 : 5-Dinitrophenanthraquinone.

Reddish yellow prisms from AcOH. M.p. 227° (228°).

Monoxime: m.p. 190-1° decomp.

Hydrazone: m.p. 162°.

Ghatak, *Chem. Zentr.*, 1933, II, 2391.

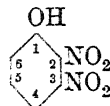
De, Dutt, *J. Indian Chem. Soc.*, 1930, I, 541.

Dinitrophenetidine.

See under Dinitroaminophenol.

Dinitrophenetole.

See under Dinitrophenol.

2 : 3-Dinitrophenol

C₆H₄O₅N₂

MW, 184

Yellow cryst. M.p. 144-5°. Sol. Et₂O, EtOH, hot H₂O. $k = 1.3 \times 10^{-5}$ at 25°.

Me ether: see 2 : 3-Dinitroanisole.

Et ether: 2 : 3-dinitrophenetole. C₈H₈O₅N₂. MW, 212. Yellowish leaflets. M.p. 101°.

Reverdin, Meldola, *J. Chem. Soc.*, 1913, 103, 1492.

2 : 4-Dinitrophenol.

Prac. colourless cryst. F.p. 112-5°. M.p. 113° (111.6°). Sublimes on careful heating. Sol. to 5% in boiling H₂O, 0.5% at 18°. Sol. to 4% in EtOH at 19°. Sol. Et₂O, CHCl₃, C₆H₆, alkalis. Volatile in steam. D₂₅ 1.683. $k = 1.0 \times 10^{-4}$ at 25°. (NH₄)₂S \rightarrow 4-nitro-o-aminophenol. Sn + HCl \rightarrow 2 : 4-diaminophenol. NH₃.Aq. at 175° \rightarrow 2 : 4-dinitroaniline.

Me ether: see 2 : 4-Dinitroanisole.

Et ether: 2 : 4-dinitrophenetole. Needles or leaflets. M.p. 87°. Volatile in steam.

Acetyl: m.p. 72°.

p-Toluenesulphonyl: m.p. 122°.

Desvergnes, *Chimie et Industrie*, 1932, 27, 278, 527 (*Review, Bibl.*).

Silberrad, B.P. 40,955, (*Chem. Abstracts*, 1920, 14, 2204).

Beaucourt, Hämmerle, *J. prakt. Chem.*, 1928, 120, 185.

Datta, Varma, *J. Am. Chem. Soc.*, 1919, 41, 2043.

Shorygin, Topchiev, Anan'ina, *Chem. Abstracts*, 1939, 33, 3781.

2 : 5-Dinitrophenol.

Yellowish needles. M.p. 108° (104°). Sol. Et₂O, hot EtOH. Spar. sol. cold H₂O. Volatile in steam. $k = 0.7 \times 10^{-5}$ at 25°.

Me ether: see 2 : 5-Dinitroanisole.

Et ether: 2 : 5-dinitrophenetole. M.p. 85°.

Datta, Varma, *J. Indian Chem. Soc.*, 1927, 4, 321.

2 : 6-Dinitrophenol.

Pale yellow needles or leaflets. M.p. 63-4°. Sol. Et₂O, CHCl₃, C₆H₆, hot EtOH. Mod. sol. hot H₂O. Volatile in steam. $k = 1.7 \times 10^{-4}$ at 25° (2.7×10^{-4} at 25°). Forms add. comp. with 2NH₃. (NH₄)₂S \rightarrow 6-nitro-o-aminophenol. Sn + HCl \rightarrow 2 : 6-diaminophenol.

Me ether: see 2 : 6-Dinitroanisole.

Et ether: 2 : 6-dinitrophenetole. Needles. M.p. 58°.

p-Toluenesulphonyl: m.p. 135°.

Borsche, *Ber.*, 1917, 50, 1349.

Kulikov, Panova, *Brit. Chem. Abstracts*, 1932, A, 586.

3 : 4-Dinitrophenol.

Needles from hot H₂O. M.p. 134°. Sol. EtOH, Et₂O. Non-volatile in steam. $k = 4.3 \times 10^{-6}$ at 25°.

Me ether: see 3 : 4-Dinitroanisole.

Et ether: 3 : 4-dinitrophenetole. C₈H₈O₅N₂. MW, 212. M.p. 87°.

Vermeulen, *Rec. trav. chim.*, 1906, 25, 14.

3 : 5-Dinitrophenol.

Leaflets. M.p. 126°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. pet. ether. $k = 2.1 \times 10^{-7}$ at 25°.

Me ether: see 3 : 5-Dinitroanisole.

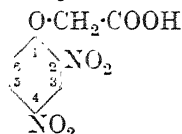
Et ether : 3 : 5-dinitrophenetole. M.p. 97°.

Acetyl : m.p. 126-7°.

Reverdin, Dresel, *Ber.*, 1905, 38, 1595.

Sidgwick, Taylor, *J. Chem. Soc.*, 1922, 1853.

2 : 4-Dinitrophenoxyacetic Acid



$\text{C}_8\text{H}_6\text{O}_7\text{N}_2$

MW, 242

Prisms from H_2O . M.p. 147-8°. Insol. C_6H_6 . Hyd. by alkalis.

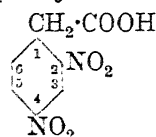
Pratesi, *Gazz. chim. ital.*, 1892, 22, 242.

3 : 5-Dinitrophenoxyacetic Acid.

Brown cryst. powder. M.p. 207°.

Reverdin, Buckey, *Ber.*, 1906, 39, 2686.

2 : 4-Dinitrophenylacetic Acid



$\text{C}_8\text{H}_6\text{O}_6\text{N}_2$

MW, 226

Needles from H_2O . M.p. 179° decomp. \rightarrow 2 : 4-dinitrotoluene. Alkali salts decomp. readily to dinitrotoluene.

Me ester : $\text{C}_9\text{H}_8\text{O}_6\text{N}_2$. MW, 240. Cryst. from EtOH. M.p. 82°.

Et ester : $\text{C}_{10}\text{H}_{10}\text{O}_6\text{N}_2$. MW, 254. Cryst. from H_2O . M.p. 35°.

Benzyl ester : yellow needles from EtOH. M.p. 98°.

Chloride : $\text{C}_8\text{H}_5\text{O}_5\text{N}_2\text{Cl}$. MW, 244.5. Yellow leaflets from CS_2 . M.p. 77°.

Amide : $\text{C}_8\text{H}_7\text{O}_5\text{N}_3$. MW, 225. Yellow prisms from EtOH. M.p. 180°.

Anilide : yellow leaflets from EtOH. M.p. 181°.

Hydrazide : m.p. 135.5-137°.

Borsche, *Ber.*, 1909, 42, 1313.

2 : 6-Dinitrophenylacetic Acid.

Yellow leaflets. M.p. 201-2° \rightarrow 2 : 6-dinitrotoluene.

Me ester : m.p. 57°.

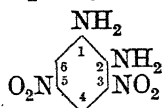
Nitrile : $\text{C}_8\text{H}_5\text{O}_4\text{N}_3$. MW, 207. Yellowish brown cryst. from PhNO_2 -EtOH. M.p. 202°.

Borsche, Rantscheff, *Ann.*, 1911, 379, 181.

2 : 4-Dinitrophenylbenzylamine.

See under 2 : 4-Dinitroaniline.

3 : 5-Dinitro-o-phenylenediamine



$\text{C}_6\text{H}_6\text{O}_4\text{N}_4$

MW, 198

Reddish needles from EtOH. M.p. 210-11° (215°). Sol. EtOH. Mod. sol. AcOH. Spar. sol. hot H_2O .

1 : 2-N-Diacetyl : m.p. 245-6°.

Norton, Elliott, *Ber.*, 1878, 11, 327.

Nietzki, Hagenbach, *Ber.*, 1897, 30, 542.

2 : 4-Dinitro-m-phenylenediamine.

Orange yellow needles from EtOH. M.p. 253-4° (260°). Spar. sol. EtOH, Et_2O , C_6H_6 .

Meisenheimer, Patzig, *Ber.*, 1906, 39, 2538.

Barr, *Ber.*, 1888, 21, 1545.

4 : 6-Dinitro-m-phenylenediamine.

Orange yellow cryst. from AcOH. M.p. 298° (300°). Mod. sol. AcOH. Spar. sol. EtOH.

1 : 3-N-Diacetyl : m.p. 228°.

Rohm and Haas, U.S.P. 1,752,998, (*Chem. Abstracts*, 1930, 24, 2468).

Société chimique de Grande-Paroisse, B.P. 169,688, (*Chem. Abstracts*, 1922, 16, 721).

2 : 3-Dinitro-p-phenylenediamine.

Yellow needles. M.p. 241-50° decomp. Spar. sol. EtOH, Et_2O , C_6H_6 , CHCl_3 .

1 : 4-N-Diacetyl : m.p. 257°.

MacLeod, Pfund, Kilpatrick, *J. Am. Chem. Soc.*, 1922, 44, 2268.

2 : 5-Dinitro-p-phenylenediamine.

Reddish brown needles. M.p. 295-300° decomp. Sol. Me_2CO . Spar. sol. Et_2O , CHCl_3 , CCl_4 .

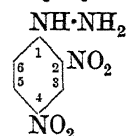
MacLeod, Pfund, Kilpatrick, *J. Am. Chem. Soc.*, 1922, 44, 2268.

2 : 6-Dinitro-p-phenylenediamine.

Purple prisms from EtOH. M.p. 225°.

Hodgson, Crook, *J. Chem. Soc.*, 1936, 1570.

2 : 4-Dinitrophenylhydrazine



$\text{C}_8\text{H}_6\text{O}_4\text{N}_4$

MW, 198

Bluish red cryst. with violet fluor. M.p. 194° (198° decomp.). Sol. aniline, hot AcOEt. Mod. sol. hot EtOH. Spar. sol. Et_2O , CHCl_3 , CS_2 , C_6H_6 . Hot caustic alkalis \rightarrow 2 : 4-dinitrophenol.

B.HNO}_3 : yellow leaflets. M.p. 158-60°.

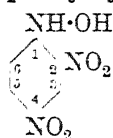
N-Acetyl : $(\text{NO}_2)_2\text{C}_6\text{H}_3\text{-NH-NH-COCH}_3$. Yellow needles from EtOH.Aq. M.p. 197-8°.

N-Benzoyl : orange red leaflets from EtOH. M.p. 206-7°.

Allen, *J. Am. Chem. Soc.*, 1930, 52, 2956 (*Bibl.*); *Organic Syntheses*, 1933, XIII, 36.

2 : 6-Dinitrophenylhydrazine.

Red needles from EtOH.Aq. M.p. 144–5°.

Borsche, Rantsch, *Ann.*, 1911, **379**, 171.Allen, *Organic Syntheses*, 1933, XIII, 36.**2 : 4-Dinitro-β-phenylhydroxylamine** $C_6H_5O_5N_3$

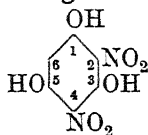
MW, 199

M.p. 80° decomp. Stable only when dry. Forms salts (Na, Ba, NH_4 , aniline, etc.). $(NH_4)_2S \rightarrow$ 4-nitro-*o*-phenylenediamine. Strong ox. agents \rightarrow di- and tri-nitrobenzenes.

Me ether: $C_6H_7O_5N_3$. MW, 213. Dark yellow prisms. M.p. 110–11°. *N-Benzoyl*: m.p. 155°.

O-Acetyl: yellow needles. M.p. 164° decomp.*Diacetyl deriv.*: m.p. 141°.*O-Benzoyl*: m.p. 163–4°.Borsche, *Ber.*, 1923, **56**, 1496.**2 : 6-Dinitro-β-phenylhydroxylamine.**

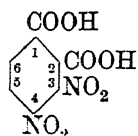
Orange red needles. M.p. 115° decomp. Less stable in dry state, but more stable in solution, than the 2 : 4-derivative. Conc. $HNO_3 \rightarrow$ 1 : 2 : 3-trinitrobenzene.

Dibenzoyl deriv.: m.p. 168–9°.Borsche, *Ber.*, 1923, **56**, 1500.**3 : 5-Dinitro-β-phenylhydroxylamine.**Yellow needles from C_6H_6 . M.p. 135–7°.Cohen, McCandlish, *J. Chem. Soc.*, 1905, **87**, 1264.**2 : 4-Dinitrophenylglucitol** $C_6H_4O_7N_2$

MW, 216

1 : 5-*Di-Me ether*: $C_8H_8O_7N_2$. MW, 244. Yellow cryst. from EtOH. M.p. 190°.

Tri-Et ether: $C_{12}H_{16}O_7N_2$. MW, 300. Cryst. from EtOH. M.p. 104–5° (98°).

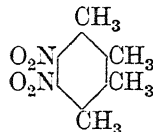
Jackson, Koch, *Am. Chem. J.*, 1899, **21**, 521.Blanksma, *Rec. trav. chim.*, 1908, **27**, 254.**3 : 4-Dinitrophthalic Acid** $C_8H_4O_8N_2$

MW, 256

Needles. M.p. 204–5° decomp.

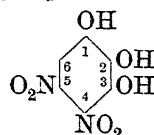
Di-Et ester: $C_{12}H_{12}O_8N_2$. MW, 312. M.p. 69°.Warner, *Proc. Chem. Soc.*, 1913, **29**, 61.**3 : 5-Dinitrophthalic Acid.**Prisms from Et₂O-ligroin. M.p. 226°. Sol. H_2O , EtOH, Et₂O. Insol. C_6H_6 , CS_2 , ligroin. $Sn + HCl \rightarrow$ 3 : 5-diaminobenzoic acid.*Et ester*: $C_{10}H_8O_5N_2$. MW, 284. M.p. 186–7°.*Di-Et ester*: m.p. 73°.

Anhydride: $C_8H_2O_7N_2$. MW, 238. Needles. M.p. 163–4° (161°).

Tetralin G.m.b.H., D.R.P. 299,014, (*Chem. Zentr.*, 1919, IV, 374).Eder, Widmer, *Helv. Chim. Acta*, 1923, **6**, 976.**3 : 6-Dinitrophthalic Acid.**Needles from Et₂O-ligroin. M.p. 201–2°. Sol. H_2O , EtOH, Et₂O. $Sn + HCl \rightarrow$ 2 : 5-diaminobenzoic acid.Will, *Ber.*, 1895, **28**, 369.**Dinitroprehnitine** $C_{10}H_{12}O_4N_2$

MW, 224

Prisms from EtOH. M.p. 178°.

Willstätter, Kubli, *Ber.*, 1909, **42**, 4162.Jacobsen, *Ber.*, 1886, **19**, 1214.**4 : 5-Dinitropyrogallol** $C_6H_4O_7N_2$

MW, 216

1 : 3-*Di-Me ether*: $C_8H_8O_7N_2$. MW, 244.Yellow cryst. M.p. 154°. Sol. ord. org. solvents. Insol. H_2O .

Tri-Me ether: $C_9H_{10}O_7N_2$. MW, 258. M.p. 119° (126°).

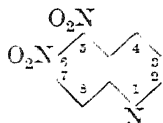
Tri-Et ether: $C_{12}H_{16}O_7N_2$. MW, 300. Cryst. from EtOH. M.p. 93°.

Bogert, Plaut, *J. Am. Chem. Soc.*, 1915, **37**, 2730.Will, *Ber.*, 1888, **21**, 612.Schiffer, *Ber.*, 1892, **25**, 723.Thoms, Siebeling, *Ber.*, 1911, **44**, 2116, 2118.**4 : 6-Dinitropyrogallol.**Yellow needles from hot H_2O . M.p. 208°.Sol. Et₂O, EtOH. Spar. sol. H_2O , $CHCl_3$, C_6H_6 . $FeCl_3 \rightarrow$ green col.

1 : 3-*Di-Me ether*: yellow needles from hot H_2O . M.p. 162–3°. Sol. EtOH, AcOH, hot H_2O .

Tri-Me ether: m.p. 87–8°.*Triacetyl*: m.p. 154°.Brand, Collischonn, *J. prakt. Chem.*, 1922, **103**, 350.Einhorn, Cobliner, Pfeiffer, *Ber.*, 1904, **37**, 120.

5 : 6-Dinitroquinoline

 $C_9H_5O_4N_3$

MW, 219

Needles from EtOH. M.p. 185°. Sol. EtOH, $CHCl_3$, C_6H_6 . Sol. dil. NaOH with red col. Sublimes.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1740.

Kaufmann, Decker, *Ber.*, 1906, 39, 3649.

5 : 7-Dinitroquinoline.

Needles from EtOH. M.p. 182–3° (180°). Sol. $CHCl_3$, hot EtOH. Spar. sol. Et_2O , C_6H_6 , hot H_2O . Sol. hot NaOH.Aq. with red col. $SnCl_2 + HCl \rightarrow$ 5 : 6-diaminoquinoline.

B.HCl: cryst. M.p. about 86°.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1736.

Claus, Hartmann, *J. prakt. Chem.*, 1896, 53, 199.

6 : 8-Dinitroquinoline.

Needles from H_2O . M.p. 149–50° (154°). Sol. hot EtOH, hot $CHCl_3$. Spar. sol. Et_2O , C_6H_6 , hot H_2O . Sol. hot alkalis with red col. Spar. sol. dil. min. acids. $SnCl_2 + HCl \rightarrow$ 6 : 8-diaminoquinoline.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1738.

Kaufmann, Decker, *Ber.*, 1906, 39, 3649.

La Coste, *Ber.*, 1882, 15, 561.

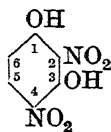
7 : 8-Dinitroquinoline.

Yellow cryst. from EtOH or C_6H_6 . M.p. 225° (221–3°). Sol. hot dil. NaOH with yellow col. Sublimes in yellow needles.

Kaufmann, Decker, *Ber.*, 1906, 39, 3650.

Kaufmann, Hüsey, *Ber.*, 1908, 41, 1741.

2 : 4-Dinitroresorcinol

 $C_6H_4O_6N_2$

MW, 200

Yellow leaflets. M.p. 147–8° (146°). De-comp. on rapid heating. $k = 8.85 \times 10^{-4}$ at 25°. Alc. $(NH_4)_2S \rightarrow$ 4-nitro-2-aminoresorcinol.

1-*Me ether*: $C_7H_6O_6N_2$. MW, 214. M.p. 108°.

Di-*Me ether*: $C_8H_8O_6N_2$. MW, 228. M.p. 73°.

1-*Et ether*: $C_8H_8O_6N_2$. MW, 228. M.p. 118°.

3-*Et ether*: m.p. 122°.

Di-*Et ether*: $C_{10}H_{12}O_6N_2$. MW, 256. Cryst. M.p. 57°.

3-*Me*-1-*Et ether*: $C_9H_{10}O_6N_2$. MW, 242. M.p. 69°.

Mono-p-toluenesulphonyl deriv.: m.p. 126–7°.

Vermeulen, *Rec. trav. chim.*, 1919, 38, 106.

Borsche, Feske, *Ber.*, 1928, 61, 698.

4 : 5-Dinitroresorcinol.

Di-*Me ether*: m.p. 131°.

Vermeulen, *Rec. trav. chim.*, 1912, 31, 103.

4 : 6-Dinitroresorcinol.

Pale yellow cryst. M.p. 215°. Sol. Et_2O , $CHCl_3$, hot AcOH. Mod. sol. hot EtOH, hot C_6H_6 , hot H_2O . Sublimes. $k = 1.05 \times 10^{-4}$ at 25°. $Sn + HCl \rightarrow$ 4 : 6-diaminoresorcinol.

Me ether: m.p. 113°.

Di-*Me ether*: needles. M.p. 157°.

Et ether: m.p. 77°.

Di-*Et ether*: m.p. 133°.

Phenyl ether: 4 : 6-dinitro-3-hydroxydiphenyl ether. $C_{12}H_8O_6N_2$. MW, 276. M.p. 117–18°.

Diphenyl ether: $C_{18}H_{12}O_6N_2$. MW, 352. M.p. 129°.

Diacetyl: m.p. 139°.

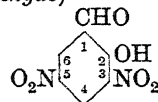
Dibenzoyl: m.p. 343–4°.

Di-*p-nitrobenzoyl*: m.p. 178°.

Mono-p-toluenesulphonyl deriv.: m.p. 135°.

Typke, *Ber.*, 1883, 16, 552.

3 : 5-Dinitrosalicylaldehyde (3 : 5-Dinitro-2-hydroxybenzaldehyde)

 $C_7H_4O_6N_2$

MW, 212

Pale yellow plates from C_6H_6 or AcOH.Aq. M.p. 62–3° (56°).

Me ether: $C_8H_6O_6N_2$. MW, 226. M.p. 86–7°.

Semicarbazone: m.p. 205°. *Phenylhydrazone*: m.p. 214°.

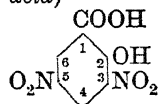
Semicarbazone: (a) decomp. at 231°. (b) M.p. 239° decomp.

Phenylhydrazone: m.p. 228°.

Hill, Robinson, *J. Chem. Soc.*, 1933, 486 (Bibl.).

Lovett, Roberts, *J. Chem. Soc.*, 1928, 1978.

3 : 5-Dinitrosalicylic Acid (3 : 5-Dinitro-o-hydroxybenzoic acid)

 $C_7H_4O_7N_2$

MW, 228

Plates + $1H_2O$ from H_2O . M.p. 173–4°. Sol. H_2O , EtOH, Et_2O . Conc. $HNO_3 \rightarrow$ picric acid. H_2O at 200° \rightarrow 2 : 4-dinitrophenol. $FeCl_3 \rightarrow$ reddish violet col. Na and K salts are spar. sol. H_2O .

Me ether: 3 : 5-dinitro-o-methoxybenzoic acid.

$C_8H_6O_7N_2$. MW, 242. M.p. 165°. *Me ester*:

$C_9H_8O_7N_2$. MW, 256. M.p. 69°. *Et ester*:

$C_{10}H_{10}O_7N_2$. MW, 270. M.p. 47°. *Nitrile*:

$C_8H_5O_5N_3$. MW, 223. M.p. 71°.

Et ether: 3 : 5-dinitro-o-ethoxybenzoic acid.

$C_9H_8O_7N_2$. MW, 256. M.p. 133°. *Me ester*:

$C_{10}H_{10}O_7N_2$. MW, 270. M.p. 80°. *Et ester*:

$C_{11}H_{12}O_7N_2$. MW, 284. M.p. 49°. Nitrile : $C_9H_7O_5N_3$. MW, 237. M.p. 72°.

Phenyl ether : 3 : 5-dinitro-*o*-phenoxybenzoic acid. $C_{13}H_9O_7N_2$. MW, 304. M.p. 150°. *Et ester* : $C_{15}H_{12}O_7N_2$. MW, 332. M.p. 98°.

Me ester : $C_9H_6O_7N_2$. MW, 242. M.p. 127-8°. Sol. EtOH. Insol. H_2O .

Et ester : $C_9H_8O_7N_2$. MW, 256. Cryst. from H_2O . M.p. 99°. Sol. hot EtOH.

n-Propyl ester : $C_{10}H_{10}O_7N_2$. MW, 270. M.p. 67-8°.

Isopropyl ester : m.p. 101-2°.

n-Butyl ester : $C_{11}H_{12}O_7N_2$. MW, 284. M.p. 60-1°.

Isobutyl ester : m.p. 72-3°.

Isoamyl ester : $C_{12}H_{14}O_7N_2$. MW, 298. M.p. 61-2°.

n-Dodecyl ester : m.p. 45.5-46°.

n-Tetradecyl ester : m.p. 52-3°.

n-Hexadecyl ester : m.p. 50-1°.

n-Octadecyl ester : m.p. 66.5-67°.

Phenyl ester : 3 : 5-dinitrosalol. $C_{13}H_8O_7N_2$. MW, 304. Needles. M.p. 183°. Mod. sol. $CHCl_3$, C_6H_6 . Spar. sol. EtOH. *Acetyl deriv.* : m.p. 118°.

α -Naphthyl ester : $C_{17}H_{10}O_7N_2$. MW, 354. M.p. 192°.

β -Naphthyl ester : m.p. 254°.

Chloride : $C_7H_3O_6N_2Cl$. MW, 246.5. M.p. 69-70°.

Amide : $C_7H_5O_6N_3$. MW, 227. Yellow needles from H_2O . M.p. 181°.

Nitrile : $C_7H_3O_5N_3$. MW, 209. Yellow cryst. from H_2O . M.p. 177°.

Sumner, *J. Biol. Chem.*, 1921, 47, 4.

Hübner, *Ann.*, 1879, 195, 46.

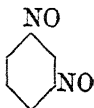
5 : 6-Dinitrosalicylic Acid.

Me ether : 5 : 6-dinitro-*o*-methoxybenzoic acid. Nitrile : m.p. 113°.

Et ether : 5 : 6-dinitro-*o*-ethoxybenzoic acid. Nitrile : m.p. 63°.

Blanksma, *Chem. Zentr.*, 1912, II, 339.

m-Dinitrosobenzene

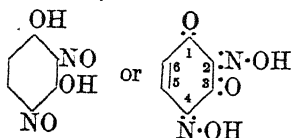


$C_6H_4O_2N_2$ MW, 136

Yellow cryst. from EtOH-Et₂O. M.p. 146-5°. Sol. EtOH, C_6H_6 , hot AcOH. Mod. sol. ligroin. Spar. sol. Et₂O. Insol. H_2O . Sols. are green.

Alway, Gortner, *Ber.*, 1905, 38, 1899.

Dinitrosoresorcinol (3 : 4 : 5 : 6-Cyclohexene-tetrone 3 : 5-dioxime)



$C_6H_4O_4N_2$

MW, 168

Bronze leaflets + $1H_2O$ from MeOH.Aq. M.p. 168° (162-3°).

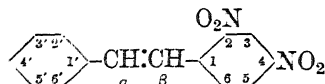
2 : 4-Diacetyl : m.p. 119-20°.

2 : 4-Dibenzoyl : m.p. 182-4°.

Borsche, Weber, *Ann.*, 1931, 489, 278 (Bibl.).

Orndorff, Nichols, *J. Am. Chem. Soc.*, 1923, 45, 1536 (Bibl.).

2 : 4-Dinitrostilbene



$C_{14}H_{10}O_4N_2$ MW, 270

(1) Yellow cryst. from AcOH. M.p. 143-5° (139-40°). Spar. sol. C_6H_6 .

(2) Yellow cryst. M.p. 127°. Sol. C_6H_6 .

Thiele, Escales, *Ber.*, 1901, 34, 2843.

Stoermer, Oehlert, *Ber.*, 1922, 55, 1236.

Pastak, *Bull. soc. chim.*, 1926, 39, 74.

2 : 6-Dinitrostilbene.

Yellow needles from AcOH. M.p. 114°.

Pfeiffer, *Ann.*, 1916, 411, 111.

2 : 2'-Dinitrostilbene.

(1) Yellowish needles from $CHCl_3$. M.p. 196°. Mod. sol. CS_2 , hot C_6H_6 . Spar. sol. EtOH, Et₂O, ligroin.

(2) Needles from AcOH. M.p. 126°.

Thiele, Dimroth, *Ber.*, 1895, 28, 1412.

Bischoff, *Ber.*, 1888, 21, 2072.

3 : 4'-Dinitrostilbene.

Yellow needles from AcOH. M.p. 155° (217°). Sol. C_6H_6 , $CHCl_3$, Me_2CO (green sol.). Spar. sol. EtOH (green sol.).

Cullinane, *J. Chem. Soc.*, 1923, 123, 2060.

Harrison, Wood, *J. Chem. Soc.*, 1926, 580, 1199.

4 : 4'-Dinitrostilbene.

Cis-.

Cryst. from AcOH. M.p. 185-6°. Heat with $PhNO_2$ and iodine \rightarrow *trans*-.

Trans-.

Yellow leaflets from AcOH. M.p. 288° (296-305°). Sol. Me_2CO , hot AcOH. Mod. sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$.

Walden, Kernbaum, *Ber.*, 1890, 23, 1959.

Cullinane, *J. Chem. Soc.*, 1923, 123, 2060.

Ruggli, Lang, *Helv. Chim. Acta*, 1938, 21, 50.

$\alpha : \beta$ -Dinitrostilbene.

(1) Yellow needles or prisms from EtOH. M.p. 186-7°. Spar. sol. MeOH, EtOH, Et₂O.

(2) Yellow prisms from EtOH. M.p. 105-7°. Sol. MeOH, EtOH, Et₂O, $CHCl_3$, Me_2CO , C_6H_6 .

Schmidt, *Ber.*, 1901, 34, 621.

α : 2'-Dinitrostilbene.

Yellow needles from EtOH. M.p. 106°. $\text{Zn} + \text{AcOH} \rightarrow$ 2-phenylindole.

Ruggli, Hegedüs, *Helv. Chim. Acta*, 1939, 22, 407.

 α : 3-Dinitrostilbene.

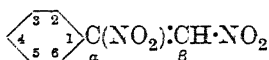
Cryst. from C_6H_6 -ligroin. M.p. 179-80°.

Flürscheim, Holmes, *J. Chem. Soc.*, 1932, 1462.

 α : 4'-Dinitrostilbene.

Yellow needles from AcOEt-ligroin. M.p. 155°.

Baker, Wilson, *J. Chem. Soc.*, 1927, 844.

 α : β -Dinitrostyrene

$\text{C}_8\text{H}_6\text{O}_4\text{N}_2$ MW, 194

Golden yellow needles from Et_2O -petrol. M.p. 81°. Decomp. about 100°. Sol. most org. solvents. Mod. sol. pet. ether. Sol. $\text{H}_2\text{SO}_4 \rightarrow$ brown sol., reprecipitated by H_2O . Does not absorb Br.

Wieland, Blümlich, *Ann.*, 1921, 424, 103.

 β : 2-Dinitrostyrene.

Yellow needles from EtOH. M.p. 106-7°. B.p. about 200°/20 mm. Volatile in steam. Alk. $\text{KMnO}_4 \rightarrow$ *o*-nitrobenzoic acid.

van der Lee, *Rec. trav. chim.*, 1925, 44, 1089.

Posner, *Ber.*, 1898, 31, 657.

 β : 3-Dinitrostyrene.

Yellow leaflets or needles from EtOH. M.p. 123-4°. Sol. Et_2O , CHCl_3 , C_6H_6 . Mod. sol. hot H_2O . Sol. alc. KOH. Warm $\text{H}_2\text{SO}_4 \rightarrow$ CO + *m*-nitrobenzaldehyde. Adds HBr in AcOH.

Posner, *Ber.*, 1898, 31, 658.

Friedländer, Lazarus, *Ann.*, 1885, 229, 233.

De, *J. Indian Chem. Soc.*, 1928, 5, 29.

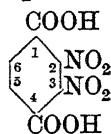
 β : 4-Dinitrostyrene.

Yellow leaflets or needles from AcOH. M.p. 199° (198°, 199-202°). Sol. Me_2CO , AcOH. Spar. sol. hot EtOH. Insol. H_2O . Volatile in steam. Sublimes in needles. $\text{K}_2\text{Cr}_2\text{O}_7 +$ dil. $\text{H}_2\text{SO}_4 \rightarrow$ *p*-nitrobenzoic acid.

Pfeiffer, *Ber.*, 1914, 47, 1768.

Thiele, Haeckel, *Ann.*, 1902, 325, 14.

2 : 3-Dinitrotetraphthalic Acid



$\text{C}_8\text{H}_4\text{O}_8\text{N}_2$ MW, 256

Cryst. from hot H_2O . M.p. above 290° decomp.

Häussermann, Martz, *Ber.*, 1893, 26, 2982.

2 : 5-Dinitrotetraphthalic Acid.

Prisms from H_2O . M.p. above 280° decomp.

Di-Ester : $\text{C}_{12}\text{H}_{12}\text{O}_8\text{N}_2$. MW, 312. Needles. M.p. 144°.

Häussermann, Martz, *Ber.*, 1893, 26, 2984.

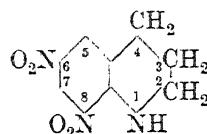
2 : 6-Dinitrotetraphthalic Acid.

Cryst. from H_2O . M.p. 255° decomp.

4-Ester : needles. M.p. 197°.

Häussermann, Martz, *Ber.*, 1893, 26, 2983; 1895, 28, 81.

6 : 8-Dinitro-1 : 2 : 3 : 4-tetrahydroquinoline



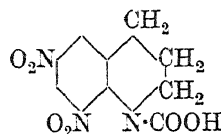
$\text{C}_8\text{H}_9\text{O}_4\text{N}_2$ MW, 223

Yellow needles from EtOH. M.p. 165-6°. CrO_3 in AcOH + $\text{H}_2\text{SO}_4 \rightarrow$ 6 : 8-dinitroquinoline.

1-Benzenesulphonyl : cryst. from C_6H_6 . M.p. 215°.

Kunckell, *Chem. Zentr.*, 1910, 11, 94.

6 : 8-Dinitrotetrahydroquinoline-1-carboxylic Acid



$\text{C}_{10}\text{H}_9\text{O}_6\text{N}_3$ MW, 267

Me ester : $\text{C}_{11}\text{H}_{11}\text{O}_6\text{N}_3$. MW, 281. Golden yellow needles from EtOH. M.p. 174° decomp. (180-1°). Sol. C_6H_6 . Spar. sol. EtOH. Insol. Et_2O , ligroin.

Et ester : $\text{C}_{12}\text{H}_{13}\text{O}_6\text{N}_3$. MW, 295. Yellow plates from EtOH. M.p. 97.5° corr. Sol. EtOH, AcOH, C_6H_6 , AcOEt, H_2SO_4 .

Amide : $\text{C}_{10}\text{H}_{10}\text{O}_5\text{N}_4$. MW, 266. Yellow plates from EtOH. M.p. 191° decomp.

Schotten, Schlömann, *Ber.*, 1891, 24, 3700.

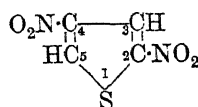
van Dorp, *Rec. trav. chim.*, 1904, 23, 308.

Thomas, *Rec. trav. chim.*, 1891, 10, 149.

Dinitrothioanisole.

See under Dinitrothiophenol.

2 : 4-Dinitrothiophene



$\text{C}_4\text{H}_2\text{O}_4\text{N}_2\text{S}$ MW, 174

Leaflets from EtOH. M.p. 56°. Volatile in steam.

Steinkopf, Höpner, *Ann.*, 1933, 501, 184.

2 : 5-Dinitrothiophene.

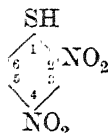
Exists in two forms. (i) Yellow leaflets from EtOH. M.p. 52°. B.p. 290°. Sol. hot H₂O. Volatile in steam → (ii). (ii) Yellow needles from H₂O or EtOH. M.p. 78–82°.

Steinkopf, Höpner, *Ann.*, 1933, 501, 184.
Stadler, *Ber.*, 1885, 18, 531.

Dinitrothiophenetole.

See under Dinitrothiophenol.

2 : 4-Dinitrothiophenol (2 : 4-Dinitro-1-mercaptobenzene)



C₆H₄O₄N₂S MW, 200

Needles from C₆H₆-ligroin. M.p. 131°. Sol. H₂O. Mod. sol. EtOH.

Me ether: 2 : 4-dinitrothioanisole. C₇H₆O₄N₂S. MW, 214. M.p. 126°.

Et ether: 2 : 4-dinitrothiophenetole. C₈H₆O₄N₂S. MW, 228. M.p. 113°.

Isopropyl ether: C₉H₁₀O₄N₂S. MW, 242. M.p. 93–4°.

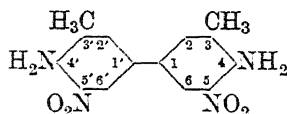
Isobutyl ether: C₁₀H₁₂O₄N₂S. MW, 256. M.p. 71–2°.

Phenyl ether: see 2 : 4-Dinitrodiphenyl sulphide.

Benzyl ether: yellow leaflets from CHCl₃-ligroin. M.p. 128°.

Zincke, Weisspfenning, *J. prakt. Chem.*, 1912, 85, 216.

5 : 5'-Dinitro-o-tolidine (5 : 5'-Dinitro-4 : 4'-diamino-3 : 3'-dimethyldiphenyl)



C₁₄H₁₄O₄N₄ MW, 302

Red needles. M.p. 268–9°. Spar. sol. EtOH, AcOH.

4 : 4'-N-Diacetyl: orange cryst. M.p. above 330°.

4 : 4 : 4' : 4'-N-Tetra-acetyl: m.p. 243°.

Le Fèvre, Turner, *J. Chem. Soc.*, 1928, 966.

Gerber, *Ber.*, 1888, 21, 749.

6 : 6'-Dinitro-o-tolidine (6 : 6'-Dinitro-4 : 4'-diamino-3 : 3'-dimethyldiphenyl).

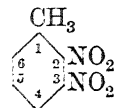
Orange red cryst. from C₆H₆ changing to orange yellow powder on drying. M.p. 217°. Sol. EtOH, AcOH. Spar. sol. C₆H₆. Insol. H₂O, pet. ether.

4-N-Acetyl: needles. M.p. 280°.

4 : 4'-N-Diacetyl: m.p. 275° decomp.

Le Fèvre, Turner, *J. Chem. Soc.*, 1928, 966.

Cain, Micklethwait, *J. Chem. Soc.*, 1914, 105, 1448.

2 : 3-Dinitrotoluene

C₇H₆O₄N₂ MW, 182

Needles. M.p. 63°. (NH₄)₂S → 2-nitro-m-toluidine. HNO₃ → 2 : 3-dinitrobenzoic acid. Volatile in steam.

Page, Heasman, *J. Chem. Soc.*, 1923, 123, 3235 (*Bibl.*).

Hodgson, Smith, *J. Chem. Soc.*, 1933, 500.

2 : 4-Dinitrotoluene.

Needles. M.p. 70–1°. Sol. C₆H₆. Mod. sol. CS₂. Spar. sol. Et₂O, cold EtOH. Ox. → 2 : 4-dinitrobenzoic acid. SnCl₂ + HCl in EtOH, or Fe + SO₂ → 4-nitro-o-toluidine. Fe + HCl → 2 : 4-tolylenediamine.

Gibson, Duckham, Fairbairn, *J. Chem. Soc.*, 1922, 121, 270.

Beilstein, Kuhlberg, *Ann.*, 1870, 155, 13.

2 : 5-Dinitrotoluene.

Needles from EtOH. M.p. 52.5°. Sol. EtOH, C₆H₆, CS₂. HNO₃ → 2 : 5-dinitrobenzoic acid. Volatile in steam.

Page, Heasman, *J. Chem. Soc.*, 1923, 123, 3235 (*Bibl.*).

Meisenheimer, Hesse, *Ber.*, 1919, 52, 1175.

2 : 6-Dinitrotoluene.

Needles. M.p. 66°. Sol. EtOH. Ox. → 2 : 6-dinitrobenzoic acid. Volatile in steam.

Gibson, Duckham, Fairbairn, *J. Chem. Soc.*, 1922, 121, 270.

Holleman, Böeseken, *Rec. trav. chim.*, 1897, 16, 427.

3 : 4-Dinitrotoluene.

Needles. M.p. 61°. Mod. sol. CS₂. Ox. → 3 : 4-dinitrobenzoic acid. Volatile in steam.

Page, Heasman, *J. Chem. Soc.*, 1923, 123, 3235 (*Bibl.*).

Gibson, Duckham, Fairbairn, *J. Chem. Soc.*, 1922, 121, 270.

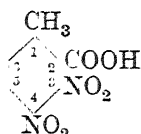
3 : 5-Dinitrotoluene.

Needles. M.p. 93°. Sol. EtOH, Et₂O, CS₂, CHCl₃, C₆H₆. Spar. sol. H₂O, ligroin. Sublimes. Volatile in steam. Sn + HCl → 3 : 5-tolylenediamine. Ox. → 3 : 5-dinitrobenzoic acid. (NH₄)₂S → 5-nitro-m-toluidine.

Cohen, McCandlish, *J. Chem. Soc.*, 1905, 87, 1271.

α : α -Dinitrotoluene

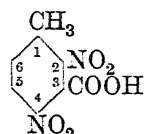
$C_7H_6O_4N_2$ $C_6H_5 \cdot CH(NO_2)_2$ MW, 182
 Colourless cryst. M.p. 78–80°.
 Fieser, Doering, *J. Am. Chem. Soc.*, 1946, 68, 2253.

3 : 4-Dinitro-*o*-toluic Acid

$C_8H_6O_6N_2$ MW, 226
 Needles from EtOH-ligroin. M.p. 182°.
Et ester : $C_{10}H_{10}O_6N_2$. MW, 254. M.p. 63°.
 Warner, *Proc. Chem. Soc.*, 1913, 29, 61.

4 : 6-Dinitro-*o*-toluic Acid.

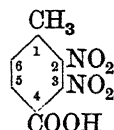
Needles from hot H_2O . M.p. 206°.
Me ester : $C_9H_8O_6N_2$. MW, 240. Needles.
 M.p. 73–4°.
 van Scherpenzeel, *Rec. trav. chim.*, 1901, 20, 175.

2 : 4-Dinitro-*m*-toluic Acid

$C_8H_6O_6N_2$ MW, 226
 Pale yellow needles from EtOH.Aq. M.p. 173°.
Me ester : $C_9H_8O_6N_2$. MW, 240. M.p. 104–5°.
 van Scherpenzeel, *Rec. trav. chim.*, 1901, 20, 167.

4 : 6-Dinitro-*m*-toluic Acid.

Pale yellow plates from C_6H_6 . M.p. 171–2°.
 Sol. EtOH. Spar. sol. H_2O , C_6H_6 .
Et ester : $C_{10}H_{10}O_6N_2$. MW, 254. M.p. 61–2°.
 Errera, Maltese, *Gazz. chim. ital.*, 1903, 33, ii, 278.

2 : 3-Dinitro-*p*-toluic Acid

$C_8H_6O_6N_2$ MW, 226
 Prisms from EtOH. M.p. 249°. Sol. EtOH, Et_2O , AcOH.
 Rozanski, *Ber.*, 1889, 22, 2675.

2 : 5-Dinitro-*p*-toluic Acid.

Cryst. from H_2O . M.p. 194°. Sol. EtOH, Et_2O , AcOH, $CHCl_3$. Mod. sol. hot H_2O .
 Rozanski, *Ber.*, 1889, 22, 2675.

2 : 6-Dinitro-*p*-toluic Acid.

Yellowish leaflets from hot H_2O . M.p. 159° (151°). Sol. EtOH, Et_2O , AcOH, $CHCl_3$. Mod. sol. hot H_2O . Sublimes.

Me ester : needles from MeOH. M.p. 87–8°.

Et ester : needles from EtOH.Aq. M.p. 75°.

Pfeiffer, *Ber.*, 1918, 51, 563.

van Scherpenzeel, *Rec. trav. chim.*, 1901, 20, 159.

Brückner, *Ber.*, 1875, 8, 1678.

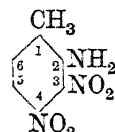
3 : 5-Dinitro-*p*-toluic Acid.

Cryst. from H_2O . M.p. 226°. Sol. Et_2O , EtOH, $CHCl_3$, AcOH, C_6H_6 . Mod. sol. hot H_2O .

Amide : $C_8H_7O_5N_3$. MW, 225. Yellowish needles. M.p. 255–7°. Sol. EtOH, hot H_2O .

Nitrile : $C_8H_5O_4N_3$. MW, 207. Yellow needles. M.p. 103–5°.

Claus, Beysen, *Ann.*, 1891, 266, 227.

3 : 4-Dinitro-*o*-toluidine

$C_7H_7O_4N_3$ MW, 197

Yellow needles from EtOH. M.p. 131–5°.

N-Acetyl : 3 : 4-dinitro-*o*-acet-toluidide. $C_9H_9O_5N_3$. MW, 239. M.p. 186°.

Brady, Williams, *J. Chem. Soc.*, 1920, 117, 1138.

Morgan, Glover, *J. Chem. Soc.*, 1921, 119, 1702.

3 : 5-Dinitro-*o*-toluidine.

Yellow cryst. from EtOH. M.p. 213°. Sol. hot toluene.

N-Me : see 3 : 5-Dinitro-*N*-methyl-*o*-toluidine.

N-Acetyl : 3 : 5-dinitro-*o*-acet-toluidide. M.p. 205–2°.

Morgan, Drew, *J. Chem. Soc.*, 1920, 117, 790.

Robinson, *J. Chem. Soc.*, 1916, 109, 1086.

3 : 6-Dinitro-*o*-toluidine.

Orange prisms. M.p. 151°.

N-Acetyl : 3 : 6-dinitro-*o*-acet-toluidide. Pale yellow prisms. M.p. 209°.

Brady, Taylor, *J. Chem. Soc.*, 1920, 117, 877.

4 : 5-Dinitro-*o*-toluidine.

M.p. 191–5°.

N-Acetyl : 4 : 5-dinitro-*o*-acet-toluidide. M.p. 180°.

Brady, Williams, *J. Chem. Soc.*, 1920, 117, 1138.

Morgan, Glover, *J. Chem. Soc.*, 1921, 119, 1702.

4 : 6-Dinitro-*o*-toluidine.

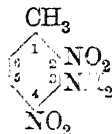
Yellow cryst. from AcOH. Aq. M.p. 155° (135°).
N-Acetyl : 4 : 6-dinitro-*o*-acet-toluidide.
 Needles. M.p. 224°.

Brand, Eisenmenger, *Ber.*, 1916, 49, 674.
 Anschütz, Zimmermann, *Ber.*, 1915, 48, 154.

5 : 6-Dinitro-*o*-toluidine.

Deep yellow needles from EtOH. M.p. 216°.
N-Acetyl : 5 : 6-dinitro-*o*-acet-toluidide.
 Cryst. M.p. 180°.

Brady, Taylor, *J. Chem. Soc.*, 1920, 117, 877.

2 : 4-Dinitro-*m*-toluidine

$C_7H_7O_4N_3$ MW, 197
 M.p. 94°.

N-Me : see 2 : 4-Dinitro-*N*-methyl-*m*-toluidine.
N-Acetyl : 2 : 4-dinitro-*m*-acet-toluidide.
 $C_9H_9O_5N_3$ MW, 239. M.p. 211-12°.

Cook, Brady, *J. Chem. Soc.*, 1920, 117, 751.

Giua, *Gazz. chim. ital.*, 1915, 45, i, 351.

2 : 6-Dinitro-*m*-toluidine.

Yellow cryst. M.p. 133-8°.
N-Acetyl : 2 : 6-dinitro-*m*-acet-toluidide. M.p. 166°.

Drew, *J. Chem. Soc.*, 1920, 117, 1618.

Körner, Contardi, *Gazz. chim. ital.*, 1917, 47, i, 234.

4 : 5-Dinitro-*m*-toluidine.

Brownish yellow needles. M.p. 141°.
N-Acetyl : 4 : 5-dinitro-*m*-acet-toluidide.
 Needles. M.p. 177°.

Brady, Day, Rolt, *J. Chem. Soc.*, 1922, 121, 531.

4 : 6-Dinitro-*m*-toluidine.

Golden yellow cryst. M.p. 195° (196.5-7.5°).
 Sol. Me_2CO , hot AcOH. Spar. sol. EtOH, Et_2O , C_6H_6 .

N-Me : see 4 : 6-Dinitro-*N*-methyl-*m*-toluidine.

N-Phenyl : m.p. 146-146.5°.
N-Acetyl : 4 : 6-dinitro-*m*-acet-toluidide. M.p. 103°.

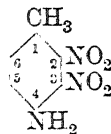
Cook, Brady, *J. Chem. Soc.*, 1920, 117, 751.

Giua, *Gazz. chim. ital.*, 1915, 45, i, 351.

5 : 6-Dinitro-*m*-toluidine.

Orange yellow plates from C_6H_6 . M.p. 165°.
N-Acetyl : 5 : 6-dinitro-*m*-acet-toluidide. Pale yellow cryst. powder. M.p. 172°.

Brady, Day, Rolt, *J. Chem. Soc.*, 1922, 121, 530.

2 : 3-Dinitro-*p*-toluidine

$C_7H_7O_4N_3$ MW, 197

Orange yellow needles. M.p. 124°. Mod. sol. most org. solvents.

N-Me : see 2 : 3-Dinitro-*N*-methyl-*p*-toluidine.

N-Acetyl : 2 : 3-dinitro-*p*-acet-toluidide.
 $C_9H_9O_5N_3$ MW, 239. Needles. M.p. 174.5°.

Dadswell, Kenner, *J. Chem. Soc.*, 1927, 584.

Page, Heasman, *J. Chem. Soc.*, 1923, 123, 3240.

2 : 5-Dinitro-*p*-toluidine.

Orange red needles. M.p. 189°. Mod. sol. most org. solvents.

N-Me : see 2 : 5-Dinitro-*N*-methyl-*p*-toluidine.

N-Acetyl : 2 : 5-dinitro-*p*-acet-toluidide.
 Needles from EtOH. M.p. 122°.

Dadswell, Kenner, *J. Chem. Soc.*, 1927, 584.

Page, Heasman, *J. Chem. Soc.*, 1923, 123, 3240.

2 : 6-Dinitro-*p*-toluidine.

Yellow needles from H_2O . M.p. 171°. Sol. EtOH, AcOH, $CHCl_3$, C_6H_6 . Spar. sol. CS_2 . Tetramorphic.

N-Acetyl : 2 : 6-dinitro-*p*-acet-toluidide. M.p. 223°.

Brady, Taylor, *J. Chem. Soc.*, 1920, 117, 877.

Holleman, Böeseken, *Rec. trav. chim.*, 1897, 16, 426.

3 : 5-Dinitro-*p*-toluidine.

Golden leaflets from C_6H_6 . M.p. 168° (171-5-2.5°).

N-Me : see 3 : 5-Dinitro-*N*-methyl-*p*-toluidine.

N-Acetyl : 3 : 5-dinitro-*p*-acet-toluidide. M.p. 195°.

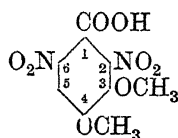
N-Diacetyl : m.p. 129.5°.

N-Benzoyl : m.p. 186°.

B, *HCl* : m.p. 204.5-205° decomp.

Brady, Day, Rolt, *J. Chem. Soc.*, 1922, 121, 528.

British Celanese, B.P. 319,296, (*Chem. Zentr.*, 1930, I, 746).

2 : 6-Dinitroveratric Acid (2 : 6-Dinitro-3 : 4-dimethoxybenzoic acid)

$C_9H_8O_8N_2$

MW, 272

Yellow needles from H_2O . M.p. 194-5°.

Me ester: $C_{10}H_{10}O_8N_2$. MW, 286. Needles from MeOH or C_6H_6 . M.p. 136-6.5°.

Wegscheider, Klemenc, *Monatsh.*, 1910, 31, 723.

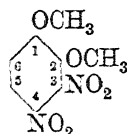
5 : 6-Dinitroveratric Acid.

Yellow leaflets from H_2O . M.p. 193°.

Me ester: needles from MeOH. M.p. 133-4.5°.

Klemenc, *Monatsh.*, 1912, 33, 389.

3 : 4-Dinitroveratrol (3 : 4-Dinitro-1 : 2-dimethoxybenzene, 3 : 4-dinitrocatechol dimethyl ether)



$C_8H_8O_6N_2$ MW, 228

Cryst. from MeOH. M.p. 91°. Sol. ord. org. solvents.

Vermeulen, *Rec. trav. chim.*, 1929, 48, 970 (*Bibl.*).

Jones, Robinson, *J. Chem. Soc.*, 1917, 111, 911.

Pollecoff, Robinson, *J. Chem. Soc.*, 1918, 113, 651.

3 : 5-Dinitroveratrol.

Cryst. from EtOH. M.p. 102°.

Vermeulen, *Rec. trav. chim.*, 1929, 48, 970.

Pollecoff, Robinson, *J. Chem. Soc.*, 1918, 113, 650.

3 : 6-Dinitroveratrol.

Yellow needles from EtOH. M.p. 56°. Sol. MeOH. Spar. sol. pet. ether.

Oxford, *J. Chem. Soc.*, 1926, 2008.

4 : 5-Dinitroveratrol.

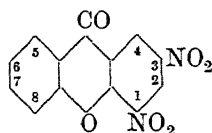
Yellow needles from EtOH. M.p. 130-2°. D_4^{20} 1.3164. Spar. sol. H_2O .

Parijs, *Rec. trav. chim.*, 1930, 49, 49.

Vermeulen, *Rec. trav. chim.*, 1929, 48, 969.

Ehrlich, Bogert, *J. Org. Chem.*, 1945, 12, 522.

1 : 3-Dinitroxanthone



$C_{13}H_6O_6N_2$ MW, 286

Pale yellow needles from EtOH or AcOH. M.p. 206°. Sol. hot AcOH, hot C_6H_6 . Spar. sol. EtOH, Et_2O .

Dhar, *J. Chem. Soc.*, 1920, 117, 1063.

Ullmann, *Ann.*, 1909, 366, 87.

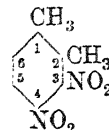
3 : 6-Dinitroxanthone.

Plates from C_6H_6 . Silky needles from EtOH. M.p. 265° (262°). Sol. hot $CHCl_3$. Spar. sol. hot EtOH. Sublimes in needles. $Sn + HCl \rightarrow$ 3 : 6-diaminoxanthone.

Dhar, *J. Chem. Soc.*, 1920, 117, 1063.

Salzmann, Wichelhaus, *Ber.*, 1877, 10, 1401.

3 : 4-Dinitro-*o*-xylene



$C_8H_8O_4N_2$ MW, 196

Needles from EtOH. M.p. 82°. Sol. Et_2O , $CHCl_3$, CS_2 , C_6H_6 . Spar. sol. EtOH.

Crossley, Renouf, *J. Chem. Soc.*, 1909, 95, 210, 216.

3 : 5-Dinitro-*o*-xylene.

Yellowish needles from EtOH. M.p. 75-6°. Sol. $CHCl_3$, Me_2CO , C_6H_6 . $(NH_4)_2S \rightarrow$ 6-nitro-*o*-4-xylydine.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2349.

Borsche, Fiedler, *Ber.*, 1913, 46, 2131.

3 : 6-Dinitro-*o*-xylene.

Cryst. from EtOH. M.p. 89-90°. Sol. Et_2O , $CHCl_3$, Me_2CO , C_6H_6 . Mod. sol. EtOH, pet. ether.

Crossley, Wren, *J. Chem. Soc.*, 1911, 99, 2343.

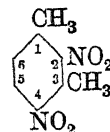
4 : 5-Dinitro-*o*-xylene.

Needles from EtOH. M.p. 118°. Sol. Et_2O , $CHCl_3$, CS_2 , Me_2CO , C_6H_6 . Mod. sol. hot EtOH. Spar. sol. pet. ether, hot H_2O . Alc. $NH_3 \rightarrow$ 5-nitro-*o*-4-xylydine.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2352.

Kuhn, van Klaveren, *Ber.*, 1938, 71, 779.

2 : 4-Dinitro-*m*-xylene



$C_8H_8O_4N_2$ MW, 196

Leaflets from EtOH. M.p. 83-4°. Sol. Et_2O , C_6H_6 . $(NH_4)_2S \rightarrow$ 2-nitro-*m*-4-xylydine.

Ibbotson, Kenner, *J. Chem. Soc.*, 1923, 123, 1267.

Ruggli, Zimmermann, Thouvay, *Helv. Chim. Acta*, 1931, 14, 1253 (*Bibl.*).

Noelting, Braun, Thesmar, *Ber.*, 1901, 34, 2260.

2 : 5-Dinitro-*m*-xylene.

Cryst. from EtOH. M.p. 101°. Sol. Et₂O, CS₂, CHCl₃, C₆H₆.

Ibbotson, Kenner, *J. Chem. Soc.*, 1923, 123, 1268.

Blanksma, *Rec. trav. chim.*, 1909, 28, 95.

4 : 5-Dinitro-*m*-xylene.

Cryst. from EtOH. M.p. 132°. Sol. CHCl₃, Me₂CO, Et₂O, C₆H₆. Mod. sol. hot EtOH. Alc. NH₃ → 5-nitro-*m*-4-xylylidine.

Blanksma, *Rec. trav. chim.*, 1906, 25, 180; 1909, 28, 93.

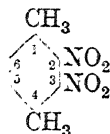
Kuhn, Klaveren, *Ber.*, 1938, 71, 779.

4 : 6-Dinitro-*m*-xylene.

Cryst. from EtOH. M.p. 94°. Sol. Et₂O, C₆H₆, CHCl₃, hot EtOH.

de Capeller, *Helv. Chim. Acta*, 1928, 11, 427.

Ruggli, Zimmermann, Thouvay, *Helv. Chim. Acta*, 1931, 14, 1252 (*Bibl.*).

2 : 3-Dinitro-*p*-xylene

C₈H₈O₄N₂ MW, 196

Cryst. from EtOH. M.p. 93° (90°). Sol. Et₂O, CHCl₃, Me₂CO, C₆H₆, hot EtOH.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

2 : 5-Dinitro-*p*-xylene.

Yellow needles from EtOH. M.p. 142° (147-8°). Sol. C₆H₆, Me₂CO, hot Et₂O, hot EtOH. Alc. NH₃ → 5-nitro-*p*-xylylidine.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

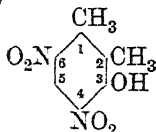
2 : 6-Dinitro-*p*-xylene.

Needles from EtOH. M.p. 123-4°.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

Sonn, *Ber.*, 1916, 49, 623.

Noelting, Thesmar, *Ber.*, 1902, 35, 641.

4 : 6-Dinitro-*o*-3-xylenol (4 : 6-Dinitro-3-hydroxy-*o*-xylene)

C₈H₈O₅N₂ MW, 212

Yellow needles from EtOH. M.p. 82°.

Noelting, Pick, *Ber.*, 1888, 21, 3159.

3 : 5-Dinitro-*o*-4-xylenol (3 : 5-Dinitro-4-hydroxy-*o*-xylene).

Yellow needles from EtOH. M.p. 125-6°.

Datta, Varma, *J. Am. Chem. Soc.*, 1919, 41, 2042.

Diepolder, *Ber.*, 1909, 42, 2917.

2 : 6-Dinitro-*m*-4-xylenol (2 : 6-Dinitro-4-hydroxy-*m*-xylene).

Yellow needles from pet. ether. M.p. 162-3°.

Fox, Turner, *J. Chem. Soc.*, 1930, 1866.

5 : 6-Dinitro-*m*-4-xylenol (5 : 6-Dinitro-4-hydroxy-*m*-xylene).

Needles from EtOH. M.p. 119-20°.

Fox, Turner, *J. Chem. Soc.*, 1930, 1866.

2 : 4-Dinitro-*m*-5-xylenol (2 : 4-Dinitro-5-hydroxy-*m*-xylene).

Yellow needles from H₂O. M.p. 115-6°. Sol. NaOH.Aq. with greenish yellow col. Volatile in steam.

Rowe, Bannister, Seth, Storey, *J. Soc. Chem. Ind.*, 1930, 49, 470.

4 : 6-Dinitro-*m*-5-xylenol (4 : 6-Dinitro-5-hydroxy-*m*-xylene).

Yellow leaflets from H₂O. M.p. 126-7°. Sol. NaOH.Aq. with yellow col. Non-volatile in steam.

Rowe, Bannister, Seth, Storey, *J. Soc. Chem. Ind.*, 1930, 49, 470.

3 : 5-Dinitro-*p*-xylenol (3 : 5-Dinitro-2-hydroxy-*p*-xylene).

Me ether: C₉H₁₀O₅N₂. MW, 226. Needles from EtOH. M.p. 60°.

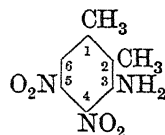
Acetyl: m.p. 102°.

Benzoyl: m.p. 124°.

p-Toluenesulphonyl: m.p. 137°.

Sane, Chakravarty, Parmanick, *J. Indian Chem. Soc.*, 1932, 9, 55.

Blanksma, *Rec. trav. chim.*, 1905, 24, 49.

4 : 5-Dinitro-*o*-3-xylylidine (4 : 5-Dinitro-3-amino-*o*-xylene)

C₈H₉O₄N₃ MW, 211

Orange needles from EtOH. M.p. 143°. Sol. Me₂CO, warm CHCl₃, warm C₆H₆.

N-Acetyl: 4 : 5-dinitro-*o*-3-acet-xylylidide. C₁₀H₁₁O₅N₃. MW, 253. M.p. 225°.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2352.

4 : 6-Dinitro-*o*-3-xylylidine (4 : 6-Dinitro-3-amino-*o*-xylene).

Golden yellow needles from EtOH. M.p. 161°. Sol. Me₂CO, warm CHCl₃, warm C₆H₆.

N-Diacetyl: m.p. 139°.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2348.

5 : 6-Dinitro-*o*-3-xylylidine (5 : 6-Dinitro-3-amino-*o*-xylene).

Deep yellow needles from EtOH. M.p. 172°. Sol. Me₂CO.

N-Acetyl : 5 : 6-dinitro-*o*-3-acet-xylylidide. Plates. M.p. 180°.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2352.

3 : 5-Dinitro-*o*-4-xylylidine (3 : 5-Dinitro-4-amino-*o*-xylene).

Orange red needles from EtOH. M.p. 143°. Sol. CHCl₃, C₆H₆.

N-Acetyl : 3 : 4-dinitro-*o*-4-acet-xylylidide. C₁₀H₁₁O₅N₃. MW, 253. M.p. 223°.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2350.

5 : 6-Dinitro-*o*-4-xylylidine (5 : 6-Dinitro-4-amino-*o*-xylene).

Orange needles from Me₂CO. M.p. 212°. Mod. sol. EtOH, CHCl₃, C₆H₆.

N-Acetyl : 5 : 6-dinitro-*o*-4-acet-xylylidide. M.p. 173°.

Crossley, Morrell, *J. Chem. Soc.*, 1911, 99, 2351.

4 : 6-Dinitro-*m*-2-xylylidine (4 : 6-Dinitro-2-amino-*m*-xylene).

Yellow needles. M.p. 177°.

N-Acetyl : 4 : 6-dinitro-*m*-2-acet-xylylidide. C₁₀H₁₁O₅N₃. MW, 253. M.p. 225-6°.

Noelting, Thesmar, *Ber.*, 1902, 35, 629.

2 : 5-Dinitro-*m*-4-xylylidine (2 : 5-Dinitro-4-amino-*m*-xylene).

Yellow needles from EtOH.Aq. M.p. 145°.

N-Acetyl : 2 : 5-dinitro-*m*-4-acet-xylylidide. C₁₀H₁₁O₅N₃. MW, 253. M.p. 233°.

N-Benzoyl : m.p. 244°.

Maltese, *Gazz. chim. ital.*, 1909, 39, i, 519.

Blanksma, *Rec. trav. chim.*, 1909, 28, 94.

2 : 6-Dinitro-*m*-4-xylylidine (2 : 6-Dinitro-4-amino-*m*-xylene).

Orange yellow needles from EtOH.Aq. M.p. 193°.

N-Acetyl : 2 : 6-dinitro-*m*-4-acet-xylylidide. M.p. 176°.

N-Benzoyl : m.p. 218°.

Voris, Spoerri, *J. Am. Chem. Soc.*, 1938, 60, 935 (*Bibl.*).

5 : 6-Dinitro-*m*-4-xylylidine (5 : 6-Dinitro-4-amino-*m*-xylene).

Yellow needles. M.p. 115° (120°). Sol. EtOH.

N-Acetyl : 5 : 6-dinitro-*m*-4-acet-xylylidide. Needles from EtOH. M.p. 217° (226°).

Blanksma, *Rec. trav. chim.*, 1909, 28, 93.

van Kleef, *Rec. trav. chim.*, 1936, 55, 765.

2 : 4-Dinitro-*m*-5-xylylidine (2 : 4-Dinitro-5-amino-*m*-xylene).

M.p. 94°.

Blanksma, *Rec. trav. chim.*, 1906, 25, 176.

4 : 6-Dinitro-*m*-5-xylylidine (4 : 6-Dinitro-5-amino-*m*-xylene).

Yellow cryst. M.p. 101°.

Blanksma, *Rec. trav. chim.*, 1909, 28, 93.

3 : 5-Dinitro-*p*-xylylidine (3 : 5-Dinitro-2-amino-*p*-xylene).

Yellow needles from AcOH. M.p. 202-3°. Sol. EtOH.

N-Acetyl : 3 : 5-dinitro-*p*-acet-xylylidide. Needles from EtOH. M.p. 228°.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

Sonn, *Ber.*, 1916, 49, 622.

3 : 6-Dinitro-*p*-xylylidine (3 : 6-Dinitro-2-amino-*p*-xylene).

M.p. 140°.

N-Acetyl : 3 : 6-dinitro-*p*-acet-xylylidide. C₁₀H₁₁O₅N₃. MW, 253. M.p. 191°.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

5 : 6-Dinitro-*p*-xylylidine (5 : 6-Dinitro-2-amino-*p*-xylene).

M.p. 172°.

N-Acetyl : 5 : 6-dinitro-*p*-acet-xylylidide. M.p. 168°.

Blanksma, *Chem. Zentr.*, 1910, II, 1459.

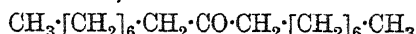
Di-*n*-nonyl Ketone.

See Caprinone.

Di-*n*-octylcarbinol.

See Heptadecanol-9.

Di-*n*-octyl Ketone (*Pelargone*, *nonylone*, *heptadecanone-9*)



C₁₇H₃₄O MW, 254

Plates from MeOH. M.p. 53° (50-5°). Spar. sol. cold EtOH.

Oxime : m.p. 11-12°.

p-Nitrophenylhydrazone : m.p. 54°.

Maihle, *Bull. soc. chim.*, 1909, 5, 619.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 57; 1912, 101, 629.

Briese, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 1699.

Diodone.

See Perabrodil.

Diogen.

See under 1-Amino-2-naphthol-3 : 6-disulphonic Acid.

Dionin.

See under Morphine.

Diorsellinic Acid.

See Lecanoric Acid.

Dioscin

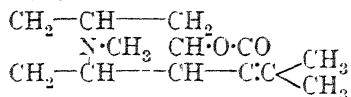
(C₂₀H₃₄O₈)_x MW, (402)_x

Extracted from the rootstocks of *Dioscorea tokoro*, Makino. Colourless cryst. M.p. 288° (308°). $[\alpha]_D^{25}$ -94.6° in EtOH. Sol. EtOH, MeOH, CHCl₃, Me₂CO, amyl alc. Insol. H₂O, Et₂O, pet. ether. Dil. acids → diosgenin + rhamnose.

Honda, *Chem. Zentr.*, 1904, II, 118.

Tsukamoto, Veno, *J. Pharm. Soc. Japan*, 1936, 56, 135.

Dioscorine



$\text{C}_{13}\text{H}_{19}\text{O}_2\text{N}$ MW, 221

Alkaloid from tubers of *Dioscorea hirsuta*. Greenish yellow plates from EtOH. M.p. 43-5°. Sol. H_2O , EtOH, CHCl_3 . Spar. sol. Et_2O , C_6H_6 . Decolourises KMnO_4 . Aq. H_2SO_4 - $\text{KIO}_3 \rightarrow$ bluish violet sol.

$B, \text{HCl}, 2\text{H}_2\text{O}$: m.p. 204°.

B, HBr : m.p. 213-14°.

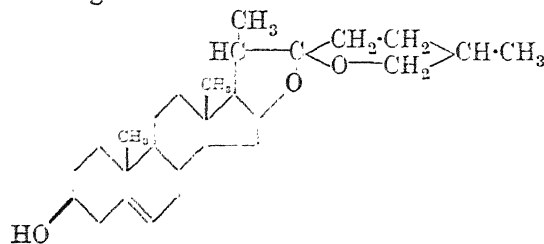
$B, \text{H}_2\text{PtCl}_6, 3\text{H}_2\text{O}$: m.p. 199-200°.

$B, \text{H}_2\text{AuCl}_4$: m.p. 171°.

Picrate: m.p. 183-4°.

Gorter, *Rec. trav. chim.*, 1911, 30, 161.

Diosgenin



$\text{C}_{27}\text{H}_{42}\text{O}_3$ MW, 414

Sapogenin isolated from extract of *Dioscorea tokoro*, Makino. Needles or plates from AcOH or Me_2CO . M.p. 204-7°. Sol. most org. solvents. $[\alpha]_D^{25} - 129^\circ$. Ac_2O at 200° $\rightarrow \psi$ -diosgenin, m.p. 190-92°. Forms insol. digitonide.

Acetyl: cryst. from AcOH. M.p. 195-8°.

Benzoyl: needles. M.p. 236-41°. $[\alpha]_D^{17} - 45^\circ$ in Py.

Phenylurethane: hydrated needles. M.p. 217-20°, anhyd. 224-5°.

3- α -Glucoside: see Trillin.

Tsukamoto, Ueno, Ohta, *J. Pharm. Soc.*

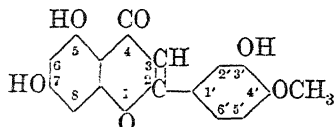
Japan, 1936, 56, 135; 1937, 57, 9, 283.

Marker, Tsukamoto, Turner, *J. Am.*

Chem. Soc., 1940, 62, 2529.

Marker, Turner, *J. Am. Chem. Soc.*, 1941, 63, 767.

Diosmetin (5:7:3'-Trihydroxy-4'-methoxy-flavone)



$\text{C}_{16}\text{H}_{12}\text{O}_6$ MW, 300

Occurs as rhamnoside diosmin in *Scrophularia nodosa*, etc. Yellow needles from EtOH-AcOEt. M.p. 253-5°. Spar. sol. EtOH. Insol. Et_2O .

Triacetyl: m.p. 195-6°.

Lovecy, Robinson, Sugawara, *J. Chem. Soc.*, 1930, 820.

Diosmin

$\text{C}_{31}\text{H}_{44}\text{O}_{21}$

MW, 788

Glycoside of diosmetin, occurring in *Dahlia variabilis*, *Scrophularia nodosa*, *Hyssopus officinalis* and other plants. Cryst. M.p. 278-80°. Sol. dil. NaOH. 5% aq.-ethanolic $\text{H}_2\text{SO}_4 \rightarrow$ glucose + rhamnose + diosmetin.

Acetyl deriv.: m.p. 191-2°.

Oesterle, Wander, *Helv. Chim. Acta*, 1925, 8, 519.

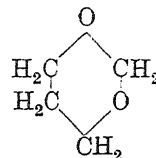
Diosphenol.

See Buchu-camphor.

p-Dioxadiene.

See 1:4-Dioxin.

1:3-Dioxan (Methylene β -propylene dioxide, trimethylene glycol methylene ether, trimethylene methylene dioxide)



$\text{C}_4\text{H}_8\text{O}_2$

MW, 88

Colourless liq., with odour resembling acetal. B.p. 105°/755 mm. Misc. with H_2O and most org. liquids. D_4^{20} 1.03422. n_D^{20} 1.41652.

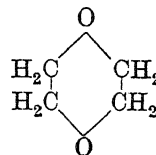
HgCl_2 add. comp.: m.p. 126° decomp.

Picrate: yellow cryst. M.p. 57°.

Clarke, *J. Chem. Soc.*, 1912, 101, 1803.

I.C.I., B.P. 338,624, (*Chem. Abstracts*, 1931, 25, 2437).

1:4-Dioxan (Di-ethylene dioxide, di-ethylene oxide, ethylene glycol ethylene ether)



$\text{C}_4\text{H}_8\text{O}_2$

MW, 88

M.p. 11°. B.p. 101°/750 mm. Misc. with H_2O and most org. liquids. D_4^{20} 1.03375. n_D^{20} 1.42241. Has excellent solvent properties. Forms constant boiling mixture with 20% H_2O , b.p. 86.8°/742 mm. Forms add. comps., e.g., $\text{C}_4\text{H}_8\text{O}_2 \cdot \text{Br}_2$, m.p. 66°; $\text{C}_4\text{H}_8\text{O}_2 \cdot \text{H}_2\text{SO}_4$, m.p. 101°. Picrate: m.p. 66°.

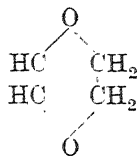
Böesenek, Tellegen, Henriquez, *Rec. trav. chim.*, 1931, 50, 909.

Carbide and Carbon Chemicals Corporation, F.P. 711,595, (*Chem. Abstracts*, 1932, 26, 1947).

Hess, Frahm, *Ber.*, 1938, 71, 2627.

I.G., D.R.P. 570,674, (*Chem. Zentr.*, 1933, I, 2610).

1 : 4-Dioxene

 $C_4H_6O_2$

MW, 86

Liq. B.p. $94.2^\circ/750$ mm. D_4^{20} 1.083. n_D^{20} 1.4375. n_D^{25} 1.4362. $O_3 \rightarrow$ ethylene glycol + HCOOH. $Cl \rightarrow$ 2 : 3-dichloro-1 : 4-dioxan. $HCl \rightarrow$ monochloro-1 : 4-dioxan.

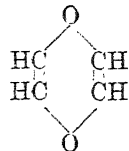
Monochloro- : b.p. $62-3^\circ/14$ mm. D_4^{20} 1.276.

Dichloro- : b.p. $85^\circ/15$ mm.

Dibromo- : cryst. from Et_2O . M.p. $69-70^\circ$.

Summerbell, Bauer, *J. Am. Chem. Soc.*, 1935, 57, 2364.

1 : 4-Dioxin (p-Dioxadiene)

 $C_4H_4O_2$

MW, 84

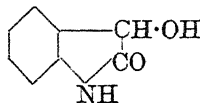
Liq. B.p. $75^\circ/746$ mm. D_4^{20} 1.115. n_D^{20} 1.4350. Sol. CCl_4 . Insol. H_2O . $Br \rightarrow$ dibromodioxene. $Cl \rightarrow$ tetrachlorodioxan. $HCl \rightarrow$ 2 : 5-dichlorodioxan.

Dibromo- : cryst. from pet. ether. M.p. 58° . Tetrachloro- : needles from MeOH. M.p. $142-3^\circ$.

2 : 5-Dichloro- : needles from pet. ether. M.p. $117-18^\circ$.

Summerbell, Umhoefer, *J. Am. Chem. Soc.*, 1939, 61, 3020.

Dioxindole (o-Aminomandelic lactam, 3-hydroxy-2-ketodihydroindole)

 $C_8H_7O_2N$

MW, 149

Cryst. from H_2O or EtOH. M.p. 180° . Decomp. at 195° . Oxidises readily to isatin. Reduces to oxindole. NH_3 on EtOH sol. \rightarrow violet col. and ppt. on heating. Strong bases \rightarrow salts of o-aminomandelic acid. Gives stable salts with HCl , H_2SO_4 , etc.

$B.HCl$: m.p. 156° .

N-Me : cryst. from C_6H_6 . M.p. $149-51^\circ$. Sol. hot H_2O .

N-Et : cryst. M.p. $154-5^\circ$.

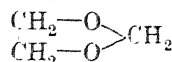
N-Acetyl : cryst. from H_2O . M.p. 127° . Sol. EtOH, hot H_2O .

N-Nitroso : yellow cryst. M.p. $300-10^\circ$. Sublimes at 340° .

Heller, *Ber.*, 1904, 37, 946.

Marschalk, *Ber.*, 1912, 45, 582.

1 : 3-Dioxolan (Dihydro-1 : 3-dioxole, ethylene glycol methylene ether)

 $C_3H_5O_2$

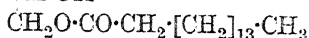
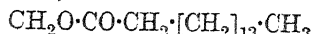
MW, 74

F.p. -95° . B.p. $78^\circ/750$ mm. D_4^{20} 1.0662. D_4^{25} 1.0600. n_D^{20} 1.3974, n_D^{25} 1.4073. Misc. with H_2O . Heat of comb. 409.4 cal. per mol. Decolourises Br water.

Verley, *Bull. soc. chim.*, 1899, 21, 275.

1 : 3-Dioxolan-4 : 5-dicarboxylic Acid.

See Methylenetartaric Acid.

 α : α' -Dipalmitin (Glycerol 1 : 3-dipalmitate, 1 : 3-dipalmitin) $C_{35}H_{68}O_5$

MW, 568

Cryst. from EtOH or $CHCl_3$. M.p. 70° . Sol. Et_2O , $CHCl_3$, hot EtOH.

Fairbourn, *J. Chem. Soc.*, 1930, 369.

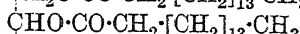
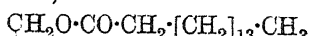
Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 869.

Grün, *Ber.*, 1905, 38, 2285.

Malkin, Shurbagy, Meara, *J. Chem. Soc.*, 1937, 1412.

Brash, *J. Soc. Chem. Ind.*, 1927, 46, 481t.

Rose, *J. Am. Chem. Soc.*, 1947, 69, 1384.

 α : β -Dipalmitin (Glycerol 1 : 2-dipalmitate, 1 : 2-dipalmitin) $C_{35}H_{68}O_5$

MW, 568

Cryst. from ligroin. M.p. 72.5° (67°).

Grün, Corelli, *Z. angew. Chem.*, 1912, 25, 667.

Fairbourn, *J. Chem. Soc.*, 1930, 369.

Brash, *J. Soc. Chem. Ind.*, 1927, 46, 481.

Dipentadecylcarbinol.

See Hentriacontanol-16.

Di-n-pentadecyl Ketone.

See Palmitone.

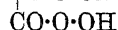
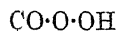
Dipentene.

See Limonene.

Di-perinaphthylencyclobutane.

See Heptacycene.

Di-peroxalic Acid

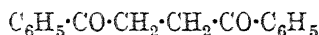
 $C_2H_2O_6$

MW, 122

Viscous liq. Powerful oxidising agent.

Milas, Panagiotakos, *J. Am. Chem. Soc.*, 1946, 68, 534.

Diphenacyl (*Succinophenone*, sym.-dibenzoyl-ethane)



$\text{C}_{16}\text{H}_{14}\text{O}_2$ MW, 238

Cryst. from EtOH. M.p. 145°. Sol. C_6H_6 , CHCl_3 . Spar. sol. Et_2O , EtOH, ligroin. Sol. conc. H_2SO_4 to green sol. turning red and fluorescent on heating.

Dioxime: cryst. from EtOH.Aq. M.p. 203–4°.

Phenylhydrazone: yellow needles. M.p. 116°.

Di-phenylhydrazone: m.p. 179°.

Di-2:4-dinitrophenylhydrazone: m.p. 265° decomp.

Dupont, *Bull. soc. chim.*, 1914, 15, 606.

Conant, Lutz, *J. Am. Chem. Soc.*, 1923, 45, 1305.

Ajello, *Gazz. chim. ital.*, 1937, 67, 708.

Weygand, Meusel, *Ber.*, 1943, 76, 498.

Diphenacylamine (*Iminodiacetophenone*)



$\text{C}_{16}\text{H}_{15}\text{O}_2\text{N}$ MW, 253

Leaflets. Sinters at 60°, melts at 74–5°. Sol. EtOH, AcOEt, C_6H_6 .

B.HCl: silvery leaflets. M.p. 235° decomp.

B.HI: needles from AcOH. M.p. 211°.

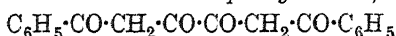
B.HAuCl: m.p. 168–9° decomp.

Picrate: prisms. M.p. 171° decomp.

N-Nitroso: yellow leaflets. M.p. 90°.

Gabriel, *Ber.*, 1908, 41, 1144.

DiphenacylDiketone (*Oxalyl-diacetophenone*, 1:3:4:6-tetraketo-1:6-diphenylhexane)



$\text{C}_{18}\text{H}_{14}\text{O}_4$ MW, 294

Prisms from CHCl_3 . M.p. 179–80°. Mod. sol. hot AcOH, hot CHCl_3 . Spar. sol. EtOH, Et_2O , ligroin. Sol. alkalis with yellow col. EtOH sol. + FeCl_3 → dark red col.

Brömme, Claisen, *Ber.*, 1888, 21, 1134.

Schmidt, *Ber.*, 1895, 28, 1206.

Diphenacylidene.

See sym.-Dibenzoylethylene.

Diphenacylmethane.

See 1:3-Dibenzoylpropane.

Diphenacylpiperidine.

See Norlobelanine.

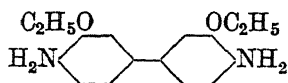
Diphenamic Acid.

See under Diphenic Acid.

Diphenanilic Acid.

See under Diphenic Acid.

Di-o-phenetidine (3:3'-Diethoxy-4:4'-diaminodiphenyl, 3:3'-diethoxybenzidine)



$\text{C}_{16}\text{H}_{20}\text{O}_2\text{N}_2$

MW, 272

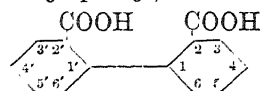
M.p. 117°. Sol. EtOH, Et_2O , CHCl_3 . Spar. sol. hot H_2O . Hydrochloride is sol. H_2O and sol. turns red on addition of ox. agents (FeCl_3 , KMnO_4 , etc.).

Möhlau, *J. prakt. Chem.*, 1879, 19, 383.

Diphenetole.

See under Dihydroxydiphenyl.

Diphenic Acid (*Diphenyl-2:2'-dicarboxylic acid*, oo'-dicarboxydiphenyl)



$\text{C}_{14}\text{H}_{10}\text{O}_4$ MW, 242

Leaflets from H_2O . M.p. 228–9°. Sol. most ord. org. solvents. Mod. sol. hot H_2O . Sublimes in needles. Stable to HNO_3 and KMnO_4 but decomp. by CrO_3 . Conc. H_2SO_4 or oleum → fluorenone-4-carboxylic acid. Soda-lime dist. → diphenyl.

Me ester: $\text{C}_{15}\text{H}_{12}\text{O}_4$. MW, 256. Plates from MeOH.Aq. M.p. 110°.

Di-Me ester: $\text{C}_{16}\text{H}_{14}\text{O}_4$. MW, 270. Cryst. from MeOH. M.p. 74°. B.p. 204–6°/14 mm.

Et ester: $\text{C}_{16}\text{H}_{14}\text{O}_4$. MW, 270. M.p. 91–2° (88°).

Di-Et ester: $\text{C}_{18}\text{H}_{18}\text{O}_4$. MW, 298. M.p. 42°.

Monophenyl ester: prisms from AcOH. M.p. 139°.

Di-p-nitrobenzyl ester: m.p. 182–6°.

Dichloride: $\text{C}_{14}\text{H}_8\text{O}_2\text{Cl}_2$. MW, 279. M.p. 94° (97°). Sol. Et_2O , C_6H_6 .

Mono-amide: diphenamic acid, diphenamidic acid. $\text{C}_{14}\text{H}_{11}\text{O}_3\text{N}$. MW, 241. Cryst. from EtOH. M.p. 193°. Sol. hot H_2O .

Diamide: $\text{C}_{14}\text{H}_{12}\text{O}_2\text{N}_2$. MW, 240. Cryst. from EtOH or H_2O . M.p. 212°. Heat above m.p. → imide.

Mono-anilide: diphenanilic acid, *N*-phenyl-diphenamic acid. Needles from AcOH.Aq. M.p. 181–3°.

Anhydride: $\text{C}_{14}\text{H}_8\text{O}_3$. MW, 224. M.p. 217°. Spar. sol. Et_2O . Insol. H_2O . Sublimes.

Imide: $\text{C}_{14}\text{H}_9\text{O}_2\text{N}$. MW, 223. Needles. M.p. 217.5° (219°). Sol. CHCl_3 . Spar. sol. EtOH. Insol. H_2O , Et_2O . *N-Acetyl*: prisms. M.p. 92°.

Di-hydrazide: m.p. 182°.

Mononitrile: $\text{C}_{14}\text{H}_9\text{O}_2\text{N}$. MW, 223. Prisms from C_6H_6 . M.p. 170–2°.

Huntress, *Organic Syntheses*, Collective Vol. I, 216.

Underwood, Clough, *J. Am. Chem. Soc.*, 1929, 51, 583.

Vorländer, Meyer, *Ann.*, 1901, 320, 138.

Underwood, Kochmann, *J. Am. Chem. Soc.*, 1924, 46, 2071.

Linstead, Doering, *J. Am. Chem. Soc.*, 1942, 64, 1985.

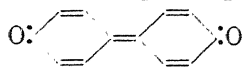
Atkinson, Lawler, *Organic Syntheses*, Collective Vol. I, 1941, 222.

Diphenin.

See 4 : 4'-Diaminohydrazobenzene.

Diphenol.

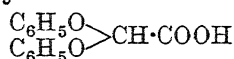
See Dihydroxydiphenyl.

Diphenoquinone (Di-p-benzoquinone)

$C_{12}H_8O_2$ MW, 184

Yellow or bluish red cryst. Decomp. at 165° . Sol. $PhNO_2$. Spar. sol. most other org. solvents. Insol. H_2O . Odourless and non-volatile. Decomp. by acids and alkalis. $PbO_2 \rightarrow p$ -benzoquinone. $Zn + AcOH \rightarrow 4 : 4'$ -dihydroxydiphenyl. Forms a quinhydrone with 4 : 4'-dihydroxydiphenyl.

Willstätter, Kalb, *Ber.*, 1905, **38**, 1235.

Diphenoxycetic Acid

$C_{14}H_{12}O_4$ MW, 244

Needles. M.p. 91° . Sol. EtOH, Et_2O . Spar. sol. H_2O , ligroin, C_6H_6 .

Et ester : $C_{16}H_{16}O_4$. MW, 272. B.p. $240^\circ/50$ mm.

Amide : $C_{14}H_{13}O_3N$. MW, 243. Leaflets. M.p. 108° . Sol. EtOH, Et_2O .

van Alphen, *Rec. trav. chim.*, 1927, **46**, 144.

Auwers, Haymann, *Ber.*, 1894, **27**, 2795.

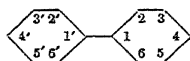
Chem. Fabr. von Heyden, D.R.P. 561,281, (*Chem. Zentr.*, 1933, I, 2280).

Diphenoxyethane.

See under Ethylene Glycol.

1 : 3-Diphenoxypropane.

See under Trimethylene Glycol.

Diphenyl (Phenylbenzene)

$C_{12}H_{10}$ MW, 154

Colourless, monoclinic cryst. M.p. 71° . B.p. $254-5^\circ$, $227^\circ/400$ mm., $217^\circ/300$ mm., $145^\circ/22$ mm. Sol. EtOH, MeOH, Et_2O . Heat of comb. C_p 1510 Cal. Oxidised or reduced only with difficulty. Fuming $HNO_3 \rightarrow 2 : 4'$ - and 4 : 4'-dinitro derivs. Sulphonated by hot conc. H_2SO_4 to 4-sulpho and 4 : 4'-disulpho derivs.

Banus, Guiteras, *Chem. Zentr.*, 1933, II, 540.

Zartman, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 3398.

Frydlander, *Rev. prod. chim.*, 1932, **35**, 161 (Review).

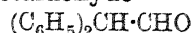
I.G., D.R.P. 555,079, (*Chem. Abstracts*, 1932, **26**, 5101).

Hixson et al., *Ind. Eng. Chem. (Anal. edition)*, 1931, **3**, 289.

Krizewsky, Turner, *J. Chem. Soc.*, 1919, **115**, 559.

Gilman, Lichtenwalter, *J. Am. Chem. Soc.*, 1939, **61**, 958.

Dict. of Org. Comp.—II.

Diphenylacetaldehyde

$C_{14}H_{12}O$ MW, 196

B.p. $315-16^\circ$ part decomp., $168-70^\circ/10$ mm. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Insol. H_2O . D_4^{20} 1.1061. n_D^{20} 1.5920. Ox. \rightarrow benzophenone. Forms bisulphite comp. Volatile in steam.

Oxime: two forms. (α) M.p. 120° ; (β) m.p. 106° .

Semicarbazone : m.p. 162° .

Weise, *Ann.*, 1888, **248**, 38.

Stoermer, *Ber.*, 1906, **39**, 2293.

Auwers, Wissebach, *Ber.*, 1923, **56**, 1680.

Thomas, Bettzieche, *Z. physiol. Chem.*, 1924, **140**, 244.

Daniloff, Venus-Danilova, *Ber.*, 1926, **59**, 1041.

Ramart-Lucas, Salmon-Legagneur, *Compt. rend.*, 1928, **186**, 1848.

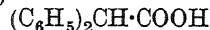
Klages, Kessler, *Ber.*, 1906, **39**, 1755.

N-Diphenylacetamide.

See under Diphenylamine.

Diphenylacethydrazide.

See under unsym.-Diphenylhydrazine and Hydrazobenzene.

Diphenylacetic Acid (Diphenylmethane- α -carboxylic acid)

$C_{14}H_{12}O_2$ MW, 212

Leaflets from EtOH. M.p. 148° . Sol. EtOH, Et_2O , $CHCl_3$, hot H_2O . Oleum \rightarrow benzhydrol. $CrO_3 \rightarrow$ benzophenone.

Me ester : $C_{15}H_{14}O_2$. MW, 226. Cryst. from EtOH.Aq. M.p. 60° .

Et ester : $C_{16}H_{16}O_2$. MW, 240. Cryst. from EtOH. M.p. 58° . B.p. $178^\circ/15$ mm.

6-Chlorohexyl ester : b.p. $215-22^\circ/2.5$ mm.

6-Bromohexyl ester : b.p. $223-6^\circ/2.5$ mm. n_D^{20} 1.5572.

6-Hydroxyhexyl ester : b.p. $223-5^\circ/3$ mm. n_D^{20} 1.5478.

Phenyl ester : cryst. from MeOH. M.p. $65-5-66-5^\circ$.

p-Phenylphenacyl ester : m.p. 111° .

Anhydride : $C_{28}H_{22}O_3$. MW, 406. M.p. 98° . B.p. $220^\circ/15$ mm.

Chloride : $C_{14}H_{11}OCl$. MW, 230.5. Cryst. from ligroin. M.p. $56-7^\circ$. B.p. $178^\circ/15$ mm.

Amide : $C_{14}H_{13}ON$. MW, 211. M.p. $167-8^\circ$.

Hydrazide hydrochloride : m.p. 298° .

Nitrile : α -cyanodiphenylmethane, diphenylacetonitrile. $C_{14}H_{11}N$. MW, 193. M.p. $72-3^\circ$ ($75-6^\circ$). B.p. $181^\circ/12$ mm. Sol. Et_2O , EtOH.

Anilide : needles from EtOH. M.p. 180° .

Hurd, Christ, Thomas, *J. Am. Chem. Soc.*, 1933, **55**, 2589.

Marvel, Hager, Caudle, *Organic Syntheses*, Collective Vol. I, 219.

Stollé, Schmidt, *Ber.*, 1912, **45**, 3114.

Staudinger, *Ber.*, 1911, **44**, 1620.

Symons, Zincke, *Ann.*, 1874, **171**, 122.

Tschitschibabin, *Ber.*, 1911, **44**, 442.

sym.-Diphenylacetone.

See Dibenzyl Ketone.

unsym.-Diphenylacetone (*Methyl benzhydryl ketone*, 2-keto-1:1-diphenylpropane, α -acetodiphenylmethane) $\text{C}_{15}\text{H}_{14}\text{O}$ MW, 210Exists in dimorphous forms. (1) Labile: m.p. 46°. (2) Stable: spangles from EtOH. M.p. 61° (62-3°). Sol. Et₂O, C₆H₆, ligroin.*Oxime*: m.p. 165°.*Semicarbazone*: m.p. 170°.*Phenylhydrazone*: needles from C₆H₆. M.p. 131°.

2:4-Dinitrophenylhydrazone: m.p. 142-5-143°.

Stoermer, *Ber.*, 1906, 39, 2302.Tiffeneau, Dorlencourt, *Compt. rend.*, 1906, 143, 127.Bardan, *Bull. soc. chim.*, 1931, 49, 1877.**Diphenylacetophenone.**

See Diphenylbenzoylmethane.

Diphenylacetyl disulphide.

See under Phenylthioacetic Acid.

Diphenylacetylene.

See Toluene.

Diphenylacrolein.

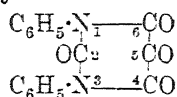
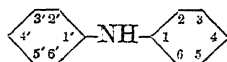
See Phenylcinnamaldehyde.

Diphenylacrylic Acid.

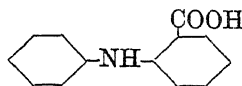
See Phenylcinnamic Acid.

Diphenylaldehyde.

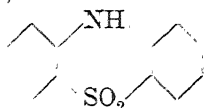
See Aldehydodiphenyl.

1:3-Diphenylalloxan $\text{C}_{15}\text{H}_{10}\text{O}_4\text{N}_2$ MW, 2945-*Oxime*: needles from EtOH. Red at 200°. Decomp. at 227°. *Acetyl*: prisms. M.p. 245° decomp.5-*Phenylhydrazone*: yellow needles from AcOH.Aq. M.p. 265° decomp.5-*Methylphenylhydrazone*: orange red prisms + yellow needles from EtOH-CHCl₃. M.p. 175° decomp.5-p-*Nitrophenylhydrazone*: yellow prisms from AcOH. M.p. 274° decomp.5-*Diphenylhydrazone*: pale yellow needles. M.p. 254-5° decomp.5- α -*Naphthylhydrazone*: m.p. 303°.Whiteley, *J. Chem. Soc.*, 1907, 91, 1344.Nightingale, Morris, *J. Am. Chem. Soc.*, 1936, 58, 1470.**Diphenylamine** $\text{C}_{12}\text{H}_{11}\text{N}$ MW, 169Leaflets. M.p. 54°. B.p. 302°, 179°/22 mm. Very sol. MeOH, EtOH. Sol. ligroin. Insol. H₂O. Heat of comb. C_p 1542.6 Cal. HNO₃ onHCl sol. → deep blue col. Also nitrites on conc. H₂SO₄ sol. → deep blue. Used for colorimetric estimation of HNO₃. S at 250° → thiodiphenylamine (phenthiazine). CHCl₃ - AlCl₃ → acridine. Salts are hyd. by H₂O.*Na deriv.*: (C₆H₅)₂N·Na. Needles. M.p. 265°.*B.HBr*: m.p. 230° decomp.*B.H₂SO₄*: m.p. 123-5°.*Benzenesulphonyl*: needles. M.p. 115-17°.*p-Toluenesulphonyl*: m.p. 64°.*Picryl chloride add. comp.*: m.p. 63-4°.*N-Nitroso*: diphenylnitrosamine. C₁₂H₁₀ON₂.MW, 198. Yellow plates. M.p. 66.5°. Sol. warm EtOH, warm C₆H₆. Alc. HCl → p-nitrosodiphenylamine.*N-Formyl*: N-diphenylformamide. C₁₃H₁₁ON.

MW, 197. Cryst. from EtOH.Aq. M.p. 73-4°.

B.p. 190°/13 mm. Sol. EtOH, C₆H₆. Insol. H₂O.*N-Acetyl*: N-diphenylacetamide, N-phenylacetanilide. C₁₄H₁₃ON. MW, 211. Cryst. from ligroin or Et₂O. M.p. 103°. Sublimes.*N-Benzoyl*: see Diphenylbenzamide.*N-Amyl*: b.p. 190-5°.*N-Phenylethyl*: m.p. 61-3°.Frei, U.S.P. 1,840,576, (*Chem. Abstracts*, 1932, 26, 1625).Schöllkopf, D.R.P. 530,736, (*Chem. Abstracts*, 1932, 26, 152).Karpukhin, *Chem. Abstracts*, 1929, 23, 1627.Contardi, *Giorn. chim. applicata*, 1920, 1, 11.Goldberg, *Ber.*, 1907, 40, 4543.Sabatier, Senderens, *Compt. rend.*, 1901, 133, 323.de Laire, Girard, Chapoteaut, *Compt. rend.*, 1866, 63, 92.Tobias, *Ber.*, 1882, 15, 2866.**Diphenylamine-2-carboxylic Acid (N-Phenylanthranilic acid)** $\text{C}_{13}\text{H}_{11}\text{O}_2\text{N}$ MW, 213Needles from EtOH. M.p. 184°. Sol. hot EtOH. Decomp. above m.p. to CO₂ + diphenylamine. Conc. H₂SO₄ → acridone. Redox titration indicator.*Et ester*: C₁₅H₁₅O₂N. MW, 241. B.p. 184-7°/6 mm.Wieland, Roseau, *Ber.*, 1915, 48, 1120.Goldberg, *Ber.*, 1906, 39, 1691.Ullmann, Dieterle, *Ann.*, 1907, 355, 320.König, Reissert, *Ber.*, 1899, 32, 790, 1161.Allen, McKee, *Organic Syntheses*, 1939, XIX, 6.Graebe, Lagodzinski, *Ann.*, 1893, 276, 43.

Diphenylamine sulphone (*Thiodiphenylamine S-dioxide*)



$C_{12}H_{10}O_2NS$ MW, 231

Needles. M.p. 257–9°. Sol. EtOH. Spar. sol. C_6H_6 .

Bernthsen, *Ber.*, 1906, 39, 1807.

I.G., D.R.P. 582,268 (*Chem. Zentr.*, 1933, II, 2329).

Diphenylanthranilic Acid.

See Triphenylamine-2-carboxylic Acid.

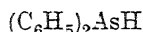
Diphenylarsenious chloride.

See Diphenylchloroarsine.

Diphenylarsenious cyanide.

See Diphenylcyanoarsine.

Diphenylarsine



$C_{12}H_{11}As$ MW, 230

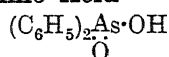
B.p. 174°/25 mm., 161–2° 20 mm. Sol. EtOH, Et_2O . Insol. H_2O . D_{25}^{25} 1.30. Oxidises in air. $Br \rightarrow$ diphenylarsine tribromide, m.p. 129°.

Dehn, Wilcox, *Am. Chem. J.*, 1906, 35, 45.

Blicke, Powers, *J. Am. Chem. Soc.*, 1932, 54, 3356.

Cookson, Mann, *J. Chem. Soc.*, 1947, 618.

Diphenylarsinic Acid



$C_{12}H_{11}O_2As$ MW, 262

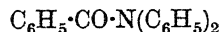
Needles. M.p. 178° (169–70°). Sol. EtOH, hot H_2O . Very spar. sol. Et_2O , C_6H_6 . Alkali salts sol. H_2O .

Bart, *Ann.*, 1922, 429, 100.

Burton, Gibson, *J. Chem. Soc.*, 1924, 125, 2275.

Dehn, Wilcox, *Am. Chem. J.*, 1906, 35, 45.

Diphenylbenzamide (*N-Benzoyldiphenylamine*)



$C_{19}H_{15}ON$ MW, 273

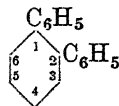
Prisms from EtOH. M.p. 179–80°. Spar. sol. EtOH, Et_2O , cold H_2O .

Herzog, Hancu, *Ber.*, 1908, 41, 636.

Johnson, Levy, *Am. Chem. J.*, 1907, 38, 458.

Meyer, Nicolaus, *J. prakt. Chem.*, 1910, 82, 530.

1 : 2-Diphenylbenzene (*2-Phenyldiphenyl, o-terphenyl*)



$C_{18}H_{14}$

MW, 230

Prisms from MeOH. M.p. 58°. B.p. 332°. Sol. Me_2CO , $CHCl_3$.

Bachmann, Clarke, *J. Am. Chem. Soc.*, 1927, 49, 2095.

1 : 3-Diphenylbenzene (*3-Phenyldiphenyl, isodiphenylbenzene, m-terphenyl*).

Needles. M.p. 89°. B.p. 363°. Sol. EtOH, Et_2O , AcOH, C_6H_6 . Does not form a picrate.

v. Braun, Irmisch, Nelles, *Ber.*, 1933, 66, 1477.

France, Heilbron, Hey, *J. Chem. Soc.*, 1939, 1290.

1 : 4-Diphenylbenzene (*4-Phenyldiphenyl, p-terphenyl*).

Leaflets from EtOH. M.p. 213° (209°). B.p. 250°/45 mm. Sol. hot C_6H_6 . Mod. sol. Et_2O , CS_2 . Very spar. sol. EtOH, AcOH. Non-volatile in steam. Sublimes. Does not form a picrate.

Mayer, Schiffner, *Ber.*, 1932, 65, 1337.

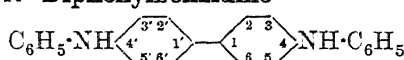
v. Braun, *Ber.*, 1927, 60, 1180.

France, Heilbron, Hey, *J. Chem. Soc.*, 1938, 1370.

Müller, Sok, *Ber.*, 1937, 70, 1992.

Ganguly, Mukherji, *Nature*, 1951, 168, 1004.

N : N'-Diphenylbenzidine



$C_{24}H_{20}N_2$ MW, 336

Plates from xylene. M.p. 244–5° (251–2°). Sol. boiling toluene, AcOH. Spar. sol. EtOH, Me_2CO , C_6H_6 . $H_2SO_4 \rightarrow$ colourless sol. becoming violet on heating or blue on addition of KNO_3 . AcOH \rightarrow yellow sol. becoming blue with $K_2Cr_2O_7$. Redox titration indicator.

N : N'-*Dimethyl* : m.p. 172–3°.

N : N'-*Diphenyl* : tetraphenylbenzidine. M.p. 227°.

Sarver, Johnson, *J. Am. Chem. Soc.*, 1935, 57, 329.

2 : 2'-Diphenylbenzidine.

Cryst. from EtOH. M.p. 151–2°.

Sako, *Bull. Chem. Soc. Japan*, 1935, 10, 593.

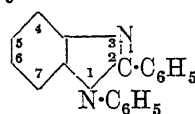
3 : 3'-Diphenylbenzidine.

Plates from EtOH.Aq. M.p. 151–2°.

N : N'-*Diacetyl* : needles from EtOH. M.p. 245–6°.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 460.

1 : 2-Diphenylbenziminazole



$C_{19}H_{14}N_2$

MW, 270

Cryst. from MeOH. M.p. 112°. Becomes red in light.

Hydrochloride: needles. M.p. 260° decomp.

Wolff, *Ann.*, 1912, 394, 67.

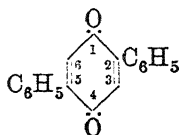
Biehringer, Busch, *Ber.*, 1902, 35, 1970.

2 : 5-(or 2 : 6)-Diphenylbenziminazole.

Plates from EtOH. M.p. 197-8°. Sol. hot AcOH. Spar. sol. hot H₂O.

Hubner, *Ann.*, 1881, 209, 347.

2 : 5-Diphenylbenzoquinone (2 : 5-Diphenylquinone, triphenylquinone)



C₁₈H₁₂O₂

MW, 260

Orange yellow plates from AcOH. M.p. 214°. Mod. sol. hot AcOH, hot C₆H₆. Reddish violet sol. in conc. H₂SO₄. Red. → 2 : 5-diphenylhydroquinone.

Müller, Pechmann, *Ber.*, 1889, 22, 2131.

Kvalnes, *J. Am. Chem. Soc.*, 1934, 56, 2478.

2 : 6-Diphenylbenzoquinone.

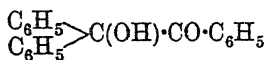
Reddish needles. M.p. 137-8°. Sol. most ord. org. solvents. Red. → 2 : 6-diphenylhydroquinone.

Oxime: decomp. at 242-4°.

Borsche, *Ber.*, 1899, 32, 2938; *Ann.*, 1900, 312, 230.

Jones, Kenner, *J. Chem. Soc.*, 1931, 1851.

Diphenylbenzoylcarbinol (α -Phenylbenzoin)



C₂₀H₁₆O₂

MW, 288

Cryst. from EtOH. M.p. 88°. Sol. EtOH, Et₂O, CHCl₃, hot ligroin. Spar. sol. H₂O. Red. → diphenylbenzoylmethane. Alc. KOH → benzoic acid + benzhydrol.

Oxime: m.p. 153-5°.

Acetyl: m.p. 146°.

Me ether: C₂₁H₁₈O₂. MW, 302. Plates from EtOH-ligroin. M.p. 94°.

Et ether: C₂₂H₂₀O₂. MW, 316. Plates from EtOH-ligroin. M.p. 85°.

Acree, *Ber.*, 1904, 37, 2758.

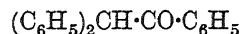
Werner, *Ber.*, 1906, 39, 1287.

Orékhoff, Tiffeneau, *Bull. soc. chim.*, 1927, 41, 842.

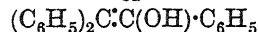
Diphenylbenzoylethylene.

See Benzylidenedeoxybenzoin.

Diphenylbenzoylmethane (*Phenyl benzhydryl ketone, α -phenyldeoxybenzoin, ω -diphenylacetophenone, triphenylvinyl alcohol, hydroxytriphenylethylene*)



or



C₂₀H₁₆O

MW, 272

Monoclinic needles. M.p. 136-7°. B.p. 270-80°/40 mm. Sol. CHCl₃, hot EtOH, C₆H₆. AcOH. Spar. sol. Et₂O. Prac. insol. H₂O. HI → triphenylethane. Alk. KMnO₄ → benzophenone + benzoic acid. PCl₅ → 2-chloro-1 : 1 : 2-triphenylethylene. Ac₂O → triphenylvinyl acetate.

Acetyl: triphenylvinyl acetate. Prisms from AcOH. M.p. 104.5-5.5°.

Benzoyl: prisms from EtOH. M.p. 153°.

Oxime: m.p. 182°.

Phenyldrazone: needles from AcOH. M.p. 156°.

Werner, *Ber.*, 1906, 39, 1286.

Betzliche, *Z. physiol. Chem.*, 1924, 140, 273.

Ley, Manecke, *Ber.*, 1923, 56, 783.

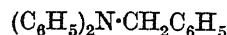
Biltz, *Ber.*, 1899, 32, 654.

McKenzie, Boyle, *J. Chem. Soc.*, 1921, 1137.

Diphenylbenzylacetic Acid.

See 1 : 1 : 2-Triphenylpropionic Acid.

Diphenylbenzylamine



C₁₉H₁₇N

MW, 259

Needles. M.p. 95° (88.5°). Spar. sol. cold EtOH.

Desai, *J. Indian Inst. Sci.*, 1924, 7, 235.

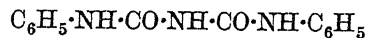
Bernthsen, Trompeter, *Ber.*, 1878, 11, 1761.

Meunier, Desparmet, *Compt. rend.*, 1907, 144, 274.

Diphenylbenzylcarbinol.

See 1-Hydroxy-1 : 1 : 2-triphenylethane.

sym.-Diphenylbiuret



C₁₄H₁₃O₂N₃

MW, 255

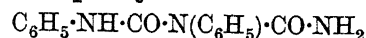
M.p. 210°. Spar. sol. EtOH.

Dains, Wertheim, *J. Am. Chem. Soc.*, 1920, 42, 2305.

Schiff, *Ann.*, 1907, 352, 77.

Kühn, Henschel, *Ber.*, 1888, 21, 504.

unsym.-Diphenylbiuret



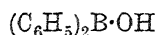
C₁₄H₁₃O₂N₃

MW, 255

Prisms. M.p. 165°. Sol. EtOH. Insol. H₂O.

Hofmann, *Ber.*, 1871, 4, 250.

Diphenylboric Acid

C₁₂H₁₁OB

MW, 182

Leaflets. M.p. 57-5°. B.p. 150-55°/20 mm.
Sol. EtOH, C₆H₆, pet. ether. Slowly decomp. in air.

König, Scharrnbeck, *J. prakt. Chem.*,
1930, 128, 166.

Diphenylbutadiene.

See Distyryl.

1 : 1-Diphenyl-*n*-butane (α -Propyldiphenylmethane)C₁₆H₁₈

MW, 210

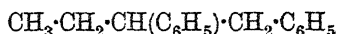
M.p. 27°. B.p. 286-8°, 145°/16 mm. Sol.
Et₂O, EtOH, CHCl₃. D₄²⁰ 0.9928. n_D²⁰ 1.5664.

Stadnikow, *J. prakt. Chem.*, 1913, 88, 8.

Albesco, *Ann. chim.*, 1922, 18, 258.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 293.

Ipatieff, Pines, Schaad, *J. Am. Chem. Soc.*, 1944, 66, 816.

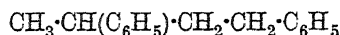
1 : 2-Diphenyl-*n*-butane (α -Ethyldibenzyl)C₁₆H₁₈

MW, 210

B.p. 289°/750 mm. (285-7°), 152°/11 mm.
Sol. EtOH, Et₂O, CHCl₃. D₆¹⁸ 1.0092. n_D¹⁸ 1.587.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 290.

Klages, Heilmann, *Ber.*, 1904, 37, 1452.

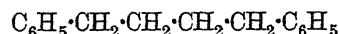
1 : 3-Diphenyl-*n*-butaneC₁₆H₁₈

MW, 210

B.p. 295°. D₄²⁰ 0.9722. n_D²⁰ 1.5525.

Stobbe, Posnjak, *Ann.*, 1909, 371, 297.

Ipatieff, Pines, Schaad, *J. Am. Chem. Soc.*, 1944, 66, 816.

1 : 4-Diphenyl-*n*-butaneC₁₆H₁₈

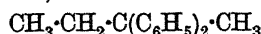
MW, 210

M.p. 52°. B.p. 317°. Sol. Et₂O, EtOH,
CHCl₃.

Ipatieff, Orloff, Dolgow, *Chem. Zentr.*,
1930, I, 1783.

Barbot, *Bull. soc. chim.*, 1930, 47, 1322.

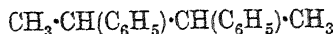
Salkind, Fundyler, *Ber.*, 1936, 69, 129.

2 : 2-Diphenyl-*n*-butane (α -Methyl- α -ethyldiphenylmethane)C₁₆H₁₈

MW, 210

M.p. 127-8°. Sol. EtOH, Et₂O, CHCl₃.

Thörner, Zincke, *Ber.*, 1878, 11, 1990.

2 : 3-Diphenyl-*n*-butane ($\alpha\beta$ -Dimethyldibenzyl)C₁₆H₁₈

MW, 210

"d." Liq. [α]_D²⁰ + 20.24°.

"l." Liq. [α]_D²⁰ - 4.6°.

"dl." M.p. 8° (12.5°). B.p. 283-4°/752 mm.,
140°/10 mm., 103-4°/1 mm. D₄²⁰ 0.9757. n_D²⁰
1.55516.

"Meso." Leaflets from MeOH. M.p. 126°
(128°). Sol. EtOH, Et₂O, CHCl₃.

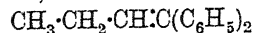
Liepin, *Chem. Abstracts*, 1913, 7, 982;
1931, 25, 3328.

Ott, Behr, *Ber.*, 1928, 61, 2139.

Conant, Blatt, *J. Am. Chem. Soc.*, 1928,
50, 555.

Wright, *J. Am. Chem. Soc.*, 1939, 61, 2110.

Wessely, Welleba, *Ber.*, 1941, 74, 777.

1 : 1-Diphenyl-1-butylene (α -Propyldenediphenylmethane)C₁₆H₁₆

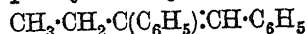
MW, 208

B.p. 295-7° (286°), 157-8°/14 mm. D₄¹⁸ 1.03
(D₆¹⁸ 1.0039). n_D²⁰ 1.5604.

Schlenk, Bergmann, *Ann.*, 1930, 479,
49.

Gilman, Fothergill, Parker, *Rec. trav. chim.*, 1929, 48, 750.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 291.

1 : 2-Diphenyl-1-butylene (α -Ethylstilbene)C₁₆H₁₆

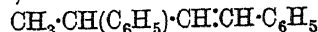
MW, 208

M.p. 57°. B.p. 296-7°. An isomeric form
exists as an oil, b.p. 294-6°. D₆¹⁸ 1.0124. n_D¹⁸
1.593.

Klages, Heilmann, *Ber.*, 1904, 37, 1453.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 291.

1 : 3-Diphenyl-1-butylene ("Liquid distyrene")

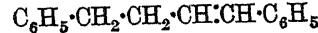
C₁₆H₁₆

MW, 208

B.p. 310-12°, 175-6°/14 mm. D₅¹⁸ 1.016. n_D¹⁸
1.590.

Stoermer, Kootz, *Ber.*, 1928, 61, 2334.

1 : 4-Diphenyl-1-butylene ("Solid distyrene")

C₁₆H₁₆

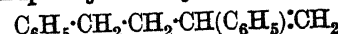
MW, 208

Leaflets from EtOH. M.p. 124°.

Liebermann, *Ber.*, 1910, 43, 1543.

Stobbe, Posnjak, *Ann.*, 1910, 372, 249.

2 : 4-Diphenyl-1-butylene

C₁₆H₁₆

MW, 208

B.p. 140°/2-3 mm.

Marion, *Can. J. Research*, 1938, 16 B, 213.

1 : 4-Diphenyl-2-butylene

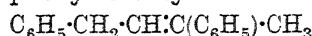
1 : 4-Diphenyl-2-butylene.

See sym.-Dibenzylethylene.

2 : 3-Diphenyl-2-butylene.

See $\alpha\beta$ -Dimethylstilbene.

2 : 4-Diphenyl-2-butylene



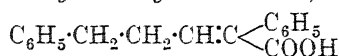
$\text{C}_{16}\text{H}_{16}$ MW, 208

B.p. 169–70°/12 mm. D_4^{20} 1.0149.

Nitroschloride : m.p. 126° decomp.

Stoermer, Kootz, *Ber.*, 1928, 61, 2333.

1 : 4-Diphenyl-1-butylene-1-carboxylic Acid (1-Phenyl-3-benzylcrotonic acid)

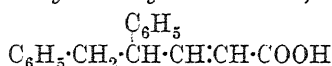


$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Needles from pet. ether. M.p. 88°.

Thiele, Meisenheimer, *Ann.*, 1899, 306, 238.

3 : 4-Diphenyl-1-butylene-1-carboxylic Acid (3-Phenyl-3-benzylcrotonic acid)

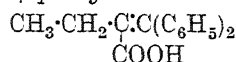


$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Prisms from ligroin-Et₂O. M.p. 89°.

Burton, Shoppee, *J. Chem. Soc.*, 1937, 548.

1 : 1-Diphenyl-1-butylene-2-carboxylic Acid (α -Ethyl- β -phenylcinnamic acid)



$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

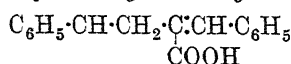
Needles from 50% EtOH. M.p. 159–60°.

Sol. C_6H_6 , CHCl_3 . Spar. sol. AcOEt.

Et ester : $\text{C}_{19}\text{H}_{20}\text{O}_2$. MW, 280. Prisms from EtOH. M.p. 88–9°.

De Fazi, *Gazz. chim. ital.*, 1916, 46, 274.

1 : 4-Diphenyl-1-butylene-2-carboxylic Acid (3-Phenyl-1-benzylidenenebutyric acid)



$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Needles from EtOH or petrol. M.p. 124–5°.

Rupe, *Ann.*, 1913, 395, 111.

1 : 4-Diphenyl-1-butylene-3-carboxylic Acid (Benzylstyrylacetic acid).



COOH

$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

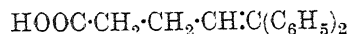
Prisms from EtOH.Aq. M.p. 125°.

Thiele, Meisenheimer, *Ann.*, 1899, 306, 230.

Mettler, *Ber.*, 1906, 39, 2942.

406 1 : 1-Diphenyl-1-butylene-2 : 3-dicarboxylic Acid

1 : 1-Diphenyl-1-butylene-4-carboxylic Acid

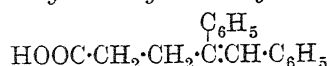


$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Me ester : $\text{C}_{18}\text{H}_{18}\text{O}_2$. MW, 266. M.p. 120°.

Fecht, *Ber.*, 1908, 41, 2986.

1 : 2-Diphenyl-1-butylene-4-carboxylic Acid (3-Phenyl-3-benzylidenenebutyric acid).

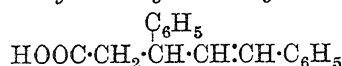


$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Needles from Et₂O-pet. ether. M.p. 106°.

Fichter, Merckens, *Ber.*, 1901, 34, 4177.

1 : 3-Diphenyl-1-butylene-4-carboxylic Acid (2-Phenyl-3-benzylidenenebutyric acid)



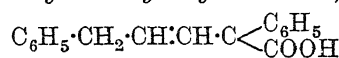
$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Rhombic cryst. from C_6H_6 . M.p. 124–5°. Mod. sol. hot H_2O .

Me ester : $\text{C}_{18}\text{H}_{18}\text{O}_2$. MW, 266. Needles from MeOH. M.p. 47–8°.

Davis, *J. Am. Chem. Soc.*, 1919, 41, 1137.

1 : 4-Diphenyl-2-butylene-1-carboxylic Acid (1-Phenyl-3-benzylvinylacetic acid)

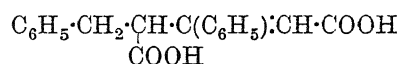


$\text{C}_{17}\text{H}_{16}\text{O}_2$ MW, 252

Leaflets from EtOH. M.p. 101.5°. Insol. H_2O . Warm 10% NaOH \rightarrow 1 : 4-diphenyl-1-butylene-1-carboxylic acid.

Thiele, Meisenheimer, *Ann.*, 1899, 306, 237.

2 : 4-Diphenyl-1-butylene-1 : 3-dicarboxylic Acid



COOH

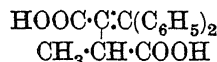
$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

Et ester : $\text{C}_{20}\text{H}_{20}\text{O}_4$. MW, 324. Prisms from EtOH.Aq. M.p. 98°.

Di-Et ester : b.p. 240–41°/10 mm. D_4^{20} 1.1082.

Feist, Pomme, *Ann.*, 1909, 370, 79.

1 : 1-Diphenyl-1-butylene-2 : 3-dicarboxylic Acid (1-Methyl-3 : 3-diphenylitaconic acid)



$\text{CH}_3\cdot\text{CH}\cdot\text{COOH}$

$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

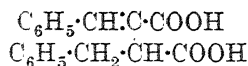
Needles from H_2O . M.p. 179–80° decomp. Sol. EtOH, Et₂O, Me₂CO, CHCl_3 . Spar. sol. C_6H_6 , CS_2 .

2-Et ester : needles from H_2O . M.p. 143–4°.

Stobbe, Noetzel, *Ber.*, 1906, 39, 1071.

1 : 4-Diphenyl-1-butylene-2 : 3-dicarboxylic Acid 407

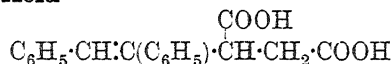
1 : 4-Diphenyl-1-butylene-2 : 3-dicarboxylic Acid



$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296
M.p. 160-2°.

Weizmann, *J. Org. Chem.*, 1943, 8, 285.

1 : 2-Diphenyl-1-butylene-3 : 4-dicarboxylic Acid



$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

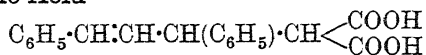
Plates + 2H₂O from H₂O. M.p. 151-2°. Needles + 1C₆H₆ from C₆H₆. M.p. 110°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. CS₂.

Di-Et ester: C₂₂H₂₄O₄. MW, 352. Cryst. from pet. ether. M.p. 39-41°. B.p. 244-8°/14 mm.

Stobbe, Russwarm, *Ann.*, 1899, 308, 156.

Borsche, Sinn, *Ann.*, 1943, 555, 70.

1 : 3-Diphenyl-1-butylene-4 : 4-dicarboxylic Acid



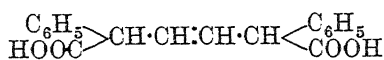
$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

Needles from H₂O. M.p. 166° decomp. Sol. EtOH, Et₂O. Spar. sol. ligroin. Loses CO₂ on boiling with H₂O.

Di-Me ester: C₂₀H₂₀O₄. MW, 324. Prisms from EtOH. M.p. 94°.

Reimer, *Am. Chem. J.*, 1907, 38, 230.

1 : 4-Diphenyl-2-butylene-1 : 4-dicarboxylic Acid



$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

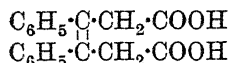
Cryst. from propyl alcohol or AcOH. M.p. 233-34°. Sol. MeOH, EtOH. Spar. sol. C₆H₆, CHCl₃.

Schlenk, Bergmann, *Ann.*, 1928, 463, 100.

Ziegler, Crössmann, Kleiner, Schäfer,

Ann., 1929, 473, 29.

2 : 3-Diphenyl-2-butylene-1 : 4-dicarboxylic Acid



$\text{C}_{18}\text{H}_{16}\text{O}_4$ MW, 296

Cis-.

Prisms from H₂O. M.p. 195°. H₂/Pd → 2 : 3-diphenyladipic acid.

Di-Et ester: prisms from EtOH. M.p. 56°.

Trans-.

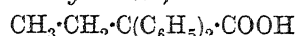
Prisms from EtOH. M.p. 297°. Not reduced by H₂/Pd.

Di-Et ester: prisms from EtOH. M.p. 86°.

Farmer, Duffin, *J. Chem. Soc.*, 1927, 412.

2 : 3-Diphenylbutyric Acid

1 : 1-Diphenylbutyric Acid (1 : 1-Diphenylpropane-1-carboxylic acid)



$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

Leaflets from EtOH.Aq. M.p. 173-4°.

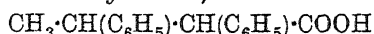
Nitrile: C₁₅H₁₅N. MW, 221. B.p. 183°/13 mm.

Meerwein, Schweinheim, *Ann.*, 1919, 419, 158.

Ramart-Lucas, *Ann. chim.*, 1913, 30, 417.

Klingemann, *Ann.*, 1893, 275, 86.

1 : 2-Diphenylbutyric Acid (β-Methyl-α-phenylhydrocinnamic acid, 1 : 2-diphenylpropane-1-carboxylic acid)



$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

Two stereoisomeric forms.

1. Needles. M.p. 180-1° (186°). Spar. sol. EtOH, Et₂O.

Nitrile: C₁₆H₁₅N. MW, 221. B.p. 188-92°/13 mm.

Amide: C₁₆H₁₇ON. MW, 239. M.p. 193°.

2. M.p. 133-4° (135°). Sol. EtOH, Et₂O.

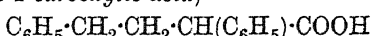
Nitrile: needles from EtOH-pet. ether. M.p. 129-30°. B.p. 210-12°/16 mm.

Amide: m.p. 173-4°.

Ramart-Lucas, *Ann. chim.*, 1913, 30, 423.

Plentl, Bogert, *J. Am. Chem. Soc.*, 1941, 63, 989.

1 : 3-Diphenylbutyric Acid (1 : 3-Diphenylpropane-1-carboxylic acid)

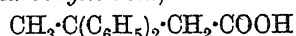


$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

Cryst. from pet. ether. M.p. 72-3° (76°). B.p. 190°/1 mm.

Newman, *J. Am. Chem. Soc.*, 1938, 60, 2949.

2 : 2-Diphenylbutyric Acid (2 : 2-Diphenylpropane-1-carboxylic acid)



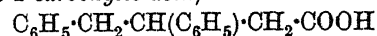
$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

Needles from pet. ether. M.p. 102-3°. B.p. 224-5°/20 mm.

Me ester: C₁₇H₁₈O₂. MW, 254. B.p. 182-3°/13 mm.

Bergmann, Taubadel, Weiss, *Ber.*, 1931, 64, 1501.

2 : 3-Diphenylbutyric Acid (2 : 3-Diphenylpropane-1-carboxylic acid)

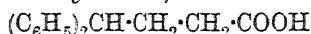


$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

Plates from AcOEt-pet. ether. M.p. 96-7°. Sol. EtOH, Et₂O, CHCl₃. Very spar. sol. H₂O, pet. ether.

Amide: $C_{18}H_{17}ON$. MW, 239. M.p. 62–3°.
 Ruhemann, *J. Chem. Soc.*, 1910, 97, 460.
 Avery, McDole, *J. Am. Chem. Soc.*, 1908,
 30, 1424.
 Spring, *J. Chem. Soc.*, 1934, 1332.

**3 : 3-Diphenylbutyric Acid (3 : 3-Diphenyl-
 propane-1-carboxylic acid)**



$C_{16}H_{16}O_2$ MW, 240

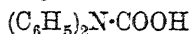
Cryst. from MeOH.Aq. M.p. 107°. Sol.
 Et_2O , EtOH, C_6H_6 . Insol. H_2O .

Me ester: b.p. 190–1°/12 mm.

Eijkman, *Chem. Zentr.*, 1904, I, 1416.

Wittig, *Ber.*, 1931, 64, 443.

**Diphenylcarbamic Acid (Diphenylamino-
 formic acid, diphenylamine-N-carboxylic acid)**



$C_{13}H_{11}O_2N$ MW, 213

K salt: white powder. Decomp. by H_2O ,
 acids, and alkalis to diphenylamine.

Me ester: $C_{14}H_{13}O_2N$. MW, 227. M.p. 86°.

Et ester: diphenylurethane. $C_{15}H_{15}O_2N$.
 MW, 241. Prisms from ligroin. M.p. 72°. B.p.
 360°.

2-Methoxyethyl ester: $C_{16}H_{17}O_3N$. MW, 271.
 M.p. 50.3–50.8°.

2-Ethoxyethyl ester: $C_{17}H_{19}O_3N$. MW, 285.
 M.p. 41.5–43°.

2-Chloroethyl ester: $C_{15}H_{14}O_2NCl$. MW, 275.5.
 M.p. 72°.

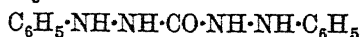
Chloride: diphenylcarbamy chloride.
 $(C_6H_5)_2N \cdot COCl$. $C_{13}H_{10}ONCl$. MW, 231.5.
 Leaflets from EtOH. M.p. 85°. Forms add.
 comp. with Py, needles, m.p. 107°.

Amide: see unsym.-Diphenylurea.

Nitrile: see Diphenylcyanamide.

Meyer, Nicolaus, *J. prakt. Chem.*, 1910,
 82, 526.

Diphenylcarbazine



$C_{13}H_{14}ON_4$ MW, 242

Cryst. from EtOH or AcOH. M.p. 170°. Sol.
 hot EtOH. Spar. sol. hot H_2O . Insol. Et_2O .
 $CuSO_4 \rightarrow$ violet col. Reagent for Fe, Hg, and
 other metals.

B.HCl: m.p. 125° decomp.

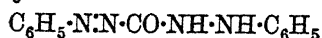
Formyl deriv.: m.p. 164° decomp.

Acetyl deriv.: m.p. 98°.

Slotta, Jacobi, *Z. anal. Chem.*, 1929, 77,
 344 (*Bibl.*).

Noller, *J. Am. Chem. Soc.*, 1930, 52, 1134.

Diphenylcarbazone



$C_{13}H_{12}ON_4$ MW, 240

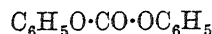
Orange red needles. M.p. 157° decomp. Sol.
 EtOH, $CHCl_3$, C_6H_6 . Reagent for several
 metals.

Slotta, Jacobi, *Z. anal. Chem.*, 1929, 77,
 344.

Diphenylcarbinol.

See Benzhydrol.

Diphenyl carbonate



$C_{13}H_{10}O_3$ MW, 214

Needles. M.p. 78° (88°). B.p. 306° (302°),
 168°/15 mm. Sol. Et_2O , AcOH, hot EtOH.
 Insol. H_2O . Decomp. by hot alkalis.

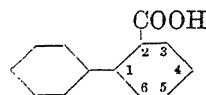
Bischoff, *Ber.*, 1902, 35, 3434.

Sluiter, *Ber.*, 1912, 45, 60.

Hoeflake, *Rec. trav. chim.*, 1916, 36, 29.

Auwers, Schaich, *Ber.*, 1921, 54, 1769.

**Diphenyl-2-carboxylic Acid (o-Phenyl-
 benzoic acid)**



$C_{13}H_{10}O_2$ MW, 198

M.p. 114°. B.p. 343–4°. Sol. EtOH, AcOH,
 C_6H_6 . Prac. insol. cold H_2O . Conc. H_2SO_4 , or
 dist. with lime \rightarrow fluorenone. Na and K salts
 sol. H_2O . Ca salt spar. sol.

Me ester: $C_{14}H_{12}O_2$. MW, 212. B.p. 308°.
 Sol. EtOH, Et_2O .

Et ester: $C_{15}H_{14}O_2$. MW, 226. B.p. 314°.
 Sol. EtOH, Et_2O .

Amide: $C_{13}H_{11}ON$. MW, 197. M.p. 177°.
 Sol. EtOH. Spar. sol. cold H_2O .

Graebe, *Ann.*, 1894, 279, 260; *Ber.*, 1906,
 39, 801.

**Diphenyl-3-carboxylic Acid (m-Phenyl-
 benzoic acid).**

Leaflets from EtOH. M.p. 161° (166°). Sol.
 EtOH, Et_2O , AcOH, ligroin, C_6H_6 . Spar. sol.
 H_2O . Dist. with lime \rightarrow diphenyl. $CrO_3 \rightarrow$
 isophthalic acid. Na and Ba salts sol. H_2O .

Mayer, *Ber.*, 1913, 46, 2587.

Willgerodt, Scholtz, *J. prakt. Chem.*, 1910,
 81, 396.

**Diphenyl-4-carboxylic Acid (p-Phenyl-
 benzoic acid).**

Needles. M.p. 228°. Sol. EtOH, Et_2O , C_6H_6 .
 Very spar. sol. hot H_2O . Sublimes. Ba and Ca
 salts spar. sol. H_2O .

Me ester: m.p. 117–18°. Sol. EtOH.

Et ester: prisms. M.p. 46°. Sol. EtOH.

Chloride: $C_{13}H_9OCl$. MW, 216.5. Needles
 from ligroin. M.p. 114–15°.

Amide: needles from AcOH. M.p. 223°.

Nitrile: $C_{13}H_9N$. MW, 179. Cryst. from EtOH. M.p. $84-5^\circ$.

Grieve, Hey, *J. Chem. Soc.*, 1933, 968.

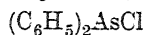
Kindler, *Ann.*, 1927, 452, 102.

Meyer, Hofmann, *Monatsh.*, 1917, 38, 355.

Hey, *J. Chem. Soc.*, 1934, 1966.

Morton, Le Ferre, Hechenbleikner, *J. Am. Chem. Soc.*, 1936, 58, 754.

Diphenylchloroarsine (*Diphenylarsenious chloride, chlorodiphenylarsine, D.A.*)



$C_{12}H_{10}ClAs$ MW, 264.5

M.p. 44° . B.p. 333° , $253^\circ/134$ mm., $224^\circ/55$ mm., $211^\circ/38$ mm., $193^\circ/20$ mm., $185^\circ/15$ mm., $180^\circ/10$ mm., $161-3^\circ/5$ mm. Sol. EtOH. Et_2O , C_6H_6 . Insol. H_2O . D_4^{25} 1.4820. D_4^{20} 1.3760. n_D^{25} 1.6332. Powerful sternutator.

Oechsli, Poulenc Frères, B.P. 173,796, (*Chem. Abstracts*, 1922, 16, 1780).

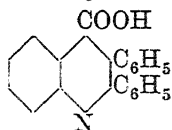
Pope, Turner, *J. Chem. Soc.*, 1920, 117, 1447.

Morgan, Vining, *ibid.*, 780.

Jackson, *Chem. Reviews*, 1935, 17, 260.

Barker *et al.*, *J. Soc. Chem. Ind.*, 1949, 68, 277, 285, 289.

2 : 3-Diphenylcinchoninic Acid (2 : 3-Diphenylquinoline-4-carboxylic acid)



$C_{22}H_{15}O_2N$ MW, 325

Needles from EtOH. M.p. 295° decomp. Sol. hot $AcOH$, Me_2CO . Spar. sol. hot EtOH, Et_2O , C_6H_6 . Prac. insol. pet. ether, H_2O . Heat above m.p. \rightarrow 2 : 3-diphenylquinoline.

Di-Et ester: $C_{24}H_{19}O_2N$. MW, 353. M.p. $96-96.5^\circ$.

Amide: $C_{22}H_{16}ON_2$. MW, 324. M.p. 278° .

Nitrile: $C_{22}H_{14}N_2$. MW, 306. Yellowish needles from EtOH. M.p. 155° .

Pfitzinger, *J. prakt. Chem.*, 1897, 56, 299.

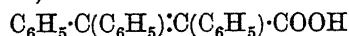
2 : 8-Diphenylcinchoninic Acid.

Cryst. M.p. $243-243.6^\circ$.

Di-Et ester: m.p. $104.6-105.2^\circ$.

Buchman, Howton, *J. Am. Chem. Soc.*, 1946, 68, 2718.

α : β -Diphenylcinnamic Acid (*Triphenyl-acrylic acid*)



$C_{21}H_{16}O_2$ MW, 300

Needles. M.p. 213° .

Me ester: $C_{22}H_{18}O_2$. MW, 314. Yellow needles. M.p. 136° .

Et ester: $C_{23}H_{20}O_2$. MW, 328. Needles. M.p. $119-20^\circ$.

Amide: $C_{21}H_{17}ON$. MW, 299. Needles. M.p. 223° .

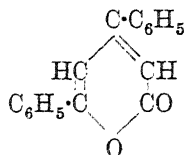
Nitrile: $C_{21}H_{15}N$. MW, 281. M.p. $166-7^\circ$ ($162-3^\circ$).

Dahl, *Ber.*, 1896, 29, 2842.

Bodroux, *Compt. rend.*, 1911, 152, 1596.

Weitz, Scheffer, *Ber.*, 1921, 54, 2341.

4 : 6-Diphenylcoumalin (4 : 6-Diphenyl- α -pyrone)



$C_{17}H_{12}O_2$ MW, 248

Pale yellow plates from EtOH. M.p. 142° .

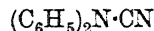
Kohler, *J. Am. Chem. Soc.*, 1922, 44, 379.

Arndt, Eistert, *Ber.*, 1925, 58, 2318.

2 : 3-Diphenylcrotonic Acid.

See β -Benzyleinnamic Acid.

Diphenylcyanamide (*Diphenylcarbamic nitrile*)



$C_{13}H_{10}N_2$ MW, 194

Prisms from EtOH. M.p. $73-4^\circ$. B.p. $235-40^\circ/60$ mm. Polymerised form, m.p. 292° .

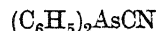
v. Braun, *Ber.*, 1900, 33, 1450.

Werner, *Chem. News*, 1892, 65, 249.

Diphenylcyanidine.

See 2 : 4-Diphenyl-1 : 3 : 5-triazine.

Diphenylcyanoarsine (*Cyanodiphenylarsine, diphenylarsenious cyanide, D.C.*)



$C_{13}H_{10}NAs$ MW, 255

Colourless plates. M.p. 31.5° (35°). B.p. $213^\circ/21$ mm., $191^\circ/11$ mm. Hot H_2O or alkalis \rightarrow diphenylarsenious oxide. HNO_3 , H_2O_2 , or Br water \rightarrow diphenylarsinic acid. Produces intense nose, throat and chest irritation. Garlic and bitter almond odour.

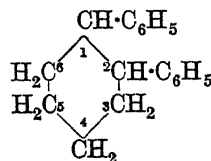
Morgan, Vining, *J. Chem. Soc.*, 1920, 117, 781.

Steinkopf, Schwen, *Ber.*, 1921, 54, 1460.

Barker *et al.*, *J. Soc. Chem. Ind.*, 1949, 68, 277.

Diphenylcyclobutane-dicarboxylic Acid.
See Truxillic Acid and Truxinic Acid.

1 : 2-Diphenylcyclohexane



$C_{18}H_{20}$

MW, 236

Needles. M.p. 172°. Sol. Et₂O. Spar. sol. EtOH, C₆H₆.

Wertyporoch, *Sagel, Ber.*, 1933, 66, 1311.

Bodroux, *Ann. chim.*, 1929, 11, 518.

Gustavson, *Compt. rend.*, 1908, 145, 641.

1 : 3-Diphenylcyclohexane.

B.p. 196–8°/17 mm. D₄²⁰ 1.0022.

Nenitzescu, Curcăneanu, *Ber.*, 1937, 70, 346.

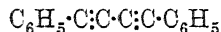
1 : 4-Diphenylcyclohexane.

Cryst. from EtOH. M.p. 170°. B.p. 190°/29 mm.

Thorpe, Wood, *J. Chem. Soc.*, 1913, 103, 1573.

Nenitzescu, Curcăneanu, *Ber.*, 1937, 70, 347.

Diphenyldiacetylene



C₁₆H₁₀ MW, 202

Needles from EtOH.Aq. M.p. 88°. Sol. EtOH, Et₂O.

Picrate : m.p. 108°.

Grignard, Tchëofaki, *Compt. rend.*, 1929, 188, 357, 1531.

Kelber, Schwarz, *Ber.*, 1912, 45, 1952.

Salkind, Fundyler, *Ber.*, 1936, 69, 128.

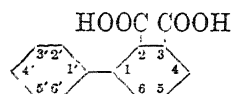
sym.-Diphenyldibenzoylthane.

See Didesyl.

Diphenyl-2 : 2'-dicarboxylic Acid.

See Diphenic acid.

Diphenyl-2 : 3-dicarboxylic Acid (3-Phenylphthalic acid)



C₁₄H₁₀O₄ MW, 242

Needles from EtOH.Aq. M.p. 181°.

Di-Me ester : C₁₆H₁₄O₄. MW, 270. Needles from pet. ether. M.p. 94°.

Anhydride : C₁₄H₈O₃. MW, 226. M.p. 144–5°.

Butterworth, Heilbron, Hey, Wilkinson, *J. Chem. Soc.*, 1938, 1386.

Diphenyl-2 : 6-dicarboxylic Acid (2-Phenylisophthalic acid).

Needles from AcOH. M.p. 282°. H₂SO₄ → deep red col.

Bell, Briggs, *J. Chem. Soc.*, 1938, 1567.

Diphenyl-3 : 4-dicarboxylic Acid (4-Phenylphthalic acid).

M.p. 201–2°. Sol. EtOH, Me₂CO, AcOH. Spar. sol. Et₂O. Insol. pet. ether.

Di-Me ester : needles from EtOH.Aq. or pet. ether. M.p. 62–3°.

Di-Et ester : b.p. 204°/4 mm.

Dinitrile : m.p. 163–4°.

Anhydride : needles. M.p. 140–1° (rapid heat.).

Imide : needles by sublimation. M.p. 200°.

Auwers, Jülicher, *Ber.*, 1922, 55, 2184.

Butterworth, Heilbron, Hey, Wilkinson, *J. Chem. Soc.*, 1938, 1386.

Diphenyl-3 : 5-dicarboxylic Acid (5-Phenylisophthalic acid).

Leaflets from AcOH. M.p. above 310°. Sol. EtOH, Et₂O, Me₂CO, C₆H₆, hot AcOH. Spar. sol. H₂O.

Doebner, *Ber.*, 1890, 23, 2381; 1891, 24, 1750.

Diphenyl-2 : 3'-dicarboxylic Acid (Isodiphenic acid).

Needles from AcOH.Aq. M.p. 216°. Sol. EtOH. Spar. sol. hot H₂O. CrO₃ → isophthalic acid. Heat with lime → fluorenone.

Di-Me ester : cryst. from EtOH. M.p. 70°.

Diamide : C₁₄H₁₂O₂N₂. MW, 240. M.p. 182–3°.

Dianilide : m.p. 219–20°.

Sieglitz, Schatzkes, *Ber.*, 1921, 54, 2070.

Diphenyl-2 : 4'-dicarboxylic Acid.

Leaflets from EtOH. M.p. 272–3°.

Dinitrile : C₁₄H₈N₂. MW, 204. M.p. 152–3°.

Carnelly, *J. Chem. Soc.*, 1877, 32, 657.

Reuland, *Ber.*, 1889, 22, 3018.

Dziewoński, Panek, *Chem. Abstracts*, 1928, 22, 3888.

Finzi, Mangini, *Gazz. chim. ital.*, 1932, 62, 1193.

Diphenyl-3 : 3'-dicarboxylic Acid.

Leaflets from EtOH. M.p. 356–7°. Sol. Et₂O, CHCl₃, hot EtOH. Spar. sol. AcOH, hot H₂O. Insol. ligroin, C₆H₆.

Di-Me ester : m.p. 104°.

Di-Et ester : C₁₈H₁₈O₄. MW, 298. M.p. 68°. Sol. EtOH, Et₂O.

Ullmann, Löwenthal, *Ann.*, 1903, 332, 72.

Diphenyl-3 : 4'-dicarboxylic Acid.

Needles. M.p. 334–5°. Sol. hot amyl alcohol, PhNO₂. Spar. sol. EtOH, Me₂CO.

Di-Me ester : m.p. 99°.

Weiler, *Ber.*, 1899, 32, 1063.

Diphenyl-4 : 4'-dicarboxylic Acid.

Does not melt. Insol. most ord. org. solvents. Does not sublime. Heat with lime → diphenyl.

Di-Me ester : m.p. 214° (224°). Sol. hot Me₂CO, hot CHCl₃, hot C₆H₆.

Di-Et ester : m.p. 112°.

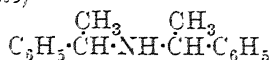
Dinitrile : m.p. 234°.

Dichloride : m.p. 184°.

Doebner, *Ber.*, 1876, 9, 272.

Ullmann, Meyer, *Ann.*, 1903, 332, 73.

Weiler, *Ber.*, 1889, 32, 1063.

1 : 1'-Diphenyldiethylamine (*αα'*-Dimethyldibenzylamine)

$\text{C}_{16}\text{H}_{19}\text{N}$ MW, 225
B.p. 190°/10 mm. (169–71°/18 mm.). Spar. sol. H_2O .

B, HCl: sublimes above 240°.

Kindler, Peschke, Dehn, *Ann.*, 1931, 485, 113.

Busch, Leefhelm, *J. prakt. Chem.*, 1908, 77, 5.

2 : 2'-Diphenyldiethylamine (*Diphenethyamine*)

$\text{C}_{16}\text{H}_{19}\text{N}$ MW, 225

M.p. 28–30°. B.p. 335–7°/600 mm., 195°/18 mm. Sol. EtOH, Et_2O . Very spar. sol. H_2O .

B, HCl: m.p. 265° (rapid heat.), 260° (slow heat.). Sol. EtOH.

N-Nitroso: m.p. 53°.

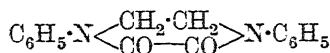
N-Et: *picrate*, m.p. 121–2°.

Picrate: m.p. 150°.

v. Braun, Blessing, Zobel, *Ber.*, 1923, 56, 1997.

Diphenyl Diketone.

See Benzil.

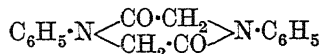
1 : 4-Diphenyl-2 : 3-diketopiperazine

$\text{C}_{16}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 266

Glittering leaflets from EtOH. M.p. 258–60°. B.p. 325°/12 mm. Sol. AcOH. Spar. sol. EtOH, C_6H_6 .

Bischoff, Nastvogel, *Ber.*, 1889, 22, 1805; 1890, 23, 2028.

Bischoff, Hedenström, *Ber.*, 1902, 35, 3439.

1 : 4-Diphenyl-2 : 5-diketopiperazine

$\text{C}_{16}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 266

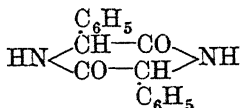
Fine needles. M.p. 264° (273°). Spar. sol. EtOH. Insol. H_2O , Et_2O , CHCl_3 , C_6H_6 . Sublimes.

Hausdörfer, *Ber.*, 1889, 22, 1797.

Rupe, *Ann.*, 1898, 301, 68.

Vorländer, de Mouilpied, *Ber.*, 1900, 33, 2468.

Heimrod, *Ber.*, 1914, 47, 348.

3 : 6-Diphenyl-2 : 5-diketopiperazine

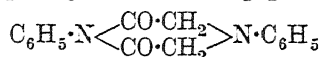
$\text{C}_{16}\text{H}_{14}\text{O}_2\text{N}_2$

MW, 266

M.p. 274° decomp. Prac. insol. ord. org. solvents.

Kossel, *Ber.*, 1891, 24, 4149.

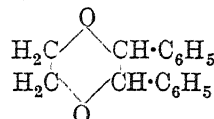
Heimrod, *Ber.*, 1914, 47, 346.

1 : 4-Diphenyl-2 : 6-diketopiperazine

$\text{C}_{16}\text{H}_{14}\text{O}_2\text{N}_2$ MW, 266

Silky needles. M.p. 152–3°. Sol. EtOH, Et_2O .

Dubsky, Spritzmann, *Ber.*, 1919, 52, 229.

2 : 3-Diphenyldioxan

$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

M.p. 49°.

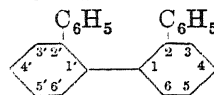
Summerbell, Christ, *J. Am. Chem. Soc.*, 1932, 54, 3778.

Summerbell, Bauer, *J. Am. Chem. Soc.*, 1935, 57, 2364.

2 : 5-Diphenyldioxan.

M.p. 147–52°. Sol. EtOH, Et_2O .

Smedley, U.S.P. 2,414,982, (*Chem. Abstracts*, 1947, 41, 2756).

2 : 2'-Diphenyldiphenyl

$\text{C}_{24}\text{H}_{18}$ MW, 306

M.p. 118–19°. B.p. 420° corr. Sol. Et_2O , pet. ether, C_6H_6 , Me_2CO , AcOH. Spar. sol. cold EtOH.

Bowden, *J. Chem. Soc.*, 1931, 1111.

Bachmann, Clarke, *J. Am. Chem. Soc.*, 1927, 49, 2094.

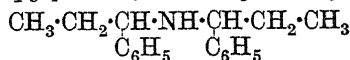
3 : 3'-Diphenyldiphenyl.

Needles from EtOH. M.p. 86°. Sol. Et_2O , C_6H_6 . Mod. sol. pet. ether. Spar. sol. EtOH, AcOH.

Bowden, *J. Chem. Soc.*, 1931, 1111.

4 : 4'-Diphenyldiphenyl.

See Benzerythrene.

1 : 1'-Diphenyldipropylamine (*Di-[1-phenylpropyl]-amine*, *αα'*-diethyldibenzylamine)

$\text{C}_{18}\text{H}_{23}\text{N}$ MW, 253

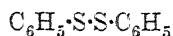
B.p. 293–4°/733 mm. Sol. EtOH, Et_2O . Spar. sol. H_2O .

B, HCl: m.p. 258°.

N-Nitroso: needles from EtOH.Aq. M.p. 74°.

N-Benzoyl: m.p. 152°.

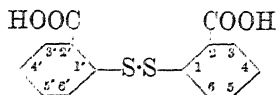
Busch, Leefhelm, *J. prakt. Chem.*, 1908, 77, 1.

Diphenyl disulphide (*Phenyl disulphide*);
 $\text{C}_{12}\text{H}_{10}\text{S}_2$ MW, 218

Needles from EtOH. M.p. 61°. B.p. 310° (295°), 192°/15 mm. Sol. Et₂O, EtOH, CS₂, C₆H₆. Red. → thiophenol. Long heating → diphenyl sulphide. HNO₃ → benzenesulphonic acid. AlCl₃ or conc. H₂SO₄ → diphenylene disulphide.

Krafft, Vorster, *Ber.*, 1893, 26, 2815.Curtius, Lorenzen, *J. prakt. Chem.*, 1898, 58, 161, 188.Rosenmund, Harms, *Ber.*, 1921, 53, 2232, 2238.

Diphenyl disulphide 2 : 2'-dicarboxylic Acid ("Dithiosalicic acid." Cf. Dithiosalicic Acid)


 $\text{C}_{14}\text{H}_{10}\text{O}_4\text{S}_2$ MW, 306

Prisms. M.p. 289-90°. Sol. EtOH, Et₂O. Insol. H₂O. Fe or Zn + caustic alkali → thiosalicic acid, HS·C₆H₄·COOH.

Di-Me ester: C₁₆H₁₄O₄S₂. MW, 334. M.p. 134°.

Di-Et ester: C₁₈H₁₈O₄S₂. MW, 362. M.p. 120°.

Dichloride: C₁₄H₈O₂Cl₂S₂. MW, 343. M.p. 153-4°.

Diamide: C₁₄H₁₂O₂N₂S₂. MW, 304. M.p. 239°.

List, Stein, *Ber.*, 1898, 31, 1669.Prescott, Smiles, *J. Chem. Soc.*, 1911, 99, 644.Rosenmund, Harms, *Ber.*, 1921, 53, 2232, 2238.

Diphenyl disulphide 3 : 3'-dicarboxylic Acid.

Needles or leaflets from EtOH. M.p. 244°. Sol. H₂O. Spar. sol. cold EtOH.

Gattermann, *Ber.*, 1899, 32, 1151.**Diphenylene.**

See Cyclobutadibenzene.

Diphenyleneacetic Acid.

See Fluorene-9-carboxylic Acid.

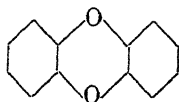
o-Diphenyleneazine.

See Benzcinnoline.

Diphenylenecarbinol.

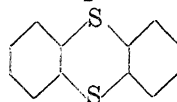
See 9-Fluorenol.

Diphenylene dioxide (*Dibenzdioxan*, *phen-dioxin*)

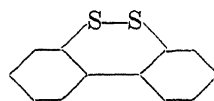

 $\text{C}_{12}\text{H}_8\text{O}_2$

MW, 184

Needles from MeOH. M.p. 119°. Spar. volatile in steam.

Tomita, *Chem. Zentr.*, 1932, II, 1304.Ullmann, Stein, *Ber.*, 1906, 32, 624.Cullinane, Davey, Padfield, *J. Chem. Soc.*, 1934, 716.Cullinane, Davies, *Rec. trav. chim.*, 1936, 55, 881.**Diphenylene disulphide** (*Thianthrene*)
 $\text{C}_{12}\text{H}_8\text{S}_2$ MW, 216

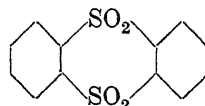
Prisms from EtOH. M.p. 158-9° (154°). B.p. 353-4° part. decomp., 204°/11 mm. Mod. sol. Et₂O, CS₂, C₆H₆. Very spar. sol. cold EtOH. Violet sol. in H₂SO₄.

Bergmann, Tschudnowsky, *Ber.*, 1932, 65, 457.Cohen, Skirrow, *J. Chem. Soc.*, 1899, 75, 888.Cullinane, Davies, *Rec. trav. chim.*, 1936, 55, 881.**Diphenylene 2 : 2'-disulphide**
 $\text{C}_{12}\text{H}_8\text{S}_2$ MW, 216

Yellow needles from hot AcOH. M.p. 113°. Heat + Cu powder → dibenzthiophene.

Barber, Smiles, *J. Chem. Soc.*, 1928, 1145.

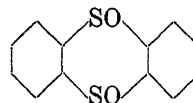
Diphenylene disulphone (*Disulphonyldiphenylene*)


 $\text{C}_{12}\text{H}_8\text{O}_4\text{S}_2$ MW, 280

Prisms from hot C₆H₆. M.p. 325°. Spar. sol. C₆H₆, AcOH. Insol. EtOH, Et₂O. Sublimes.

Cohen, Skirrow, *J. Chem. Soc.*, 1899, 75, 889.Krafft, Lyons, *Ber.*, 1896, 29, 442.

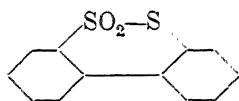
Diphenylene disulphoxide (*Dithionylidiphenylene*)


 $\text{C}_{12}\text{H}_8\text{O}_2\text{S}_2$ MW, 248

Two stereoisomeric forms. (1) Needles from C₆H₆. M.p. 249°. Colourless sol. in H₂SO₄. (2) Cryst. from AcOH. M.p. 284° (278°). Reddish violet sol. in H₂SO₄.

Bergmann, Tschudnowsky, *Ber.*, 1932, 65, 457.

Diphenylene 2 : 2'-disulphoxide

 $C_{12}H_8O_2S_2$

MW, 248

Needles from hot EtOH. M.p. 128°. HI in warm AcOH \rightarrow 2 : 2'-diphenylene disulphide.

Barber, Smiles, *J. Chem. Soc.*, 1928, 1146.

Diphenyleneglycollic Acid.

See 9-Hydroxyfluorene-9-carboxylic Acid.

Diphenylene-iodonium iodide.

See Dibenziodolium iodide.

Diphenylene Ketone.

See Fluorenone.

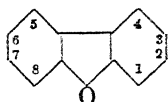
Diphenylenemalonic Acid.

See Fluorene-9 : 9-dicarboxylic Acid.

Diphenylene-methane.

See Fluorene.

Diphenylene oxide (Dibenzfuran)

 $C_{12}H_8O$

MW, 168

Needles or colourless leaflets with blue fluor. M.p. 86-7°. B.p. 287° (276°). Sol. EtOH, Et₂O. Mod. sol. hot C₆H₆. Spar. sol. H₂O. Very stable.

Picrate : m.p. 96.5-7.5°.

Styphnate : m.p. 138.5-40°.

2 : 4-Dinitrobenzene add. comp. : m.p. 63-3.5°.

sym.-Trinitrobenzene add. comp. : yellow needles. M.p. 96°.

2 : 4 : 6-Trinitro-m-cresol add. comp. : m.p. 126-6.5°.

Graebe, Ullmann, *Ber.*, 1896, 29, 1876.

Krämer, Weissgerber, *Ber.*, 1901, 34, 1662.

Sabatier, Maible, *Compt. rend.*, 1910, 151, 492.

Kruber, D.R.P. 491,594, (*Chem. Abstracts*, 1930, 24, 2475).

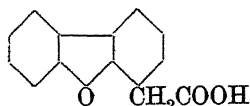
Orlow, Tistschenko, *Ber.*, 1930, 63, 2948.

Hale, Stoesser, U.S.P. 1,808,349, (*Chem. Abstracts*, 1931, 25, 4286).

Sugii, Shindo, *Chem. Zentr.*, 1933, II, 1678.

Cullinane, Davies, *Rec. trav. chim.*, 1936, 55, 881.

Diphenylene oxide 1-acetic acid

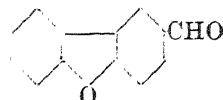
 $C_{14}H_{10}O_3$

MW, 226

M.p. 213.5-4.5°. Sol. EtOH.
Amide : $C_{14}H_{11}O_3N$. MW, 225. Cryst. from EtOH. M.p. 211-12°.

Gilman, Parker, Bailie, Brown, *J. Am. Chem. Soc.*, 1939, 61, 2836.

Diphenylene oxide 3-aldehyde

 $C_{13}H_8O_2$

MW, 196

Colourless laminae from pet. ether. M.p. 68°. Sol. Et₂O. $KMnO_4 \rightarrow$ diphenylene oxide 3-carboxylic acid.

Oxime : colourless laminae from pet. ether. M.p. 129°.

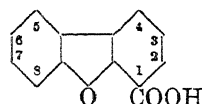
Semicarbazone : colourless plates from EtOH. M.p. 240°.

Anil : pale yellow needles from pet. ether. M.p. 131°.

Phenylhydrazones : pale yellow plates from EtOH. M.p. 162°.

Hinkel, Ayling, Beynon, *J. Chem. Soc.*, 1937, 778.

Diphenylene oxide 1-carboxylic Acid (Dibenzfuran-1-carboxylic acid)

 $C_{13}H_8O_3$

MW, 212

Needles from EtOH. M.p. 209-10°.

Me ester : $C_{14}H_{10}O_3$. MW, 226. Cryst. from pet. ether. M.p. 92-4°.

Gilman, Young, *J. Am. Chem. Soc.*, 1934, 56, 1416.

Diphenylene oxide 2-carboxylic Acid.

Needles from AcOH or EtOH.Aq. M.p. 271-72°.

Me ester : cryst. from pet. ether. M.p. 138.5°.

Nitrile : $C_{13}H_7ON$. MW, 193. Needles from MeOH or AcOH. M.p. 120°.

Gilman, Smith, Cheney, *J. Am. Chem. Soc.*, 1935, 57, 2097.

Borsche, Bothe, *Ber.*, 1908, 41, 1943.

Diphenylene oxide 3-carboxylic Acid.

Needles from EtOH. Softens at 237°. M.p. 246-7°.

Borsche, Bothe, *Ber.*, 1908, 41, 1943.

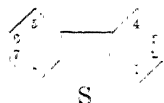
Mayer, Kreiger, *Ber.*, 1922, 55, 1661.

Diphenylene oxide 4-carboxylic Acid.

Cryst. from 50% EtOH. M.p. 232-3°.

Me ester : plates from MeOH. M.p. 63°.

Gilman, van Ess, *J. Am. Chem. Soc.*, 1939, 61, 1370.

Diphenylene sulphide (*Dibenzthiophene*)

$C_{12}H_8S$ MW, 184

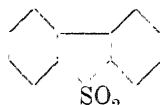
Needles from ligroin. M.p. 99°. B.p. 332-3°, 152-4° 3 mm.

Picrate: yellow needles from EtOH. M.p. 125°.

Gilman, Jacoby, *J. Org. Chem.*, 1938, 3, 111.

Buu-Hoi, Cagniant, *Ber.*, 1943, 76, 1269.

Diphenylene sulphone



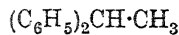
$C_{12}H_8O_2S$ MW, 216

Cryst. from hot EtOH. M.p. 230°. Sol. C_6H_6 , Et_2O , CS_2 .

Graebe, *Ann.*, 1874, 174, 188.

sym.-Diphenylethane.

See Dibenzyl.

unsym.-Diphenylethane (α -Methyldiphenylmethane)

$C_{14}H_{14}$ MW, 182

B.p. 268-70°, 148°/22 mm. (150°/16 mm.), 136°/12 mm. D_4^{20} 1.0033. n_D^{20} 1.5761. $CrO_3 \rightarrow$ benzophenone.

Reichert, Nieuwland, *J. Am. Chem. Soc.*, 1923, 45, 3090.

Böeseke, Bastet, *Rec. trav. chim.*, 1913, 32, 189, 194.

Späth, *Monatsh.*, 1913, 34, 2011.

Diphenylethane-carboxylic Acid.

See Diphenylpropionic Acid.

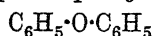
sym.-Diphenylethane-dicarboxylic Acid.

See Dibenzylsuccinic Acid and Diphenylsuccinic Acid.

sym.-Diphenylethanolamine.

See α -Hydroxy- β -aminodibenzyl.

Diphenyl Ether (*Diphenyl oxide*, *phenyl ether*, *phenoxybenzene*, *phenol phenyl ether*)



$C_{12}H_{10}O$ MW, 170

M.p. 28°. B.p. 259°. Sol. EtOH, Et_2O , AcOH, C_6H_6 . Insol. H_2O . D_4^{20} 1.0728. Stable to CrO_3 and HI. Conc. $HNO_3 \rightarrow$ 4 : 4'-dinitro deriv.

Ullmann, Sponagel, *Ann.*, 1906, 350, 85.

Meyer, Bergius, *Ber.*, 1914, 47, 3156.

Hale, U.S.P. 1,744,961, (*Chem. Abstracts*, 1930, 24, 1394).

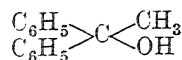
Schöllkopf, D.R.P. 530,736, (*Chem. Abstracts*, 1932, 26, 152).

Diphenyl Ether carboxylic Acid.

See Phenoxybenzoic Acid.

Diphenyl Ether 2 : 2'-dicarboxylic Acid.

See Disalicylic Acid.

1 : 1-Diphenylethyl Alcohol (*Methyldiphenylcarbinol*, α -methylbenzhydrol)

$C_{14}H_{14}O$ MW, 198

M.p. 61-2°. B.p. 190-2°/12 mm.

Phenylurethane: m.p. 83.5-4°.

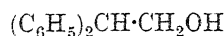
Ramart, Amagat, *Compt. rend.*, 1924, 179, 899.

Gilman, Fothergill, Parker, *Rec. trav. chim.*, 1929, 48, 748.

1 : 2-Diphenylethyl Alcohol.

See Phenylbenzylcarbinol.

2 : 2-Diphenylethyl Alcohol



$C_{14}H_{14}O$ MW, 198

Cryst. from pet. ether. M.p. 64-5°. Bp. 195°/20 mm. Sol. most org. solvents.

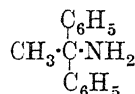
Me ether: $C_{15}H_{16}O$. MW, 212. B.p. 198°/19 mm.

Oxalyl: cryst. from AcOH. M.p. 160.5°.

3 : 5-Dinitrobenzoyl: cryst. from MeOH. M.p. 135°.

Kharasch, Sternfeld, Mayo, *J. Org. Chem.*, 1940, 5, 376.

Kharasch, Clapp, *J. Org. Chem.*, 1938-9, 3, 358.

1 : 1-Diphenylethylamine (α -Amino-*unsym.*-diphenylethane)

$C_{14}H_{15}N$ MW, 197

B.p. 161-2°/13 mm. Spar. sol. H_2O .

B, HNO_2 : m.p. 96-7° decomp.

Brander, *Rec. trav. chim.*, 1918, 37, 69.

1 : 2-Diphenylethylamine (α -Aminodibenzyl)

$C_{14}H_{15}N$ MW, 197

B.p. 310-11°/750 mm., 174-6°/15 mm. D_4^{15} 1.031. Sol. EtOH, Et_2O .

B, HCl : needles. M.p. 253° (242°).

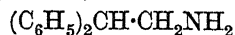
$B_2, H_2PtCl_6, 2H_2O$: m.p. 188°.

Oxalate: m.p. 158°.

Picrate: m.p. 212-13°.

Sieglitz, *Ber.*, 1922, 55, 2040.

Gonzalès, *Bull. soc. chim.*, 1925, 37, 1595.

2 : 2-Diphenylethylamine (β -Amino-*unsym.*-diphenylethane)

$C_{14}H_{15}N$ MW, 197

M.p. 38°. B.p. 180°/33 mm., 170°/11 mm., 149°/4 mm. D_{20}^{20} 1.028. Rapidly absorbs CO_2 \rightarrow cryst. carbonate.

B.HCl: m.p. 263–5° (237–8°).

N-Acetyl: m.p. 88°.

N-Benzoyl: m.p. 143–4° (123°).

Phenylurethane: m.p. 191–2°.

Picrate: m.p. 212–3°.

Levy, Gallais, *Bull. soc. chim.*, 1928, 43, 864.

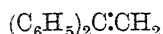
Lipp, *Ann.*, 1926, 449, 15.

Rupe, Gisiger, *Helv. Chim. Acta*, 1925, 8, 341.

sym.-Diphenylethylene.

See Stilbene.

unsym.-Diphenylethylene (α -Methylenediphenylmethane)



$\text{C}_{14}\text{H}_{12}$ MW, 180

M.p. 8°. B.p. 277°, 147°/16 mm. (135–6°/13 mm.). D_4^{20} 1.038. n_D^{20} 1.610, n_D^{25} 1.59672. $\text{Na} + \text{EtOH} \rightarrow$ unsym.-diphenylethane. Ox. \rightarrow benzophenone.

Schlenk, Bergmann, *Ann.*, 1928, 463, 25.

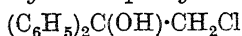
Allen, Converse, *Organic Syntheses*, Collective Vol. I, 221.

Hurd, Webb, *J. Am. Chem. Soc.*, 1927, 49, 546.

Diphenylethylene-carboxylic Acid.

See Phenylcinnamic Acid.

1 : 1-Diphenylethylene chlorohydrin (2-Chloro-1-hydroxy-1 : 1-diphenylethane)

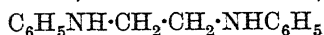


$\text{C}_{14}\text{H}_{13}\text{OCl}$ MW, 232.5

Cryst. from ligroin. M.p. 66°. Sol. EtOH, Et_2O . Spar. sol. ligroin. The vapour is lachrymatory.

Klages, Kessler, *Ber.*, 1906, 39, 1754.

sym.-Diphenylethylenediamine (Ethylene-diphenyldiamine, 1 : 2-dianilinoethane)



$\text{C}_{14}\text{H}_{16}\text{N}_2$ MW, 212

M.p. 65°. Sol. EtOH, Et_2O .

B. 2HBr : plates from EtOH. M.p. 248–50°.

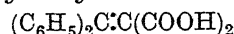
B. 2HNO_3 : m.p. 165°.

B. HgCl_2 : plates. M.p. 129°.

Dinitroso: m.p. 157°.

Bennett, *J. Chem. Soc.*, 1919, 115, 577.

1 : 1-Diphenylethylene-2 : 2-dicarboxylic Acid (Diphenylmethylenemalononic acid)



$\text{C}_{16}\text{H}_{12}\text{O}_4$ MW, 268

M.p. 194–5°.

Di-Et ester: $\text{C}_{20}\text{H}_{20}\text{O}_4$. MW, 324. M.p. 71–72°.

Mononitrile: $\text{C}_{16}\text{H}_{11}\text{O}_2\text{N}$. MW, 249.

Needles. M.p. 178°.

Adickes, *J. prakt. Chem.*, 1936, 145, 235.

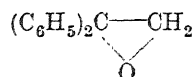
1 : 2-Diphenylethylene-1 : 2-dicarboxylic Acid.

See Diphenylmaleic Acid and Diphenylfumaric Acid.

Diphenylethylene Glycol.

See Hydrobenzoin.

1 : 1-Diphenylethylene oxide



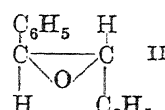
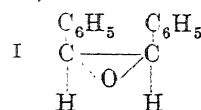
$\text{C}_{14}\text{H}_{12}\text{O}$

MW, 196

Cryst. M.p. 56°. Sol. EtOH, Me_2CO , C_6H_6 . Slowly resinifies in air. Heat with $\text{NaHSO}_3 \rightarrow$ diphenylacetaldehyde bisulphite comp. Volatile in steam.

Klages, Kessler, *Ber.*, 1906, 39, 1754.

1 : 2-Diphenylethylene oxide (Stilbene oxide)



$\text{C}_{14}\text{H}_{12}\text{O}$

MW, 196

Occurs in four isomeric forms.

Cis (I):

Fine needles from 70% EtOH. M.p. 42°.

Trans (II):

d.

M.p. 69–70°. $[\alpha]_D + 310^\circ$ in EtOH.

l.

Long needles from 70% EtOH. M.p. 69–70°. $[\alpha]_D - 306^\circ$ in EtOH.

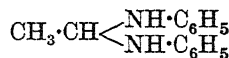
dl.

M.p. 69–70°.

All forms are remarkably stable to oxidizing agents.

Read, Campbell, *J. Chem. Soc.*, 1930, 2378.

Diphenylethylenediamine (Ethylidene-dianiline, ethylidene-diphenamine, 1 : 1-dianilinoethane)



$\text{C}_{14}\text{H}_{16}\text{N}_2$

MW, 212

Cryst. from EtOH–pet. ether. M.p. 51°. Sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . $\text{Ac}_2\text{O} \rightarrow$ acetanilide.

Eibner, *Ber.*, 1897, 30, 1446.

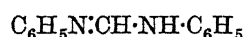
Di-2-phenylethyl Ketone.

See Dibenzylacetone.

Diphenylformamide.

See under Diphenylamine.

Diphenylformamidine



$\text{C}_{13}\text{H}_{12}\text{N}_2$

MW, 196.

Needles from EtOH. M.p. 142° (137°). Sol. Me₂CO, CHCl₃, Et₂O, C₆H₆. Spar. sol. pet. ether. Hyd. by boiling EtOH.Aq.

B, HCl, 3H₂O : m.p. 255°.

*B*₂, H₂PtCl₆ : m.p. 228°.

Picrate : m.p. 193° (187°).

Mono-oxalate : m.p. 166°.

Mono-benzenesulphonate : m.p. 166-7°.

Mono-p-toluenesulphonate : m.p. 215°.

Dibenzoate : m.p. 179°.

Dicinnamate : m.p. 170°.

Dimalonate : m.p. 170°.

Disuccinate : m.p. 166°.

Claisen, *Ann.*, 1895, 287, 366.

Dains, *Ber.*, 1902, 35, 2498.

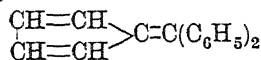
Goldschmidt, Bräuer, *Ber.*, 1906, 39, 108.

Shoosmith, Haldane, *J. Chem. Soc.*, 1923, 123, 2705.

Hinkel, Dunn, *J. Chem. Soc.*, 1930, 1834.

I.C.I., F.P. 717,145, (*Chem. Abstracts*, 1932, 26, 2748); U.S.P. 1,933,206, (*Chem. Abstracts*, 1934, 28, 493).

Diphenylfulvene



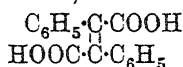
C₁₈H₁₄ MW, 230

Red cryst. from pet. ether. M.p. 82°. Sol. AcOH. Reduces KMnO₄.

Thiele, *Ber.*, 1900, 33, 672.

Courtot, *Ann. chim.*, 1915, 4, 93.

Diphenylfumaric Acid (trans form of Stilbene αβ-dicarboxylic acid, 1 : 2-diphenylethylene-1 : 2-dicarboxylic acid)



C₁₆H₁₂O₄ MW, 268

M.p. 289° rapid heat. (276°, 271°, 260°) → diphenylmaleic anhydride.

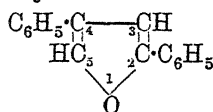
Di-Me ester : C₁₈H₁₆O₄. MW, 296. M.p. 140°.

Di-Et ester : C₂₀H₂₀O₄. MW, 324. M.p. 76°.

Ramart-Lucas, Hoch, *Ann. chim.*, 1930, 13, 393, 413; *Compt. rend.*, 1929, 189, 696.

Japp, Lander, Murray, *J. Chem. Soc.*, 1897, 71, 142, 152.

2 : 4-Diphenylfuran



C₁₆H₁₂O MW, 220

Iridescent plates from EtOH. M.p. 111°. Sol. ord. org. solvents, and conc. H₂SO₄ with blue fluor. U.V. → intense clear blue fluor.

Kohler, Jones, *J. Am. Chem. Soc.*, 1919, 41, 1263.

2 : 5-Diphenylfuran.

Cryst. from EtOH.Aq. M.p. 91°. B.p. 343-5°. Sol. most ord. org. solvents. Insol. H₂O. Green sol. in conc. H₂SO₄.

Kohler, Engelbrecht, *J. Am. Chem. Soc.*, 1919, 41, 1382.

3 : 4-Diphenylfuran.

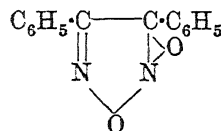
M.p. 109-10.5°.

Backer, Stevens, *Rec. trav. chim.*, 1940, 59, 423.

Diphenylfuran.

See 3 : 4-Diphenyl-1 : 2 : 5-oxdiazole.

Diphenylfuroxan (*Diphenylglyoxime peroxide*)



C₁₄H₁₀O₂N₂ MW, 238

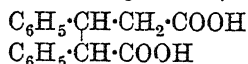
Stout needles from hot EtOH. M.p. 114-15° (118°). Sublimes.

Steinkopf, Jürgens, *J. prakt. Chem.*, 1912, 84, 692, 712.

Wieland, Semper, *Ann.*, 1908, 358, 43.

Auwers, Meyer, *Ber.*, 1888, 21, 803.

1 : 2-Diphenylglutaric Acid (1 : 2-Diphenylpropane-1 : 3-dicarboxylic acid)



C₁₇H₁₆O₄ MW, 284

(1) *Trans*-, or *fumaroid form*.

dl-.

Needles from EtOH.Aq. M.p. 226-28° (230-31°). Spar. sol. hot H₂O. CH₃COCl at 140° → *cis*-anhydride.

Me ester : C₁₈H₁₈O₄. MW, 298. Needles from MeOH.Aq. M.p. 165-70°.

Di-Me ester : C₁₉H₂₀O₄. MW, 312. Plates or prisms. M.p. 143°.

Di-Et ester : C₂₁H₂₄O₄. MW, 340. Needles from EtOH.Aq. M.p. 93° (95-6°).

d-.

Hair-like cryst. from EtOH.Aq. M.p. 224-6°. [α]_D²⁰ + 58.7° in Me₂CO.

l-.

Hair-like cryst. from EtOH.Aq. M.p. slightly lower than 224-6°. [α]_D²⁰ - 58.0° in Me₂CO.

(2) *Cis*-, or *maleinoid form*.

dl-.

Prisms from AcOH.Aq. or EtOH.Aq. M.p. 208-10° corr. Long heat. at m.p. → *trans*-acid.

Di-Me ester : needles from MeOH. M.p. 87°.

Di-Et ester : C₂₁H₂₄O₄. MW, 340. Needles from EtOH. M.p. 76°.

Anhydride: $C_{17}H_{14}O_3$. MW, 266. Plates. M.p. 124° (126.5°).

Monoamide: $C_{17}H_{17}O_3N$. MW, 283. Cryst. from 50% EtOH. M.p. $200-205^\circ$ decomp.

Monoanilide: needles or rods from 50% EtOH. M.p. $201-2^\circ$.

1-Nitrile: $C_{17}H_{15}O_2N$. MW, 265. Needles from C_6H_6 . M.p. $162-3^\circ$. *Et ester*: needles from EtOH. M.p. $99-100^\circ$.

Imide: cryst. from EtOH.Aq. M.p. $225-9^\circ$.

d.

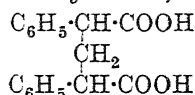
Flat needles from EtOH.Aq. M.p. 202° . $[\alpha]_D^{20} + 141^\circ$ in Me_2CO .

l.

Flat needles from EtOH.Aq. M.p. 202° . $[\alpha]_D^{20} - 140^\circ$ in Me_2CO .

Avery, Maclay, *J. Am. Chem. Soc.*, 1929, 51, 2833.

1 : 3-Diphenylglutaric Acid (1 : 3-Diphenylpropane-1 : 3-dicarboxylic acid)



$C_{17}H_{16}O_4$ MW, 284

Acid exists in 2 forms. (1) Needles from hot H_2O . M.p. $164-5^\circ$. (2) Cryst. from $CHCl_3$ -pet. ether. M.p. $185-6^\circ$.

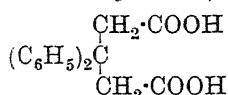
Di-Me ester: b.p. $205-10^\circ/6$ mm.

Di-Et ester: b.p. $216-17^\circ/7$ mm.

Dinitrile: prisms from EtOH. M.p. 66° ($70-71^\circ$). B.p. $220-27^\circ/5$ mm.

Southner, *J. Am. Chem. Soc.*, 1924, 46, 1303.

2 : 2-Diphenylglutaric Acid (2 : 2-Diphenylpropane-1 : 3-dicarboxylic acid)



$C_{17}H_{16}O_4$ MW, 284

Plates from H_2O . M.p. $162-3^\circ$.

Di-Me ester: b.p. $210^\circ/30$ mm. D_4^{21} 1.1398. n_D 1.5511.

Di-Et ester: b.p. $235^\circ/7$ mm. D_4^{21} 1.0970. n_D 1.5364.

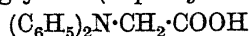
Diamide: needles from H_2O . M.p. 172° .

Imide: m.p. 188° .

Dianilide: needles from EtOH.Aq. M.p. 185° .

Phalnikar, Nargund, *Chem. Zentr.*, 1938, I, 61.

Diphenylglycine (Diphenylaminoacetic acid)



$C_{14}H_{13}O_2N$ MW, 227

Needles from pet. ether. M.p. 113° decomp. (m.p. varies with rate of heat.). Sol. EtOH, Et_2O , Me_2CO , $CHCl_3$. Spar. sol. H_2O , pet. ether. Dil. $HNO_3 \rightarrow$ reddish violet sol.

Dict. of Org. Comp.—II.

Et ester: $C_{16}H_{17}O_2N$. MW, 255. B.p. $205^\circ/20$ mm.

Stollé, *J. prakt. Chem.*, 1914, 90, 273.

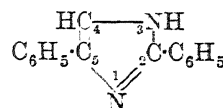
Diphenylglycollic Acid.

See Benzilic Acid.

Diphenylglyoxal.

See Benzil.

2 : 5-Diphenylglyoxaline (2 : 5-Diphenyliminazole, 2 : 5-diphenyl-1 : 3-diazole)



$C_{15}H_{12}N_2$ MW, 220

Two isomeric forms which produce the same salt with any given acid. (I). M.p. 168° . (II). Prisms from EtOH. M.p. 194° . Heat with EtOH \rightarrow (I).

B.HCl: m.p. 274° .

B.(COOH)_2: m.p. $225-7^\circ$.

Burtles, Pyman, *J. Chem. Soc.*, 1923, 123, 361.

4 : 5-Diphenylglyoxaline.

M.p. 230° (227°). Sol. most ord. org. solvents.

B.HCl: m.p. $227-30^\circ$.

B.H_2SO_4: m.p. above 280° decomp.

B.HNO_3: prisms from H_2O . Decomp. at 164° .

B_2.(COOH)_2: m.p. 244° decomp.

N-Acetyl: m.p. 150° .

Picrate: m.p. 233° .

Biltz, Edlefsen, *Ber.*, 1907, 40, 2633.

Biltz, Krebs, *Ann.*, 1912, 391, 211.

Davidson, Weiss, Jelling, *J. Org. Chem.*, 1937, 2, 327.

Diphenylglyoxime.

See Benzil dioxime.

Diphenylglyoxime peroxide.

See Diphenylfuroxan.

sym.-Diphenylguanidine



$C_{13}H_{13}N_3$ MW, 211

Needles from EtOH or toluene. M.p. 148° . Decomp. above 170° . Very sol. EtOH. Sol. CCl_4 , $CHCl_3$, hot C_6H_6 , hot toluene, dil. min. acids. Spar. sol. H_2O . Aq. sol. reacts strongly alk. Monacid base. $k = 6.09 \times 10^{-5}$. Accelerator for vulcanisation of rubber. Convenient base for standardising acids.

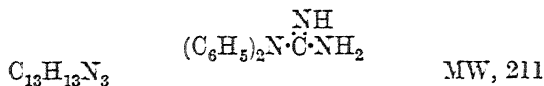
B.HNO_3: m.p. 195° decomp.

Wylder, Swiss P. 145,148, (*Chem. Abstracts*, 1931, 25, 5179); D.R.P. 540,143, (*Chem. Abstracts*, 1932, 26, 1625).

Drosdow, *Chem. Zentr.*, 1933, I, 2675.

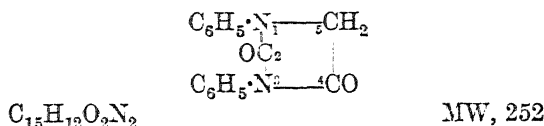
Shimada, Kimishima, *ibid.*, II, 1512.

Rathke, *Ber.*, 1879, 12, 772.

unsym.-Diphenylguanidine

Cryst. from AcOEt. M.p. 147°. Sol. dil. AcOH. NaOH.Aq. \rightarrow diphenylamine. B, HNO_3 : needles. M.p. 207°.

Arndt, Rosenau, *Ber.*, 1917, 50, 1261.

1 : 3-Diphenylhydantoin

Leaflets. M.p. 139°. Sol. CHCl_3 , C_6H_6 . Spar. sol. Et_2O , hot EtOH. Prac. insol. ligroin. Hentschel, *Ber.*, 1898, 31, 509. Wheeler, Hoffman, *Am. Chem. J.*, 1911, 45, 383.

1 : 5-Diphenylhydantoin.

Cryst. from EtOH. M.p. 204°. Aspelund, *Chem. Abstracts*, 1947, 41, 2415.

3 : 5-Diphenylhydantoin.

Needles from EtOH. M.p. 191°. Sol. EtOH, CHCl_3 , C_6H_6 , warm H_2O . Ehrlich, *Biochem. Z.*, 1908, 8, 453.

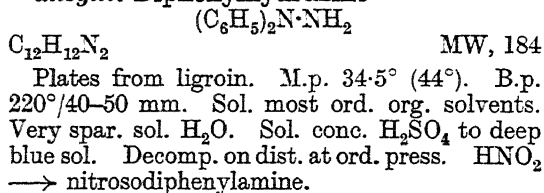
5 : 5-Diphenylhydantoin.

Cryst. from EtOH. M.p. 286° corr. Sol. EtOH, Me_2CO , AcOH. Spar. sol. CHCl_3 , C_6H_6 . Insol. H_2O . Stable to ox. agents. Has hypnotic and anti-epileptic action.

Biltz, Seydel, *Ber.*, 1911, 44, 411.

sym.-Diphenylhydrazine.

See Hydrazobenzene.

unsym.-Diphenylhydrazine

Acetyl deriv.: unsym.-diphenylacethydrazide. $(\text{C}_6\text{H}_5)_2\text{N}\cdot\text{NH}\cdot\text{CO}\cdot\text{CH}_3$. Needles. M.p. 184°. Sol. hot EtOH. Insol. H_2O .

Stahel, *Ann.*, 1890, 258, 243.

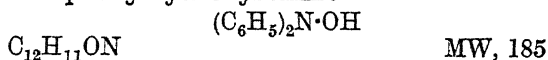
Gattermann, Johnson, Hölzle, *Ber.*, 1892, 25, 1077.

Diphenylhydrocinnamic Acid.

See Triphenylpropionic Acid.

Diphenyl hydrogen phosphate.

See under Phenol.

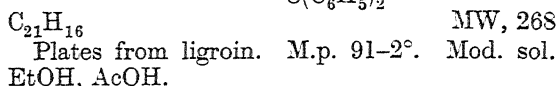
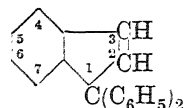
Diphenylhydroxylamine

Needles or leaflets from C_6H_6 -pet. ether. M.p. 60° decomp. Sol. ord. org. solvents. Insol. H_2O . Unstable. Sensitive to light.

Wieland, Roth, *Ber.*, 1920, 53, 216.

Diphenylene.

See 2 : 4'-Diaminodiphenyl.

1 : 1-Diphenylindene

Gagnon, *Ann. chim.*, 1929, 12, 296.

1 : 2-Diphenylindene.

Long needles from hot AcOH. M.p. 177–8° (173–5°). Spar. sol. EtOH, C_6H_6 , pet. ether. Sol. conc. $\text{H}_2\text{SO}_4 \rightarrow$ dark green col. on standing. Alkalis \rightarrow 2 : 3-diphenylindene.

Orechoff, *Ber.*, 1914, 47, 95; *Bull. soc. chim.*, 1919, 25, 598.

Banús, Calvet, *Chem. Abstracts*, 1929, 23, 3205.

1 : 3-Diphenylindene.

Two forms. (i) M.p. 68–9°. (ii) M.p. 84–5°. B.p. 230°/15 mm. Stable to acids.

Ziegler, Grabbe, Ulrich, *Ber.*, 1924, 57, 1988.

Dufraisse, Enderlin, *Bull. soc. chim.*, 1934, 1, 267.

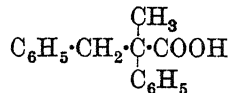
2 : 3-Diphenylindene.

Prisms. M.p. 108–9°. Sol. ord. org. solvents. Dark green sol. in conc. H_2SO_4 .

Orechoff, *Bull. soc. chim.*, 1919, 25, 598.

Banús, Calvet, *Chem. Abstracts*, 1929, 23, 3205.

1 : 2-Diphenylisobutyric Acid (α -Benzyl-hydratropic acid, 1 : 2-diphenylpropane-2-carboxylic acid)



Needles from EtOH.Aq. M.p. 126°.

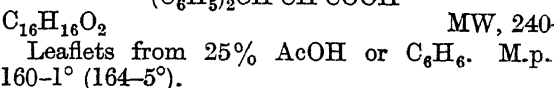
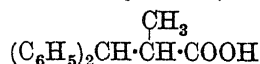
Na salt: needles + 7 H_2O from H_2O . M.p. 45°.

Cu salt: green. M.p. 73°.

Nitrile: $\text{C}_{16}\text{H}_{15}\text{N}$. MW, 221. B.p. 335–7°.

Meyer, Janssen, *Ann.*, 1889, 250, 137.

2 : 2-Diphenylisobutyric Acid (1 : 1-Diphenylpropane-2-carboxylic acid)



Me ester: $C_{17}H_{15}O_2$. MW, 254. Cryst. from pet. ether. M.p. $84-5^\circ$.

Amide: $C_{16}H_{17}ON$. MW, 239. M.p. 123° .

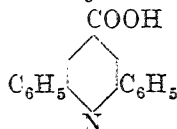
Bergmann, *J. Chem. Soc.*, 1936, 413.

Eijkman, *Chem. Zentr.*, 1908, II, 1190.

2 : 2'-Diphenylisobutyric Acid.

See Dibenzylacetic Acid.

2 : 6-Diphenylisonicotinic Acid (2 : 6-Diphenylpyridine-4-carboxylic acid)



$C_{18}H_{13}O_2N$ MW, 275

Needles from EtOH, AcOH or $PhNO_2$. M.p. $278-9^\circ$. Prac. insol. Me_2CO , C_6H_6 , $CHCl_3$, CS_2 . Dist. Ca salt with $CaO \rightarrow$ 2 : 6-diphenylpyridine.

Klobb, *Bull. soc. chim.*, 1903, 29, 407.

Paal, Strasser, *Ber.*, 1887, 20, 2761.

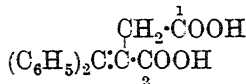
1 : 2-Diphenylisopropyl Alcohol.

See 2-Hydroxy-1 : 2-diphenylpropane.

1 : 3-Diphenylisopropyl Alcohol.

See Dibenzylcarbinol.

3 : 3-Diphenylitaconic Acid (Diphenylmethylenesuccinic acid, 1 : 1-diphenylpropylene-2 : 3-dicarboxylic acid)



$C_{17}H_{14}O_4$ MW, 282

Cryst. from H_2O . Softens at 90° . M.p. $168-9^\circ$ decomp. $CH_3COCl \rightarrow$ anhydride.

1-Et ester: $C_{19}H_{16}O_4$. MW, 310. Plates from CS_2 . M.p. $130-1^\circ$.

2-Et ester: prisms from CS_2 . M.p. $124-5^\circ$.

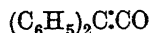
Di-Et ester: $C_{21}H_{22}O_4$. MW, 338. Prisms from pet. ether. M.p. $44-5^\circ$.

Anhydride: $C_{17}H_{12}O_3$. MW, 264. Yellow prisms from $CHCl_3$ or needles from C_6H_6 . M.p. $151-2^\circ$.

Stobbe, *Ann.*, 1899, 308, 90.

Fittig, Reiche, *Ann.*, 1904, 330, 359.

Diphenylketene



$C_{14}H_{10}O$ MW, 194

Reddish yellow liq. B.p. $265-70^\circ$ decomp., $146^\circ/12$ mm. $D_{15}^{1.107}$. $n_D^{1.41}$ 1.615. Unstable, but may be preserved in an atmosphere of CO_2 . $H_2O \rightarrow$ diphenylacetic acid. $NH_3 \rightarrow$ diphenylacetamide. EtOH \rightarrow ethyl diphenylacetate. $C_6H_5NH_2 \rightarrow$ diphenylacetanilide.

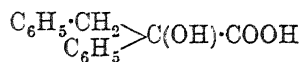
Hurd, Dull, *J. Am. Chem. Soc.*, 1932, 54, 2432.

Smith, Hoehn, *Organic Syntheses*, 1940, XX, 47.

Diphenyl Ketone.

See Benzophenone.

1 : 2-Diphenyl-lactic Acid (Phenylbenzylglycollic acid, 1 : 2-diphenyl-1-hydroxypropionic acid)



$C_{15}H_{14}O_3$ MW, 242

Needles from C_6H_6 . M.p. $165-6^\circ$ (164°). Sol. EtOH, Et_2O . Spar. sol. H_2O .

Malkin, Robinson, *J. Chem. Soc.*, 1925, 127, 376.

Widman, *Ber.*, 1916, 49, 484.

2 : 2-Diphenyl-lactic Acid (2 : 2-Diphenyl-1-hydroxypropionic acid, benzhydrylglycollic acid)



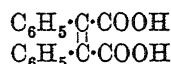
$C_{15}H_{14}O_3$ MW, 242

Needles from H_2O . M.p. 159° decomp. Sol. EtOH, Et_2O .

Et ester: $C_{17}H_{16}O_3$. MW, 270. Needles. M.p. 66° . Sol. EtOH, Et_2O . *Acetyl*: prisms from ligroin. M.p. 53° .

Weise, *Ann.*, 1888, 248, 45.

Diphenylmaleic Acid (Cis form of Stilbene $\alpha\beta$ -dicarboxylic acid, 1 : 2-diphenylethylene-1 : 2-dicarboxylic acid)



$C_{16}H_{12}O_4$ MW, 268

Free acid unknown. When liberated reverts to the anhydride.

Anhydride: $C_{16}H_{10}O_3$. MW, 250. Dimorphous. (1) Pale green cryst. from Me_2CO , m.p. 155° . $D_{15}^{1.340}$. (2) Prac. colourless cryst. with blue fluor., m.p. 146° . B.p. $236^\circ/15$ mm. $D_{15}^{1.345}$. (2) is the labile form and reverts to (1) on heating.

Di-Me ester: $C_{18}H_{16}O_4$. MW, 296. M.p. $110-111^\circ$.

Di-Et ester: $C_{20}H_{20}O_4$. MW, 324. M.p. 54° .

Dinitrile: $\alpha\beta$ -dicyanostilbene. $C_{16}H_{10}N_2$. MW, 230. M.p. 159° . Sol. Et_2O , C_6H_6 , hot EtOH, $CHCl_3$.

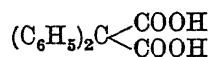
Imide: $C_{16}H_{11}O_2N$. MW, 249. Yellow needles. M.p. 213° . Sol. EtOH. Prac. insol. H_2O . Sublimes.

Ramart-Lucas, Hoch, *Ann. chim.*, 1930, 13, 385.

Heller, *Ann.*, 1908, 358, 355.

Anschütz, Bendix, *Ann.*, 1890, 259, 63.

Diphenylmalonic Acid



$C_{15}H_{12}O_4$

MW, 256

Free acid unknown. When liberated loses $\text{CO}_2 \rightarrow$ diphenylacetic acid.

Di-Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_4$. MW, 284. M.p. $94-5^\circ$.

Di-Et ester: $\text{C}_{19}\text{H}_{20}\text{O}_4$. MW, 312. M.p. $58-9^\circ$.

Et ester-nitrile: $\text{C}_{17}\text{H}_{15}\text{O}_2\text{N}$. MW, 265. M.p. 59° .

Dichloride: $\text{C}_{15}\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 293. M.p. 52° . B.p. $183-4/13$ mm. Stable to H_2O . Alc. $\text{NaOH} \rightarrow$ diphenylacetic acid.

Dianilide: m.p. $187-8^\circ$.

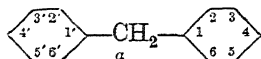
Staudinger, Göhring, Schöller, *Ber.*, 1914, 47, 43.

Guyot, Esteva, *Compt. rend.*, 1909, 148, 564.

Morsman, *Helv. Chim. Acta*, 1935, 18, 1466.

Dox, Thomas, *J. Am. Chem. Soc.*, 1923, 45, 1813.

Diphenylmethane (Benzylbenzene)



$\text{C}_{13}\text{H}_{12}$ MW, 168

Colourless needles. M.p. $26-7^\circ$. B.p. $261-2^\circ$ ($264-7^\circ$), $158^\circ/35$ mm., $120^\circ/10$ mm. Sol. EtOH , Et_2O , CHCl_3 . Insol. H_2O . D_{25}^{20} 1.0056, D_{25}^{20} 1.0008. n_D^{20} 1.57884, n_D^{20} 1.5770. Heat of comb. C_r 1658.2 Cal. $\text{CrO}_3 \rightarrow$ benzophenone. Red heat \rightarrow fluorene.

Kaufmann, D.R.P. 555,403, (*Chem. Abstracts*, 1932, 26, 5101).

Sabatier, Murat, *Ann. chim.*, 1915, 4, 277.

Tschitschibabin, *Ber.*, 1911, 44, 442.

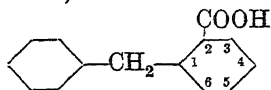
Meyer, *J. prakt. Chem.*, 1910, 82, 538.

Bredereck, Lehmann, Schönfeld, Fritzsche, *Ber.*, 1939, 72, 1421.

Hartman, Phillips, *Organic Syntheses*, 1934, XIV, 34.

Gazopoulos, *Chem. Abstracts*, 1934, 28, 1672.

Diphenylmethane-2-carboxylic Acid (o-Benzylbenzoic acid)



$\text{C}_{14}\text{H}_{12}\text{O}_2$ MW, 212

Needles. M.p. 117° . Sol. EtOH , Et_2O , CHCl_3 , C_6H_6 . Spar. sol. cold H_2O . Sublimes. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ anthranol.

Amide: $\text{C}_{14}\text{H}_{13}\text{ON}$. MW, 211. M.p. 163° .

Nitrile: o-cyanodiphenylmethane. $\text{C}_{14}\text{H}_{11}\text{N}$. MW, 193. M.p. 19° . B.p. $313-14^\circ$ ($300-5^\circ/147$ mm.).

Fischer, Schmidt, *Ber.*, 1894, 27, 2788.

Scholl, Neovius, *Ber.*, 1911, 44, 1080 (Footnote).

Ullmann, *Ann.*, 1896, 291, 24.

Diphenylmethane-3-carboxylic Acid (m-Benzylbenzoic acid).

Leaflets from EtOH.Aq. M.p. $107-8^\circ$. Sol. EtOH , Et_2O , CHCl_3 . Spar. sol. cold H_2O .

Senff, *Ann.*, 1883, 220, 244.

Diphenylmethane-4-carboxylic Acid (p-Benzylbenzoic acid).

M.p. $157-8^\circ$. Sol. EtOH , Et_2O , CHCl_3 , C_6H_6 . Spar. sol. cold H_2O . Sublimes. $\text{CrO}_3 \rightarrow$ p-benzoylbenzoic acid.

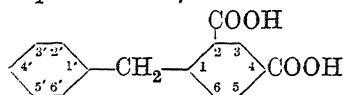
Nitrile: p-cyanodiphenylmethane. Prisms. M.p. 51° .

Liebermann, *Ber.*, 1912, 45, 1207.

Diphenylmethane-α-carboxylic Acid.

See Diphenylacetic Acid.

Diphenylmethane-2:4-dicarboxylic Acid (4-Benzylisophthalic acid)



$\text{C}_{15}\text{H}_{12}\text{O}_4$ MW, 256

Needles from EtOH.Aq. M.p. $242-3^\circ$. Sol. EtOH , Et_2O , Me_2CO . Spar. sol. CHCl_3 , toluene. Prac. insol. hot H_2O .

Zincke, Blatzbecker, *Ber.*, 1876, 9, 1765.

Diphenylmethane-2:2'-dicarboxylic Acid (oo'-Dicarboxydiphenylmethane).

Cryst. from EtOH. M.p. $254-5^\circ$. Sol. EtOH , Et_2O . Spar. sol. CHCl_3 , H_2O .

Di-Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_4$. MW, 284. M.p. 44° .

Graebe, Juillard, *Ann.*, 1887, 242, 253.

Diphenylmethane-2:4'-dicarboxylic Acid.

Cryst. + $1\text{H}_2\text{O}$ from EtOH.Aq. or AcOH . M.p. 220° . Sol. EtOH , Et_2O . Spar. sol. C_6H_6 , cold AcOH . Insol. CHCl_3 .

Di-Me ester: needles from Et_2O . M.p. 48° .

Dichloride: $\text{C}_{15}\text{H}_{10}\text{O}_2\text{Cl}_2$. MW, 293. Cryst. from C_6H_6 . M.p. 180° .

Diamide: $\text{C}_{15}\text{H}_{14}\text{O}_2\text{N}_2$. MW, 254. Needles from EtOH.Aq. M.p. 236° .

Dianilide: needles from Me_2CO . M.p. 227° .

Limpricht, *Ann.*, 1899, 309, 115.

Copp, Simonsen, *J. Chem. Soc.*, 1942, 209.

Diphenylmethane-3:3'-dicarboxylic Acid (mm'-Dicarboxydiphenylmethane).

M.p. 254° ($220-5^\circ$). Sol. EtOH , Me_2CO . Very spar. sol. H_2O .

Weil, *Ber.*, 1894, 27, 3315.

Diphenylmethane-4:4'-dicarboxylic Acid (pp'-Dicarboxydiphenylmethane).

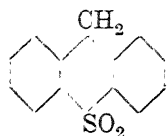
Needles. M.p. $334-6^\circ$ (323° , 290°). Sol. hot EtOH , AcOH . Spar. sol. EtOH , CHCl_3 , C_6H_6 . Sublimes.

Di-Me ester: m.p. $81-2^\circ$.

Dinitrile: cryst. from C_6H_6 . M.p. 169° (165°).

Liebermann, *Ber.*, 1912, 45, 1207.

Diphenylmethane sulphone (*Sulphonyl-diphenylmethane, thioxanthene S-dioxide*)



$C_{13}H_{10}O_2S$ MW, 230

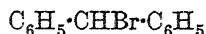
Pale yellow needles from EtOH. M.p. 170°. Sol. $CHCl_3$, AcOH. Spar. sol. Et_2O , cold EtOH. $CrO_3 \rightarrow$ benzophenone sulphone.

Lapworth, *J. Chem. Soc.*, 1898, 73, 408.

Diphenylmethane sulfoxide.

See under Thioxanthene.

Diphenylmethyl bromide (α -Bromodiphenylmethane, diphenylbromomethane, benzhydryl bromide)



$C_{13}H_{11}Br$ MW, 247

Spangles. M.p. 45°. B.p. 184°/20 mm., 172°/11 mm. Sol. C_6H_6 . D^{25}_D 1.491. H_2O at 150° \rightarrow benzhydrol and benzhydryl ether.

Courtot, *Ann. chim.*, 1916, 5, 80.

Norris, Thomas, Brown, *Ber.*, 1910, 43, 2959.

Diphenylmethyl chloride (α -Chlorodiphenylmethane, diphenylchloromethane, benzhydryl chloride)



$C_{13}H_{11}Cl$ MW, 202.5

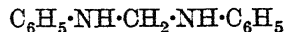
Cryst. M.p. 20.5° (14°). B.p. 173°/19 mm. (159°/12 mm.), 135–45°/4 mm.

Ward, *J. Chem. Soc.*, 1927, 2288.

Diphenylmethylene chloride.

See $\alpha\alpha$ -Dichlorodiphenylmethane.

Diphenylmethylenediamine (*Methylenediphenyldiamine, methylenedianiline, dianilinomethane*)



$C_{13}H_{14}N_2$ MW, 198

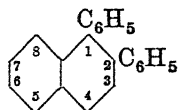
Plates from Et_2O -pet. ether. M.p. 65°. B.p. 209–10° slight decomp. Heat with aniline \rightarrow 4 : 4'-diaminodiphenylmethane. $KMnO_4$ in $H_2SO_4 \rightarrow$ nitrosobenzene.

Drozov, *Chem. Abstracts*, 1932, 26, 5293.

Senior, Goodwin, *J. Chem. Soc.*, 1902, 81, 283.

Eibner, *Ann.*, 1898, 302, 349.

1 : 2-Diphenylnaphthalene



$C_{22}H_{16}$

MW, 280

Needles from EtOH-AcOEt. M.p. 109–10°. Sol. Me_2CO , C_6H_6 .

Crawford, *J. Am. Chem. Soc.*, 1939, 61, 609.

1 : 3-Diphenylnaphthalene.

Needles from EtOH-AcOEt. M.p. 70–1°. Sol. Me_2CO , C_6H_6 .

Crawford, *J. Am. Chem. Soc.*, 1939, 61, 609.

1 : 4-Diphenylnaphthalene.

Needles from EtOH. M.p. 135–7°.

Weiss, Abeles, *Monatsh.*, 1932, 61, 167.

1 : 6-Diphenylnaphthalene.

M.p. 86–7°.

Picrate : m.p. 106–8°.

Bergmann, Szmuskowicz, Fawaz, *J. Am. Chem. Soc.*, 1947, 69, 1773.

2 : 3-Diphenylnaphthalene.

Cryst. from EtOH- C_6H_6 . M.p. 86–7°.

Crawford, *J. Am. Chem. Soc.*, 1939, 61, 610.

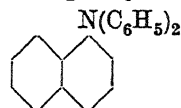
2 : 6-Diphenylnaphthalene.

M.p. 233–4°.

Price, Tomisek, *J. Am. Chem. Soc.*, 1943, 65, 439.

Buu-Hoi, Cagniant, *Compt. rend.*, 1945, 220, 326.

N-Diphenyl-1-naphthylamine



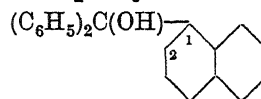
$C_{22}H_{17}N$

MW, 295

Needles from EtOH-Aq. M.p. 142°. B.p. 335–40°/80 mm. Sol. Et_2O , EtOH, Me_2CO , CS_2 , C_6H_6 .

Herz, *Ber.*, 1890, 23, 2541.

Diphenyl-1-naphthylcarbinol



$C_{23}H_{18}O$

MW, 310

Cryst. from ligroin. M.p. 136°. Sol. Et_2O , C_6H_6 . Mod. sol. hot ligroin, hot EtOH. Insol. H_2O . Red. \rightarrow diphenyl-1-naphthylmethane. Et ether : $C_{25}H_{22}O$. MW, 338. M.p. 132°.

Ullmann, Mourawiew-Winigradoff, *Ber.*, 1905, 38, 2214.

Acree, *Ber.*, 1904, 37, 2755.

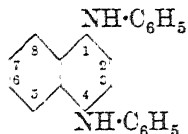
Gomberg, Schoepfle, *J. Am. Chem. Soc.*, 1919, 41, 1659.

Diphenyl-2-naphthylcarbinol.

Prisms from Et_2O -ligroin. M.p. 115–16°. Sol. EtOH, C_6H_6 . Spar. sol. ligroin.

Ullmann, Mourawiew-Winigradoff, *Ber.*, 1905, 38, 2214.

1 : 4-Diphenylnaphthylenediamine (1 : 4-Naphthylenediphenyldiamine, 1 : 4-dianilino-naphthalene)



$C_{22}H_{18}N_2$ MW, 310

Prisms from EtOH. M.p. 144°.

Fischer, Hepp, *Ann.*, 1890, 256, 255.

2 : 3-Diphenylnaphthylenediamine (2 : 3-Naphthylenediphenyldiamine, 2 : 3-dianilino-naphthalene).

Needles from AcOH. M.p. 143°.

Knoevenagel, *J. prakt. Chem.*, 1914, 89, 37.

2 : 6-Diphenylnaphthylenediamine (2 : 6-Naphthylenediphenyldiamine, 2 : 6-dianilino-naphthalene).

M.p. 210°.

Leonhardt, D.R.P. 54,087.

2 : 7-Diphenylnaphthylenediamine (2 : 7-Naphthylenediphenyldiamine, 2 : 7-dianilino-naphthalene).

Silvery leaflets. M.p. 168°. Sol. Et₂O, CS₂, C₆H₆. Spar. sol. EtOH. Insol. ligroin.

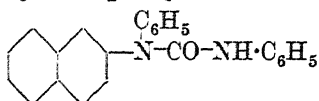
Diacetyl : m.p. 197-8°.

Clausius, *Ber.*, 1890, 23, 528.

Annaheim, *Ber.*, 1887, 20, 1372.

Durand, Huguenin, D.R.P. 40,886, (*Ber. Referate*, 1887, 20, 756).

Diphenyl-2-naphthylurea



$C_{23}H_{18}ON_2$ MW, 338

Leaflets from EtOH. M.p. 133°. Sol. C₆H₆, hot AcOH. Spar. sol. cold EtOH.

Kym, *Ber.*, 1890, 23, 426.

Diphenylnitromethane.

See α -Nitrodiphenylmethane.

Diphenylnitrosamine.

See under Diphenylamine.

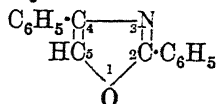
Diphenylolpropane.

See 2 : 2-Di-*p*-hydroxyphenylpropane.

sym.-Diphenyloxamide.

See Oxanilide.

2 : 4-Diphenyloxazole



$C_{15}H_{11}ON$ MW, 221

Leaflets from hot EtOH. M.p. 103°. B.p. 338°. Sol. Et₂O, C₆H₆.

Lewy, *Ber.*, 1887, 20, 2579.

2 : 5-Diphenyloxazole.

Needles from ligroin. M.p. 74°. Sol. EtOH, Et₂O. Prac. insol. H₂O. Spar. volatile in steam.

B, HCl : m.p. 165°. Hyd. by H₂O.

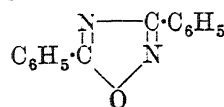
Fischer, *Ber.*, 1896, 29, 207.

4 : 5-Diphenyloxazole.

Prisms from ligroin. M.p. 44°. Sol. EtOH. Insol. H₂O.

Japp, Murray, *J. Chem. Soc.*, 1893, 63, 470.

3 : 5-Diphenyl-1 : 2 : 4-oxdiazole



$C_{14}H_{10}ON_2$ MW, 222

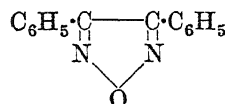
Needles from MeOH or ligroin. M.p. 108°. B.p. 210°/17 mm. Sol. most org. solvents. Spar. sol. H₂O. Insol. acids, alkalis. Sublimes. Volatile in steam. Rapid heat. \rightarrow C₆H₅CN + C₆H₅NCO.

Arndt, Rose, *J. Chem. Soc.*, 1935, 6.

Schulz, *Ber.*, 1885, 18, 1081.

Ponzio, Busti, *Chem. Zentr.*, 1906, II, 232.

3 : 4-Diphenyl-1 : 2 : 5-oxdiazole (3 : 4-Diphenylfurazan)

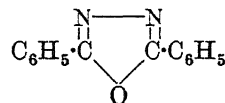


$C_{14}H_{10}ON_2$ MW, 222

Needles or prisms from EtOH. M.p. 98°. B.p. 202°/17 mm. Rapid heat. \rightarrow C₆H₅CN + C₆H₅NCO.

Auwers, Meyer, *Ber.*, 1888, 21, 810.

2 : 5-Diphenyl-1 : 3 : 4-oxdiazole



$C_{14}H_{10}ON_2$ MW, 222

Needles + 1H₂O from EtOH. M.p. about 70°. Anhyd. needles or leaflets from pet. ether or C₆H₆. M.p. 139-40°. B.p. above 360°, 248°/16 mm., 231°/13 mm. Spar. sol. H₂O, ligroin, alkalis, acids. Sublimes.

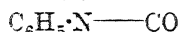
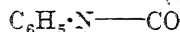
AgNO₃ add. comp. : needles from EtOH. Aq. M.p. 275° decomp.

Milone, *Gazz. chim. ital.*, 1933, 63, 456.

Stollé, Münch, *J. prakt. Chem.*, 1904, 70, 416.

Diphenyl oxide.

See Diphenyl Ether.

Diphenylparabanic Acid (*Oxalylcarbanilide*)
 $\text{C}_{15}\text{H}_{10}\text{O}_3\text{N}_2$

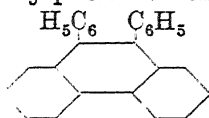
MW, 266

Needles. M.p. $206-7^\circ$ (204°). Sol. EtOH, Et₂O. Insol. H₂O. Hot caustic alkalis \rightarrow aniline, oxalic acid, and CO₂.

Hanssen, *Ber.*, 1887, **20**, 785.

Andreasch, *Ber.*, 1898, **31**, 138.

Figee, *Rec. trav. chim.*, 1915, **34**, 307.

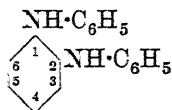
9 : 10-Diphenylphenanthrene
 $\text{C}_{26}\text{H}_{18}$

MW, 330

Needles from Et₂O or C₆H₆. M.p. 240° (235°). Sublimes.

Schoepfle, Ryan, *J. Am. Chem. Soc.*, 1932, **54**, 3692.

sym.-Diphenyl-o-phenylenediamine (*o-Phenylenediphenyldiamine*, 1 : 2-dianilinobenzene)


 $\text{C}_{18}\text{H}_{16}\text{N}_2$

MW, 260

Prisms from MeOH. M.p. 109° .

1 : 2-N-Diacetyl : m.p. 281° .

Clemo, Perkin, Robinson, *J. Chem. Soc.*, 1924, **125**, 1780.

Gibson, Johnson, *J. Chem. Soc.*, 1928, 1988.

sym.-Diphenyl-m-phenylenediamine (*m-Phenylenediphenyldiamine*, 1 : 3-dianilinobenzene).

Needles from EtOH. M.p. 95° . Sol. Et₂O, hot C₆H₆. Spar. sol. cold EtOH, ligroin. Insol. H₂O. H₂SO₄ + nitrite \rightarrow reddish violet col.

1 : 3-N-Diacetyl : m.p. 163° .

1 : 3-N-Dibenzoyl : plates from C₆H₆-ligroin. M.p. 184° .

Calm, *Ber.*, 1883, **16**, 2795.

Fischer, Hepp, *Ann.*, 1891, **262**, 263.

Fischer, *Ann.*, 1895, **286**, 176.

sym.-Diphenyl-p-phenylenediamine (*p-Phenylenediphenyldiamine*, 1 : 4-dianilinobenzene).

Silvery leaflets. M.p. 152° . Sol. Et₂O, CHCl₃, AcOH, hot C₆H₆. Mod. sol. hot EtOH. Spar. sol. ligroin. Decomp. on dist. H₂SO₄ sol. + nitrite \rightarrow deep red col.

Fischer, Wacker, *Ber.*, 1888, **21**, 2615.

Limpricht, *Ber.*, 1889, **22**, 2911.

Ullmann, Maag, *Ber.*, 1906, **39**, 1694

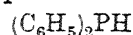
(Footnote).

unsym.-Diphenylphenylenediamine.

See Aminotriphenylamine.

Diphenyl phosphate.

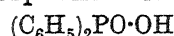
See under Phenol.

Diphenylphosphine
 $\text{C}_{12}\text{H}_{11}\text{P}$

MW, 186

B.p. 280° . Sol. EtOH, Et₂O, C₆H₆, conc. HCl. Insol. H₂O. D₁₆ 1.07. Oxidises in air. Cl, HNO₃, etc., \rightarrow diphenylphosphinic acid.

Dörken, *Ber.*, 1888, **21**, 1508.

Diphenylphosphinic Acid
 $\text{C}_{12}\text{H}_{11}\text{O}_2\text{P}$

MW, 218

Long needles from conc. HNO₃. M.p. 190° ($195-6^\circ$). Sol. hot EtOH, hot conc. HNO₃. Spar. sol. cold EtOH. Insol. H₂O. Forms anhydride at 230° . Soda-lime fusion \rightarrow phosphoric acid + benzene.

Et ester : C₁₄H₁₅O₂P. MW, 246. Needles. M.p. 165° . B.p. $173-5^\circ/1.5$ mm.

Isopropyl ester : C₁₅H₁₇O₂P. MW, 260. Needles from Et₂O. M.p. $95-6^\circ$.

Isobutyl ester : C₁₆H₁₉O₂P. MW, 274. Cryst. from EtOH. M.p. 77° .

Phenyl ester : C₁₈H₁₅O₂P. MW, 294. Prisms from EtOH. M.p. 136° .

Michaelis, Götter, *Ber.*, 1878, **11**, 885.

Michaelis, Gleichmann, *Ber.*, 1882, **15**, 802.

Michaelis, La Coste, *Ber.*, 1885, **18**, 2113.

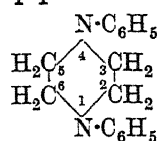
Arbuzov, *Chem. Abstracts*, 1911, **5**, 1397.

Diphenylphthalide.

See Phthalophenone.

Diphenylpicoline.

See Methylidiphenylpyridine.

1 : 4-Diphenylpiperazine
 $\text{C}_{16}\text{H}_{18}\text{N}_2$

MW, 238

Needles from MeOH or Et₂O. M.p. $164-5^\circ$. B.p. 300° decomp., $230-5^\circ/12$ mm. Spar. sol. cold EtOH. Insol. H₂O.

B₂C₆H₃(NO₂)₃ : red plates. M.p. 171° .

Wedekind, Bruch, *Ann.*, 1929, **471**, 88.

Morera, *Chem. Abstracts*, 1930, **24**, 1644.

Schouten, *Rec. trav. chim.*, 1937, **56**, 863.

2 : 3-Diphenylpiperazine.

Exists in two forms.

(1) Needles from pet. ether. M.p. $122-3^\circ$. Sol. EtOH, C₆H₆. Spar. sol. Et₂O, pet. ether. Insol. H₂O.

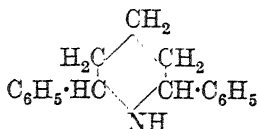
B₂HCl : needles. M.p. about 310° .

(2) Needles from EtOH.Aq. M.p. 108–9°. Sol. EtOH, C₆H₆. Spar. sol. Et₂O. Insol. H₂O. B₂HCl: prisms. M.p. about 295°.

Mason, *J. Chem. Soc.*, 1889, 55, 101.

Hayashi, *Chem. Abstracts*, 1947, 41, 5886.

2 : 6-Diphenylpiperidine



C₁₇H₁₉N

MW, 237

Exists in two isomeric forms.

(1) M.p. 71°. B.p. 206–7°/15 mm. Sol. Et₂O. Spar. sol. EtOH.

B₂HCl: cryst. from H₂O. M.p. 316°.

B₂HBr: m.p. 295°.

B₂HI: m.p. 248°.

B₂HAuCl₄: m.p. 202°.

B₂H₂PtCl₆: orange red needles from EtOH.Aq.–Et₂O. M.p. 206–7°.

Sulphate: m.p. 255°.

d-Tartrate: needles from EtOH–Et₂O. M.p. 205°.

d-Camphor-β-sulphonate: plates from H₂O. M.p. 114°.

N-Benzoyl: prisms from EtOH.Aq. M.p. 137°.

Picrate: m.p. 212°.

(2) B.p. 204–5°/15 mm. D₂₀ 1.0657.

B₂HCl: m.p. 218°.

B₂HBr: m.p. 258°.

B₂HI: m.p. 257°.

Sulphate: m.p. 192°.

N-Benzoyl: plates from EtOH. M.p. 115°.

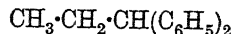
Paal, Demeler, *Ber.*, 1897, 30, 1503.

Scholtz, *Ber.*, 1895, 28, 1733; 1901, 34, 1616.

1 : 3-Diphenylpropandione-1 : 2.

See Phenyl benzyl Diketone.

1 : 1-Diphenylpropane (α-Ethylidiphenyl-methane)



C₁₅H₁₆

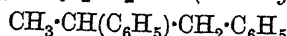
MW, 196

B.p. 278.5–280.5°, 153–4°/20 mm. D₂₀ 0.9881. n_D²⁰ 1.569.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 287;

Compt. rend., 1912, 155, 385.

1 : 2-Diphenylpropane (α-Methyldibenzyl)



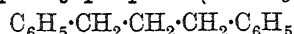
C₁₅H₁₆

MW, 196

B.p. 280–2° (285–6°), 166–7°/28 mm. D₄¹⁷ 0.9857. n_D¹⁷ 1.5635.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 287; *Compt. rend.*, 1912, 155, 385.

1 : 3-Diphenylpropane (Dibenzylmethane)



C₁₅H₁₆

MW, 196

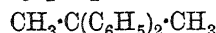
M.p. 6°. B.p. 295° 760 mm., 168–70°/5 mm., 157° 4 mm. D₄²¹ 0.9958. n_D²¹ 1.5694.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 286; *Compt. rend.*, 1912, 155, 385.

Ipatieff, Orloff, Dolgow, *Chem. Zentr.*, 1930, I, 1783.

Sirks, *Rec. trav. chim.*, 1943, 62, 193.

2 : 2-Diphenylpropane



C₁₅H₁₆

MW, 196

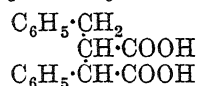
Prisms. M.p. 29°. B.p. 282–3°. D₀²⁵ 0.9958. n_D²⁵ 1.570.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 286; *Compt. rend.*, 1912, 155, 385.

Diphenylpropane-carboxylic Acid.

See Dibenzylacetic Acid, Diphenylbutyric Acid and Diphenylisobutyric Acid.

1 : 3-Diphenylpropane-1 : 2-dicarboxylic Acid (1-Phenyl-2-benzylsuccinic acid)



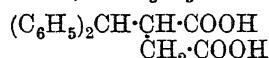
C₁₇H₁₆O₄

MW, 284

Needles from Et₂O–CHCl₃. M.p. 176° (156°). Spar. sol. C₆H₆. Sol. EtOH, Et₂O. Insol. H₂O, CHCl₃, pet. ether.

Avery, Upson, *J. Am. Chem. Soc.*, 1908, 30, 600.

3 : 3-Diphenylpropane-1 : 2-dicarboxylic Acid (γγ-Diphenylpyrotartaric acid, diphenyl-methylsuccinic acid, benzhydrylsuccinic acid)



C₁₇H₁₆O₄

MW, 284

Cryst. + 1H₂O from H₂O. M.p. 145–80°. Anhyd. at 112°. M.p. anhyd. 180–4°. Spar. sol. C₆H₆, Et₂O, CHCl₃. Sol. EtOH, Me₂CO.

Stobbe, Kohlmann, *Ann.*, 1899, 308, 100.

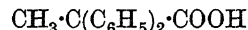
1 : 3-Diphenylpropane-2 : 2-dicarboxylic Acid.

See Dibenzylmalonic Acid.

Diphenylpropane-dicarboxylic Acid.

See also Diphenylglutaric Acid.

1 : 1-Diphenylpropionic Acid (α-Phenyl-hydratropic acid, 1 : 1-diphenylethane-1-carboxylic acid)



C₁₅H₁₄O₂

MW, 226

Cryst. from EtOH.Aq. M.p. 173–4°. Sol. Et₂O, CHCl₃, C₆H₆, hot EtOH. CrO₃ → benzophenone and benzoic acid.

Me ester: C₁₆H₁₆O₂. MW, 240. B.p. 149–52°/3 mm. D₄²⁰ 1.1206. n_D²⁰ 1.5691.

Allyl ester : b.p. 175–7° 8 mm.

Benzyl ester : prisms. M.p. 71–2°. B.p. 230–3°/10 mm.

Chloride : $C_{15}H_{13}OCl$. MW, 244.5. M.p. 95–6°.

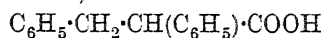
Amide : $C_{15}H_{15}ON$. MW, 225. Prisms from C_6H_6 -pet. ether. M.p. 149°.

p-Toluidide : m.p. 110–11°.

Nitrile : $C_{15}H_{13}N$. MW, 207. B.p. 168–70°/10 mm.

Bateman, Marvel, *J. Am. Chem. Soc.*, 1927, 49, 2917.

1 : 2-Diphenylpropionic Acid (*Phenyl-benzylacetic acid*, α -phenylhydrocinnamic acid, 1 : 2-diphenylethane-1-carboxylic acid, dibenzyl- α -carboxylic acid)



$C_{15}H_{14}O_2$ MW, 226

d.

M.p. 83–9°. $[\alpha]_D^{25} + 94.04^\circ$ in C_6H_6 .

l-Menthyl ester : needles from EtOH. M.p. 100–1°. $[\alpha]_D^{20} - 22.0^\circ$ in C_6H_6 .

l.

Needles from EtOH.Aq. M.p. 83–9°. $[\alpha]_D^{25} - 85.08^\circ$ in C_6H_6 .

l-Menthyl ester : needles from EtOH. M.p. 58–62° (slow heat.). $[\alpha]_D^{20} - 89.1^\circ$ in C_6H_6 .

dl.

Exists in three cryst. forms. From $CHCl_3$: (1) plates, m.p. 95–6°, or (2) prisms, m.p. 88–9°. (3) From fused state : m.p. 82°. B.p. 330–40°. Sol. EtOH, Et₂O. Spar. sol. hot H_2O .

Me ester : $C_{16}H_{16}O_2$. MW, 240. Needles from EtOH.Aq. M.p. 34°.

Et ester : $C_{17}H_{18}O_2$. MW, 254. B.p. 325°.

Benzyl ester : b.p. 197–201°/1 mm.

l-Menthyl ester : needles from EtOH.Aq. M.p. 67–8°. $[\alpha]_D^{20} - 86.04^\circ$ in C_6H_6 .

Anhydride : $C_{30}H_{26}O_3$. MW, 434. Needles from EtOH. M.p. 97–8°. B.p. 240°/16 mm.

Chloride : $C_{15}H_{13}OCl$. MW, 244.5. B.p. 177°/14 mm.

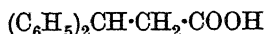
Amide : $C_{15}H_{15}ON$. MW, 225. M.p. 133–4°. Sol. EtOH, Et₂O.

Nitrile : α -cyanodibenzyl. $C_{15}H_{13}N$. MW, 207. M.p. 58°. B.p. 335°.

Miller, Rohde, *Ber.*, 1892, 25, 2017.

Rupe, Kerkovins, *Ber.*, 1912, 45, 1401.

2 : 2-Diphenylpropionic Acid (*Benzhydrylacetic acid*, β -phenylhydrocinnamic acid, 2 : 2-diphenylethane-1-carboxylic acid)



$C_{15}H_{14}O_2$ MW, 226

Cryst. from EtOH.Aq. M.p. 155° (147°). Sol. EtOH. Spar. sol. H_2O . Non-volatile in steam. Ox. \rightarrow benzophenone.

Me ester : $C_{16}H_{16}O_2$. MW, 240. M.p. 56–9°. Sol. EtOH, Et₂O.

Et ester : $C_{17}H_{18}O_2$. MW, 254. Needles from pet. ether. M.p. 22–3° (63°). B.p. 190–3° 12 mm. Sol. EtOH, Et₂O.

tert.-Butyl ester : m.p. 55.5–55.6°.

l-Menthyl ester : needles from MeOH. M.p. 40–1°. $[\alpha]_D^{25} - 61.72^\circ$ in C_6H_6 .

Amide : $C_{15}H_{15}ON$. MW, 225. M.p. 127°. Sol. EtOH, Et₂O.

Nitrile : $C_{15}H_{13}N$. MW, 207. M.p. 100°.

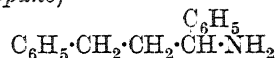
Anilide : needles from EtOH.Aq. M.p. 177–S° (167°).

Wislicenus, Eble, *Ber.*, 1917, 50, 253.

Diphenylpropyl Alcohol.

See Hydroxydiphenylpropane.

1 : 3-Diphenylpropylamine (1-Amino-1 : 3-diphenylpropane)



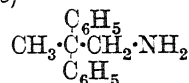
$C_{15}H_{17}N$ MW, 211

B.HCl : needles. M.p. 195°.

Picrate : m.p. 155°.

Henrich, *Ann.*, 1907, 351, 180.

2 : 2-Diphenylpropylamine (1-Amino-2 : 2-diphenylpropane)



$C_{15}H_{17}N$ MW, 211

B.p. 179–82°/22 mm. $D_{18}^{20} 1.027$.

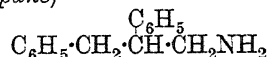
B.HCl : m.p. 261–3°.

N-Acetyl : m.p. 106–7°.

N-Benzoyl : m.p. 82–3°.

Levy, Gallais, *Bull. soc. chim.*, 1928, 43, 866.

2 : 3-Diphenylpropylamine (1-Amino-2 : 3-diphenylpropane)



$C_{15}H_{17}N$ MW, 211

B.p. 315–17°, 182°/12 mm., 171°/6 mm., 128–9°/0.6 mm. Sol. EtOH, Et₂O, $CHCl_3$.

B.HCl : needles. M.p. 188–90°.

B.HAuCl₄ : yellow leaflets. M.p. 144–5°.

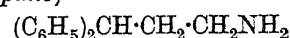
N-Diacetyl : needles from EtOH.Aq. M.p. 85°.

N-Benzoyl : b.p. 280°/11 mm.

v. Braun, Bayer, Cassel, *Ber.*, 1927, 60, 2607.

Levene, Mikeska, Passoth, *J. Biol. Chem.*, 1930, 88, 27.

3 : 3-Diphenylpropylamine (1-Amino-3 : 3-diphenylpropane)



$C_{15}H_{17}N$ MW, 211

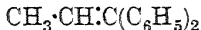
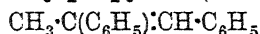
B.p. 150°/2 mm.

B.HCl : m.p. 217.5–18.5°.

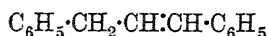
Freeman, Ringk, Spoerri, *J. Am. Chem. Soc.*, 1947, 69, 858.

Di-[1-phenylpropyl]-amine.

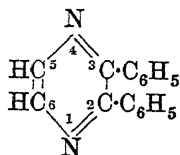
See 1 : 1'-Diphenyldipropylamine.

1 : 1-Diphenylpropylene (α -Ethylidenediphenylmethane) $\text{C}_{15}\text{H}_{14}$ MW, 194Leaflets. M.p. 52°. B.p. 280–1°, 149°/11 mm. Sol. EtOH, C_6H_6 . n_D^{25} 1.593.Schorigin, *Ber.*, 1908, 41, 2720.Klages, Heilmann, *Ber.*, 1904, 37, 1450.Sabatier, Murat, *Chem. Zentr.*, 1912, II, 1455.**1 : 2-Diphenylpropylene** (α -Methylstilbene) $\text{C}_{15}\text{H}_{14}$ MW, 194

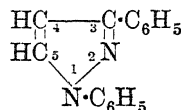
Two forms.

(1) Colourless leaflets from EtOH. M.p. 82°. B.p. 285–6°, 183°/26 mm. Sol. EtOH, Et_2O , C_6H_6 . D_4^{20} 0.9857. n_D^{20} 1.5635. CrO_3 in $\text{AcOH} \rightarrow$ benzoic acid + acetophenone.(2) Cryst. from MeOH. M.p. 48°. Converted to more stable (1) by warming AcOH sol. with trace of HBr .Sabatier, Murat, *Ann. chim.*, 1915, 4, 287.Ley, *Ber.*, 1917, 50, 249.Ellingboe, Fuson, *J. Am. Chem. Soc.*, 1933, 55, 2964.**1 : 3-Diphenylpropylene** (*Phenylstyryl-methane*, sym.-phenylbenzylethylene) $\text{C}_{15}\text{H}_{14}$ MW, 194Exists in two stereoisomeric forms. (1) B.p. 178–9°/15 mm. (2) M.p. 57°. Sol. EtOH, Et_2O .Dieckmann, Kämmerer, *Ber.*, 1906, 39, 3048.Francis, *J. Chem. Soc.*, 1899, 75, 869.**3 : 3-Diphenylpropylene** (α -Vinylidiphenylmethane) $\text{C}_{15}\text{H}_{14}$ MW, 194B.p. 293°. n_D^{20} 1.596. D_4^{24} 1.0038.Levy, Gallais, Abagam, *Bull. soc. chim.*, 1928, 43, 873.**1 : 1-Diphenylpropylene - 2 : 3-dicarboxylic Acid.**

See 3 : 3-Diphenylitaconic Acid.

2 : 3-Diphenylpyrazine (2 : 3-Diphenyl-1 : 4-diazine) $\text{C}_{16}\text{H}_{12}\text{N}_2$

MW, 232

Monoclinic cryst. from EtOH.Aq. M.p. 118–19°. Distils at about 340° with part. decomp. Sol. EtOH, Et_2O , C_6H_6 , conc. min. acids. Spar. sol. ligroin. Insol. H_2O .Mason, Dryfoos, *J. Chem. Soc.*, 1893, 63, 1297.**2 : 5-Diphenylpyrazine** (*Isoindole, diphenylaldine*).Colourless, monoclinic needles or yellow-orange leaflets from EtOH. Pale yellow leaflets from hot AcOH . M.p. 195–6°. Spar. sol. most org. solvents. Sol. hot conc. HCl . Sublimes. Very stable.Tutin, *J. Chem. Soc.*, 1910, 97, 2500.Crippa, Long, *Gazz. chim. ital.*, 1931, 61, 390.**2 : 6-Diphenylpyrazine.**Needles from EtOH.Aq. M.p. 92°. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O . B, HCl : m.p. 189°.Mason, Winder, *J. Chem. Soc.*, 1893, 63, 1368.Tutin, *J. Chem. Soc.*, 1910, 97, 2501.**1 : 3-Diphenylpyrazole** (1 : 3-Diphenyl-1 : 2-diazole) $\text{C}_{15}\text{H}_{12}\text{N}_2$ MW, 220

Needles from ligroin. M.p. 84–5°. B.p. 341–2°/270 mm. Volatile in steam.

Methiodide: needles from H_2O . M.p. 172°.Knorr, Duden, *Ber.*, 1893, 26, 114.Auwers, Schmidt, *Ber.*, 1925, 58, 538.**1 : 4-Diphenylpyrazole.**Yellowish leaflets from EtOH.Aq. M.p. 97°. Sol. Et_2O , C_6H_6 , pet. ether.Rupe, Knap, *Helv. Chim. Acta*, 1927, 10, 305.**1 : 5-Diphenylpyrazole.**M.p. 55–6°. B.p. 337°/736 mm. (340°). Sol. EtOH, Et_2O , C_6H_6 . Volatile in steam.*Methiodide*: m.p. 207°.Auwers, Schmidt, *Ber.*, 1925, 58, 539.Bischler, *Ber.*, 1892, 25, 3145.**3 : 4-Diphenylpyrazole.**Yellow needles from AcOH . M.p. 154–5°.Wislicenus, Ruthing, *Ann.*, 1911, 379, 256.**3 : 5-Diphenylpyrazole.**

Cryst. from EtOH. M.p. 200°. B.p. 347°/175 mm. Sublimes above m.p.

 B, HCl : m.p. 232–3°.*Picrate*: m.p. 161–3°.

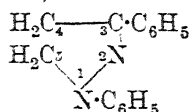
sym.-Trinitrobenzene add. comp.: yellow prisms. M.p. 135-5°.

4-Bromo-: m.p. 198-9°.

Wislicenus, *Ann.*, 1899, 308, 254.

Posner, *Ber.*, 1901, 34, 3984.

1 : 3-Diphenylpyrazoline (1 : 3-Diphenyl-4 : 5-dihydropyrazole)



$C_{15}H_{14}N_2$

MW, 222

Yellow needles from MeOH. M.p. 158° (152°). Very sol. $CHCl_3$. Sol. C_6H_6 . Spar. sol. EtOH, Et_2O , ligroin. Sols show blue fluor.

Auwers, *Ber.*, 1932, 65, 832.

Jacob, Madinaveitia, *J. Chem. Soc.*, 1937, 1931.

Nesbit, *J. Chem. Soc.*, 1945, 126.

1 : 5-Diphenylpyrazoline.

Needles from EtOH. M.p. 137-8°. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. ligroin. Insol. H_2O . Sols show no fluor.

Auwers, Müller, *Ber.*, 1908, 41, 4232.

Knorr, Duden, *Ber.*, 1893, 26, 112.

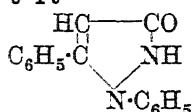
3 : 5-Diphenylpyrazoline.

Plates or needles from EtOH. M.p. 88°. Readily oxidised in air.

$B.HCl$: plates from MeOH. M.p. 220-21° decomp.

Kishner, *Chem. Zentr.*, 1916, I, 1063.

1 : 5-Diphenylpyrazolone-3



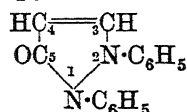
$C_{15}H_{12}ON_2$

MW, 236

Needles from EtOH. M.p. 255-6° corr.

Japp, Maitland, *J. Chem. Soc.*, 1904, 85, 1495.

1 : 2-Diphenylpyrazolone-5



$C_{15}H_{12}ON_2$

MW, 236

Needles from H_2O . M.p. 130°. Sol. ord. org. solvents except ligroin.

Diels, Reese, *Ann.*, 1934, 511, 177.

1 : 3-Diphenylpyrazolone-5.

M.p. 137°. Sol. EtOH, AcOH, $CHCl_3$, C_6H_6 . Spar. sol. H_2O , Et_2O , ligroin. Forms cryst. hydrochloride and sulphate.

Knorr, Klotz, *Ber.*, 1887, 20, 2546.

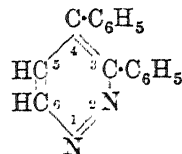
Rothenburg, *Ber.*, 1894, 27, 784.

1 : 4-Diphenylpyrazolone-5.

Leaflets from EtOH. M.p. 195-6°. Spar. sol. Et_2O , acids.

Wislicenus, *Ber.*, 1887, 20, 2932.

3 : 4-Diphenylpyridazine (3 : 4-Diphenyl-1 : 2-diazine)



$C_{16}H_{12}N_2$

MW, 232

M.p. 106-7°. Sol. EtOH, AcOH, C_6H_6 . Spar. sol. ligroin. Yellow sol. in conc. H_2SO_4 .

Picrate: m.p. 155-6°.

Almström, *Ann.*, 1913, 400, 139.

3 : 5-Diphenylpyridazine.

M.p. 139-40°.

Picrate: m.p. 137-8°.

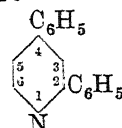
Almström, *Ann.*, 1913, 400, 135.

3 : 6-Diphenylpyridazine.

Leaflets. M.p. 221-2°. Sublimes. Spar. sol. EtOH.

Paal, Schulze, *Ber.*, 1900, 33, 3789.

2 : 4-Diphenylpyridine



$C_{17}H_{13}N$

MW, 231

Plates. M.p. 69°. Sol. conc. H_2SO_4 with faint blue fluor. Very feebly basic.

$B.H_2SO_4$: needles. M.p. 245°.

$B.HCl$: needles. Decomp. on heating.

$B_2.H_2PtCl_6$: orange needles. M.p. 238° decomp.

Picrate: m.p. 187° decomp.

Methiodide: yellow needles. M.p. 210° decomp.

Gastaldi, *Gazz. chim. ital.*, 1922, 52, i, 305.

2 : 6-Diphenylpyridine.

White needles from EtOH. M.p. 82°. B.p. 396-8° slight decomp. Sol. EtOH, Et_2O . Insol. H_2O .

$B_2.H_2PtCl_6$: orange needles from EtOH. M.p. 205°.

$B.HAuCl_4$: m.p. 203-4°.

Picrate: m.p. 169°.

sym.-Trinitrobenzene add. comp.: yellow needles from EtOH. M.p. 113° corr.

Methiodide: m.p. 203°. Sol. hot H_2O , EtOH.

Paal, Strasser, *Ber.*, 1887, 20, 2764.

Döbner, Kuntze, *Ann.*, 1889, 252, 349;

1888, 249, 121.

Scholtz, *Ber.*, 1895, 28, 1730.

3 : 5-Diphenylpyridine.

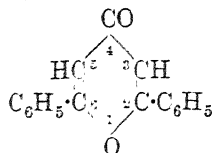
Prisms from C_6H_6 . M.p. 193–4°. Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$. Insol. pet. ether.

Picrate: yellow prisms. M.p. 276°.

Benary, Bitter, *Ber.*, 1928, 61, 1059.

Diphenyl- α -pyrone.

See Diphenylcoumalin.

2 : 6-Diphenyl- γ -pyrone

$C_{17}H_{15}O_2$

MW, 248

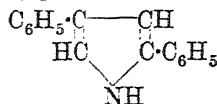
Needles from EtOH.Aq. M.p. 135° (139–40°). Sol. $CHCl_3$, hot EtOH, hot C_6H_6 . Spar. sol. cold EtOH, Et_2O . Violet fluor. in H_2SO_4 .

Kalff, *Rec. trav. chim.*, 1927, 46, 597.

3 : 5-Diphenyl- γ -pyrone.

Needles from C_6H_6 . M.p. 186–7°. Sol. hot EtOH, C_6H_6 .

Benary, Bitter, *Ber.*, 1928, 61, 1058.

2 : 4-Diphenylpyrrole

$C_{16}H_{13}N$

MW, 219

White needles from C_6H_6 . M.p. 178–9°.

Rogers, *J. Chem. Soc.*, 1943, 590.

2 : 5-Diphenylpyrrole.

Needles from EtOH.Aq. M.p. 143–5°. Sol. EtOH, Et_2O , AcOH. Insol. H_2O , alkalis. Reddish violet sol. with blue fluor. in warm H_2SO_4 .

N-o-Tolyl: needles from EtOH. M.p. 114–15°.

N-p-Tolyl: needles from AcOH. M.p. 203°.

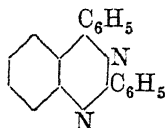
N- α -Naphthyl: yellow needles from EtOH. M.p. 148–9°.

N- β -Naphthyl: m.p. 207–8°.

Baumann, *Ber.*, 1887, 20, 1490.

Kapf, Paal, *Ber.*, 1888, 21, 3061.

Allen, Young, Gilbert, *J. Org. Chem.*, 1937, 2, 240.

2 : 4-Diphenylquinazoline

$C_{20}H_{14}N_2$

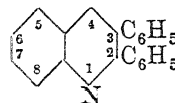
MW, 282

Needles from EtOH. M.p. 119–20°. Sol. hot HCl. Spar. sol. Et_2O , $CHCl_3$.

$B_2H_2PtCl_6$: red cryst. powder from EtOH-HCl. M.p. 180°.

Picrate: yellow powder. M.p. 192°.

Bischler, Barad, *Ber.*, 1892, 25, 3091.

2 : 3-Diphenylquinoline

$C_{21}H_{15}N$

MW, 281

Prisms from 50% EtOH. M.p. 95–6°. B.p. about 420°, about 310°/80 mm. Sol. most org. solvents except pet. ether. Insol. H_2O . Sol. dil. min. acids with blue fluor.

Methiodide: yellow needles from H_2O . M.p. 231° decomp.

Picrate: greenish yellow prisms from EtOH. M.p. 223–4°.

Buddeberg, *Ber.*, 1890, 23, 2075.

Pfützing, *J. prakt. Chem.*, 1897, 56, 304.

2 : 4-Diphenylquinoline.

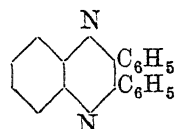
Plates from Et_2O . M.p. 114°.

$B_2H_2PtCl_6$: yellow needles. Decomp. about 200°.

Picrate: yellow needles. M.p. 189°.

Beyer, *Ber.*, 1887, 20, 1772.

Borsche, Sinn, *Ann.*, 1939, 538, 291.

2 : 3-Diphenylquinoxaline

$C_{20}H_{14}N_2$

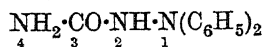
MW, 282

Needles from EtOH. M.p. 126° corr. Sol. Et_2O , $CHCl_3$, C_6H_6 . Insol. H_2O .

Methochloride: yellow ppt. Decomp. at 70°.

Methonitrate: yellow plates. M.p. about 120°.

Hinsberg, König, *Ber.*, 1894, 27, 2181.

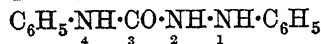
1 : 1-Diphenylsemicarbazide

$C_{13}H_{13}ON_3$

MW, 227

Needles from EtOH. M.p. 195°.

Michaelis, *Ber.*, 1908, 41, 1432.

1 : 4-Diphenylsemicarbazide

$C_{13}H_{13}ON_3$

MW, 227

Cryst. from EtOH. M.p. 177°. Spar. sol. hot H_2O .

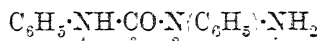
1-Acetyl: m.p. 192°.

1-Nitroso: m.p. 174–5°.

Busch, *Ber.*, 1909, 42, 4599, 4602.

Busch, Frey, *Ber.*, 1903, 36, 1369.

2 : 4-Diphenylsemicarbazide



$\text{C}_{13}\text{H}_{13}\text{ON}_3$ MW, 227

Leaflets from EtOH. M.p. 165.5° → 1 : 4-derivative. Sol. AcOH, CHCl_3 , Et_2O , C_6H_6 . Benzaldehyde → benzaldehyde 2 : 4-diphenylsemicarbazone.

B.HCl: m.p. 186° decomp. Decomp. by hot H_2O . Unstable.

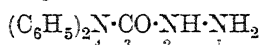
1-Acetyl: m.p. 184°.

1-Benzoyl: needles from EtOH. M.p. 156°.

Busch, Frey, *Ber.*, 1903, 36, 1362.

Busch, *Ber.*, 1909, 42, 4602.

4 : 4-Diphenylsemicarbazide



$\text{C}_{13}\text{H}_{13}\text{ON}_3$ MW, 227

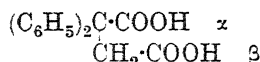
Prisms from EtOH. M.p. 154°. Reduces Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. Feeble base. Stable. Good reagent for $-\text{CO}-$ compounds, forming more sharply defined derivatives than semicarbazide itself.

B.HCl: m.p. 218-20°.

Picrate: m.p. 164-7° decomp.

Toschi, *Gazz. chim. ital.*, 1914, 44, i, 444.

1 : 1-Diphenylsuccinic Acid



$\text{C}_{16}\text{H}_{14}\text{O}_4$ MW, 270

Cryst. from EtOH.Aq. Softens at 170° → anhydride.

α -Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_4$. MW, 284. M.p. 183-4°.

β -Me ester: m.p. 141-3°.

Di-Me ester: $\text{C}_{18}\text{H}_{18}\text{O}_4$. MW, 298. M.p. 82-3°.

α -Et ester: $\text{C}_{18}\text{H}_{18}\text{O}_4$. MW, 298. M.p. 137-8°.

β -Et ester: m.p. 144-6°. α -Amide: m.p. 105-6°.

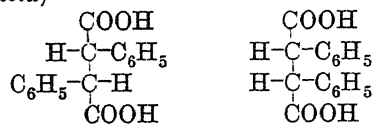
Di-Et ester: $\text{C}_{20}\text{H}_{22}\text{O}_4$. MW, 326. M.p. 76-7°.

α -Amide: $\text{C}_{16}\text{H}_{15}\text{O}_3\text{N}$. MW, 269. M.p. 140°.

Anhydride: $\text{C}_{16}\text{H}_{12}\text{O}_3$. MW, 252. M.p. 90-1°.

Imide: $\text{C}_{16}\text{H}_{13}\text{O}_2\text{N}$. MW, 251. M.p. 139°.

Salmon-Legagneur, *Compt. rend.*, 1939, 208, 1508.

1 : 2-Diphenylsuccinic Acid (Dibenzyl- $\alpha\beta$ -dicarboxylic acid, sym.-diphenylethane- $\alpha\beta$ -dicarboxylic acid)

α -, dl-, or racemic

β - or meso

$\text{C}_{16}\text{H}_{14}\text{O}_4$ MW, 270

α -Form.

dl-, or racemic:

Cryst. + H_2O . M.p. 183°. Solidifies and re-melts at 220-1°. Sol. Et_2O , CHCl_3 , AcOH, CS_2 , hot C_6H_6 . $k=2.6 \times 10^{-4}$ at 25°.

Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_4$. MW, 284. Needles from MeOH. M.p. 196-8°.

Di-Me ester: $\text{C}_{18}\text{H}_{18}\text{O}_4$. MW, 298. M.p. 173-5-4°.

Et ester: $\text{C}_{18}\text{H}_{18}\text{O}_4$. MW, 298. Needles from EtOH. M.p. 170-1°.

Di-Et ester: $\text{C}_{20}\text{H}_{22}\text{O}_4$. MW, 326. M.p. 84-5°. Sublimcs.

Butyl ester: cryst. from pet. ether- C_6H_6 . M.p. 129-30°.

Dibutyl ester: plates from EtOH. M.p. 46-7°.

Anhydride: $\text{C}_{16}\text{H}_{12}\text{O}_3$. MW, 252. M.p. 115-6°. Sol. CHCl_3 . Sublimcs.

Dinitrile: $\alpha\beta$ -dicyanodibenzyl. $\text{C}_{16}\text{H}_{12}\text{N}_2$. MW, 232. M.p. 160°. Sol. EtOH.

Monoanilide: prisms from EtOH. M.p. 173-5° decomp. Solidifies and re-melts at 227°.

d-.

Needles from H_2O . M.p. 179-80° (190°). Solidifies and re-melts at 212-14° to yellow liq. Sol. EtOH, Et_2O . Spar. sol. H_2O , C_6H_6 . $[\alpha]_D^{25} + 369.7^\circ$ in EtOH.

Di-Me ester: leaflets from MeOH. M.p. 165-6°. $[\alpha]_D^{25} + 341.9^\circ$ in Me_2CO .

Et ester: leaflets from H_2O . Decomp. at 170°.

Di-Et ester: m.p. 104-5°. $[\alpha]_D^{25} + 279.4^\circ$ in Me_2CO .

Butyl ester: prisms from pet. ether. M.p. 93-5-94°.

Dibutyl ester: plates from EtOH. M.p. 64-4-5°.

Mono-l-menthyl ester: needles from pet. ether. M.p. 144-5°. $[\alpha]_D^{25} + 179.5^\circ$ in Me_2CO .

Anhydride: m.p. 105-5-106-5°. $[\alpha]_D^{25} + 246.0^\circ$ in CHCl_3 .

l-.

Needles from H_2O . M.p. 176-7° (190°). Solidifies and re-melts at 211.5-214°. $[\alpha]_D^{25} - 368.9^\circ$ in EtOH.

Di-Me ester: m.p. 165-6°. $[\alpha]_D^{25} - 342.1^\circ$ in Me_2CO .

Et ester: m.p. 113-5-14-5°.

Di-Et ester: plates from EtOH. M.p. 104-5°. $[\alpha]_D^{25} - 279.7^\circ$ in Me_2CO .

Butyl ester: prisms from pet. ether. M.p. 93-5-94°.

Dibutyl ester: plates from EtOH. M.p. 64-4-5°.

l-Menthyl ester: needles + $\text{C}_2\text{H}_5\text{OH}$ from EtOH. M.p. 158-5-9-5°. $[\alpha]_D^{25}$ (EtOH-free) - 266.9° in Me_2CO .

Di-l-menthyl ester: needles from EtOH. M.p. 160-1°. $[\alpha]_D^{25} - 214.8^\circ$ in Me_2CO .

Anhydride: prisms from pet. ether. M.p. 105-106-5°. $[\alpha]_D^{25} - 263.1^\circ$ in AcOEt.

5- or meso-Form.

M.p. 252° (245° , 229°). Spar. sol. AcOH. Insol. H_2O , C_6H_6 . $k=2.0 \times 10^{-4}$ at 25° . Heat above m.p. \rightarrow anhydride of racemic form.

Di-Me ester: m.p. $219-20^{\circ}$.

Et ester: needles from EtOH.Aq. M.p. $174.5-175^{\circ}$.

Di-Et ester: m.p. $140-1^{\circ}$. Sublimes.

Butyl ester: m.p. $159.5-60.5^{\circ}$.

Dibutyl ester: m.p. $100-1^{\circ}$.

Di-1-menthyl ester: m.p. $178-9^{\circ}$. $[\alpha]_D^{25} -77.1^{\circ}$ in CHCl_3 .

Dinitrile: m.p. $239-40^{\circ}$. Prac. insol. Et_2O , cold EtOH.

Imide: cryst. from AcOH. M.p. $196-8^{\circ}$. Sol. alkalis.

Wren, Still, *J. Chem. Soc.*, 1915, 107, 444, 1449.

Reimer, *Ber.*, 1881, 14, 1803.

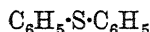
Smith, *Ber.*, 1938, 71, 641.

Biquard, *Ann. chim.*, 1933, 20, 118.

Ivanov, Spasov, *Chem. Abstracts*, 1934, 28, 6711.

McRae, Townshend, *Chem. Abstracts*, 1935, 29, 1077.

Diphenyl sulphide (*Phenyl sulphide, thiophenol phenyl ether, diphenyl thioether*)



$\text{C}_{12}\text{H}_{10}\text{S}$ MW, 186

B.p. 296° , $213^{\circ}/100$ mm., $189^{\circ}/50$ mm., $157-8^{\circ}/16.5$ mm. Misc. with Et_2O , CS_2 , C_6H_6 , hot EtOH. D_4^{25} 1.1185. n_D^{25} 1.635. CrO_3 or conc. $\text{HNO}_3 \rightarrow$ diphenyl sulphone.

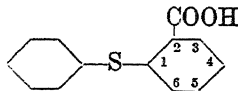
Graebe, Mann, *Ber.*, 1882, 15, 1683.

Krafft, Lyons, *Ber.*, 1894, 27, 1771.

Hartman, Smith, Dickey, *Organic Syntheses*, 1934, XIV, 36.

Vorozhtzov, Mitzenzender, *Chem. Abstracts*, 1934, 28, 2340.

Diphenyl sulphide 2-carboxylic Acid (*o-Phenylmercaptobenzoic acid, S-phenylthiosalicylic acid*)



$\text{C}_{13}\text{H}_{10}\text{O}_2\text{S}$ MW, 230

Leaflets from EtOH.Aq. M.p. 166° . Sol. EtOH, Et_2O , AcOH, C_6H_6 . Spar. sol. cold H_2O . Sublimes. $\text{KMnO}_4 \rightarrow$ diphenyl sulphone 2-carboxylic acid. HNO_3 .Aq. \rightarrow diphenyl sulphoxide 2-carboxylic acid. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ thioxanthone.

Et ester: $\text{C}_{15}\text{H}_{14}\text{O}_2\text{S}$. MW, 258. Needles from ligroin. M.p. 151° .

Weedon, Doughty, *Am. Chem. J.*, 1905, 33, 393.

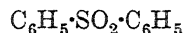
Mayer, *Ber.*, 1909, 42, 1135.

Diphenyl sulphide 4-carboxylic Acid (*p-Phenylmercaptobenzoic acid*).

Plates from EtOH. M.p. 177° . Sol. EtOH, Et_2O , C_6H_6 . $\text{KMnO}_4 \rightarrow$ diphenyl sulphone 4-carboxylic acid.

Weedon, Doughty, *Am. Chem. J.*, 1905, 33, 424.

Diphenyl sulphone (*Benzenesulphone, sulphobenzide*)



$\text{C}_{12}\text{H}_{10}\text{O}_2\text{S}$ MW, 218

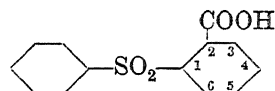
M.p. $128-9^{\circ}$. B.p. 379° , $232^{\circ}/18$ mm. Sol. hot EtOH. Mod. sol. C_6H_6 . Spar. sol. hot H_2O . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ benzenesulphonic acid. $\text{PCl}_5 \rightarrow$ chlorobenzene + benzenesulphochloride.

Hinsberg, *Ber.*, 1910, 43, 290.

Stenhouse, *Ann.*, 1866, 140, 290.

Carr, U.S.P. 2,000,061, (*Chem. Abstracts*, 1935, 29, 4027).

Diphenyl sulphone 2-carboxylic Acid



$\text{C}_{13}\text{H}_{10}\text{O}_4\text{S}$ MW, 262

Needles from C_6H_6 , m.p. 146° . Cryst. + $1\frac{1}{2}\text{H}_2\text{O}$ from H_2O , m.p. 51.5° . Sol. most ord. org. solvents.

Me ester: $\text{C}_{14}\text{H}_{12}\text{O}_4\text{S}$. MW, 276. Plates from MeOH. M.p. 63° .

Et ester: $\text{C}_{15}\text{H}_{14}\text{O}_4\text{S}$. MW, 290. M.p. $78-9^{\circ}$.

Chloride: $\text{C}_{13}\text{H}_9\text{O}_3\text{ClS}$. MW, 280.5. Prisms. M.p. 80° .

Anhydride: $\text{C}_{26}\text{H}_{18}\text{O}_7\text{S}_2$. MW, 506. M.p. 148° .

Amide: $\text{C}_{13}\text{H}_{11}\text{O}_3\text{NS}$. MW, 261. M.p. $175-175.5^{\circ}$.

Weedon, Doughty, *Am. Chem. J.*, 1905, 33, 417.

Diphenyl sulphone 4-carboxylic Acid.

Prisms from EtOH. M.p. 277° . Sol. EtOH. Very spar. sol. hot H_2O .

Chloride: needles from pet. ether. M.p. $146-7^{\circ}$.

Amide: m.p. $248.3-248.8^{\circ}$.

Anilide: prisms from EtOH. M.p. $202-3^{\circ}$.

Newell, *Am. Chem. J.*, 1898, 20, 304.

Diphenyl sulphoxide (*Benzene sulphoxide*)



$\text{C}_{12}\text{H}_{10}\text{OS}$ MW, 202

Prisms. M.p. 70.5° . B.p. 340° slight decomp., $210^{\circ}/15$ mm. Sol. EtOH, Et_2O , AcOH, C_6H_6 . $\text{KMnO}_4 \rightarrow$ diphenyl sulphone.

Chloroaurate: orange prisms from EtOH. M.p. $117-18^{\circ}$.

Chloroplatinate: m.p. 128° .

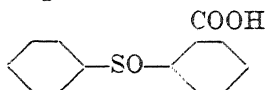
$2C_{12}H_{10}OS, CdI_2$: cryst. from EtOH.Aq. M.p. 136° .

Colby, McLoughlin, *Ber.*, 1887, 20, 195.

Hinsberg, *Ber.*, 1910, 43, 290.

Shriner, Struck, Jorison, *J. Am. Chem. Soc.*, 1930, 52, 2065.

Diphenyl sulphoxide 2-carboxylic Acid

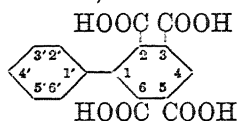


$C_{13}H_{10}O_3S$ MW, 246

Needles + $1H_2O$ from H_2O , m.p. $80-5^\circ$: anhyd. from EtOH, m.p. 163° . Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O , hot H_2O .

Weedon, Doughty, *Am. Chem. J.*, 1905, 33, 394.

Diphenyl-2 : 3 : 5 : 6-tetracarboxylic Acid (Phenylpyromellitic acid)



$C_{16}H_{10}O_8$ MW, 330

Cryst. Darkens at 230° . Not completely melted at 280° . Sol. EtOH. Spar. sol. hot H_2O . Prac. insol. C_6H_6 .

Tetra-Me ester: $C_{20}H_{18}O_8$. MW, 386. Cryst. from CCl_4 . M.p. $130-33^\circ$.

Tetrabenzyl ester: cryst. from AcOH. M.p. $114-18^\circ$.

Michael, Bucher, *Am. Chem. J.*, 1898, 20, 102.

Diphenyl-2:3:2':3'-tetracarboxylic Acid. Plates + $1H_2O$. M.p. 265° . Sol. H_2O . Heat with $CH_3COCl \rightarrow$ dianhydride, m.p. 267° .

2 : 2'-Di-Me ester: $C_{18}H_{14}O_8$. MW, 358. Prisms + $1EtOH$ from EtOH. M.p. 205° decomp. Heat above m.p. \rightarrow dianhydride.

Tetra-Me ester: needles from C_6H_6 . M.p. 167° .

Kenner, Mathews, *J. Chem. Soc.*, 1914, 105, 2478.

Diphenyl-2:3:2':4'-tetracarboxylic Acid. *Tetra-Me ester*: prisms from MeOH. M.p. $153-4^\circ$.

Ruzicka, Graaff, Hosking, *Helv. Chim. Acta*, 1931, 14, 236.

Diphenyl-2:4:2':4'-tetracarboxylic Acid. Cryst. from H_2O . Does not melt below 325° . *Tetra-Me ester*: cryst. from MeOH. M.p. $181-2^\circ$.

Liebermann, Kardos, *Ber.*, 1913, 46, 200.

Diphenyl-2:5:2':5'-tetracarboxylic Acid. Does not melt below 300° . Spar. sol. org. solvents.

Tetra-Me ester: prisms from C_6H_6 . M.p. 156° .

Kenner, Witham, *J. Chem. Soc.*, 1913, 103, 237.

Diphenyl-2:6:2':6'-tetracarboxylic Acid. Plates. M.p. about 390° decomp. Sol. hot H_2O . Prac. insol. hot $PhNO_2$.

Tetra-Me ester: needles from MeOH. M.p. $125-6^\circ$.

Tetrachloride: m.p. $189-90^\circ$.

Mayer, *Ber.*, 1911, 44, 2302.

Vollmann, Becker, Corell, Streeck, *Ann.*, 1937, 531, 150.

Diphenyl-3:4:3':4'-tetracarboxylic Acid. Needles + $2H_2O$ from H_2O . M.p. above 300° decomp. Sol. boiling EtOH. Spar. sol. hot H_2O , Et_2O . Heat. with $CH_3COCl \rightarrow$ dianhydride, m.p. 292° .

Tetra-Me ester: prisms from MeOH. M.p. $99-100^\circ$.

Kenner, Matthews, *J. Chem. Soc.*, 1914, 105, 2481.

Diphenyl-3:5:3':5'-tetracarboxylic Acid. Pptd. as micro-prisms from H_2SO_4 by H_2O . Does not melt below 300° .

Tetra-Me ester: prisms from C_6H_6 . M.p. 209° .

Tetra-Et ester: $C_{24}H_{26}O_8$. MW, 442. Prisms from C_6H_6 . M.p. $146-7^\circ$.

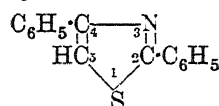
Tetrachloride: prisms from C_6H_6 . M.p. 128° .

Tetra-amide: needles. M.p. above 300° .

Tetra-anilide: prisms. Decomp. at 280° .

Burton, Kenner, *J. Chem. Soc.*, 1923, 123, 1045.

2 : 4-Diphenylthiazole



$C_{15}H_{11}NS$ MW, 237

Leaflets from EtOH. M.p. $92-3^\circ$. B.p. above 360° .

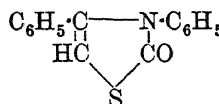
Hubacher, *Ann.*, 1890, 259, 237.

2 : 5-Diphenylthiazole.

Rhombic plates from EtOH. M.p. 104° .

Gabriel, *Ber.*, 1910, 43, 137.

3 : 4-Diphenylthiazolone-2 (2-Keto-3 : 4-diphenyl-2 : 3-dihydro-1 : 3-thiazole)



$C_{15}H_{11}ONS$ MW, 253

Prisms from EtOH or AcOH. M.p. 124° . Sol. Et_2O , C_6H_6 , $CHCl_3$, CS_2 . Spar. sol. pet. ether. Insol. H_2O .

Hydrazone: cryst. from Py.Aq. M.p. 175° decomp. *Hydrobromide*: softens at 206° . M.p. $224-6^\circ$ decomp.

Isopropylidenehydrazone: yellow. M.p. 165° .

Benzylidenehydrazone: yellow. M.p. 191° .

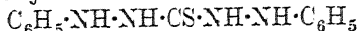
Anisylidenehydrazone : m.p. 161°.

Anil : *hydrobromide*, prisms from EtOH. M.p. 276°. *Picrate* : orange yellow prisms from EtOH. M.p. 173°.

Imide : yellow needles from EtOH. M.p. 185-6°.

Walther, Griefenhagen, *J. prakt. Chem.*, 1907, 75, 204.

Diphenylthiocarbazide



$\text{C}_{18}\text{H}_{14}\text{N}_4\text{S}$ MW, 258

Cryst. from EtOH. M.p. 156-8° decomp. Spar. sol. cold EtOH, C_6H_6 . Dissolves in alkalis with decomp. Turns green on melting or heating sols. Gives characteristic coloured pptes. with metallic salts.

Busch, Ridder, *Ber.*, 1897, 30, 845.

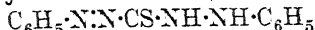
Heller, *Ann.*, 1891, 263, 278.

Guha, Banerjee, *J. Indian Inst. Sci.*, 1928, 11A, 233.

Maw, McIntire, *Chem. Abstracts*, 1938, 32, 2912.

Billman, Cleland, *J. Am. Chem. Soc.*, 1943, 65, 1300; *Organic Syntheses*, 1945, XXV, 38.

Diphenylthiocarbazon (Dithizone)



$\text{C}_{13}\text{H}_{12}\text{N}_4\text{S}$ MW, 256

Bluish black cryst. from CHCl_3 -EtOH. Spar. sol. EtOH, $\text{Et}_2\text{O} \rightarrow$ dark red sols. Sol. $\text{H}_2\text{SO}_4 \rightarrow$ blue sol. Alkalis \rightarrow red sols. Reagent for detection and determination of lead.

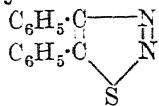
Fischer, Besthorn, *Ann.*, 1882, 212, 316.

Miller, *Chemist-Analyst*, 1937, 26, 55.

Maw, McIntire, *Chem. Abstracts*, 1938, 32, 2912.

Billman, Cleland, *J. Am. Chem. Soc.*, 1943, 65, 1300.

4 : 5-Diphenyl-1 : 2 : 3-thiodiazole

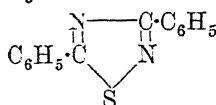


$\text{C}_{14}\text{H}_{10}\text{N}_2\text{S}$ MW, 238

Cryst. from Et_2O . M.p. 93-4°. Turns yellow in light.

Staudinger, Siegwart, *Ber.*, 1916, 49, 1921.

3 : 5-Diphenyl-1 : 2 : 4-thiodiazole



$\text{C}_{14}\text{H}_{10}\text{N}_2\text{S}$ MW, 238

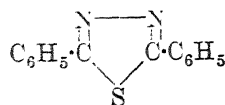
Needles from EtOH. M.p. 90-91°. Distills. Sol. Et_2O , CHCl_3 , C_6H_6 .

Walther, *J. prakt. Chem.*, 1904, 69, 45.

Ishikawa, *Sci. Papers Inst. Phys. Chem.*

Research Tokyo, 1925, 3, 147.

2 : 5-Diphenyl-1 : 3 : 4-thiodiazole



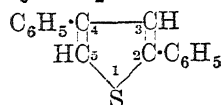
$\text{C}_{14}\text{H}_{10}\text{N}_2\text{S}$ MW, 238

Leaflets from EtOH. M.p. 141-2°. B.p. 259°/17 mm. Sol. CHCl_3 , boiling C_6H_6 , AcOH. Mod. sol. Et_2O , ligroin. Insol. H_2O . Sol. H_2SO_4 , repptd. by H_2O .

*B, AgNO*₃ : needles from EtOH. M.p. 175°.

Stollé, Kind, *J. prakt. Chem.*, 1904, 70, 424.

2 : 4-Diphenylthiophene



$\text{C}_{16}\text{H}_{12}\text{S}$ MW, 236

Plates from EtOH. M.p. 124°. Sol. Me_2CO , AcOH, CHCl_3 .

Picrate : needles. M.p. 133-4°.

Baumann, Fromm, *Ber.*, 1895, 28, 893.

2 : 5-Diphenylthiophene.

Plates from Me_2CO . M.p. 155-6°.

Baumann, Fromm, *Ber.*, 1895, 28, 892.

Fromm, Fantl, Leibsohn, *Ann.*, 1927, 457, 271.

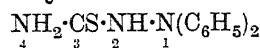
3 : 4-Diphenylthiophene.

Prisms from AcOH or CHCl_3 . M.p. 114°.

Hinsberg, *Ber.*, 1915, 48, 1613.

Backer, Bolt, Stevens, *Rec. trav. chim.*, 1937, 56, 1065.

1 : 1-Diphenylthiosemicarbazide

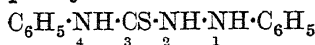


$\text{C}_{13}\text{H}_{13}\text{N}_3\text{S}$ MW, 243

M.p. 202°. Sol. Me_2CO , CHCl_3 , C_6H_6 . Insol. ligroin.

Tivoli, *Gazz. chim. ital.*, 1892, 22, ii, 384.

1 : 4-Diphenylthiosemicarbazide



$\text{C}_{13}\text{H}_{13}\text{N}_3\text{S}$ MW, 243

Prisms from EtOH. M.p. 176-7°. Sol. alkalis. Mod. sol. Me_2CO , hot EtOH. Spar. sol. CS_2 , Et_2O . Insol. H_2O . Stable.

1-Acetyl : cryst. from EtOH. M.p. 160°.

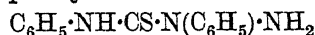
4-Acetyl : m.p. 161-2°.

1-Benzoyl : m.p. 310°.

Gränacher, *Helv. Chim. Acta*, 1920, 3, 163.

Marckwald, *Ber.*, 1892, 25, 3107.

2 : 4-Diphenylthiosemicarbazide



$\text{C}_{13}\text{H}_{13}\text{N}_3\text{S}$ MW, 243

M.p. 139°. Sol. hot C_6H_6 , Me_2CO . Spar. sol. EtOH. At m.p. or in boiling EtOH \rightarrow 1:4-isomer. $HNO_3 \rightarrow$ thiocarbanilide.

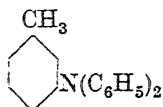
1-Acetyl: yellowish needles from EtOH. M.p. 133°.

Marckwald, *Ber.*, 1892, 25, 3106.

sym.-Diphenylthiourea.

See Thiocarbanilide.

Diphenyl-*m*-toluidine (3-Methyltriphenylamine, diphenyl-*m*-tolylamine)



$C_{19}H_{17}N$

MW, 259

Needles from EtOH. M.p. 69–70°. B.p. 275°/60 mm. Conc. H_2SO_4 sol. turns blue with traces of ox. agents.

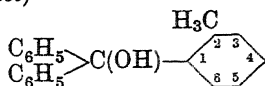
Haeussermann, Bauer, *Ber.*, 1898, 31, 2988.

Haeussermann, *Ber.*, 1901, 34, 38; 1906, 39, 2764.

Diphenyl-*m*-tolylamine.

See Diphenyl-*m*-toluidine.

Diphenyl-*o*-tolylcarbinol (2-Methyltriphenylcarbinol)



$C_{20}H_{18}O$

MW, 274

Cryst. from EtOH. M.p. 100–1°. Sol. Et_2O , C_6H_6 . Orange sol. in conc. H_2SO_4 . Zn + AcOH \rightarrow diphenyl-*o*-tolylmethane.

Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, 54, 1450.

Diphenyl-*m*-tolylcarbinol (3-Methyltriphenylcarbinol).

Leaflets from C_6H_6 . M.p. 68–9°. B.p. 255°/26 mm. Deliquescent. Sol. Et_2O , EtOH, AcOH, C_6H_6 , ligroin. Orange sol. in conc. H_2SO_4 . Zn + AcOH \rightarrow diphenyl-*m*-tolylmethane.

Acree, *Ber.*, 1904, 37, 998.

Bistrzycki, Gyr, *Ber.*, 1904, 37, 1250.

Diphenyl-*p*-tolylcarbinol (4-Methyltriphenylcarbinol).

Octahedra from C_6H_6 . M.p. 73–4°. Sol. EtOH, Et_2O , AcOH, C_6H_6 . Decomp. on dist. Carbonate: cryst. from xylene. M.p. 193–5°. Phenylurethane: cryst. from Et_2O . M.p. 116–18°.

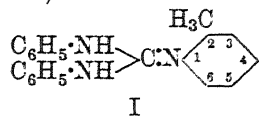
Acree, *Ber.*, 1904, 37, 992.

Bistrzycki, Gyr, *Ber.*, 1904, 37, 663.

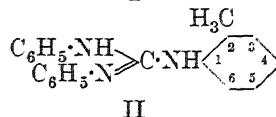
Coffey, B.P. 325,933, (*Chem. Zentr.*, 1930, II, 2694).

Dict. of Org. Comp.—II.

Diphenyl-*o*-tolylguanidine (2-Methyltriphenylguanidine)



I



II

$C_{20}H_{19}N_3$

MW, 301

Isomer I: m.p. 93°.

Isomer II: m.p. 110–5°.

Sol. Me_2CO , C_6H_6 . Spar. sol. cold EtOH, ligroin. The isomers are difficult to separate, and for the unresolved mixture the following properties are recorded:

B, HNO_3 : m.p. 172°.

B_2, H_2PtCl_6 : orange-red cryst. M.p. 210°.

Marckwald, *Ann.*, 1895, 286, 366.

Sieg, Dehn, *J. Am. Chem. Soc.*, 1940, 62, 3506.

Diphenyl-*m*-tolylguanidine (3-Methyltriphenylguanidine).

Isomer I: m.p. 101°.

Isomer II: m.p. 92°.

For the unresolved mixture the following properties are described. Needles from EtOH. M.p. 132°. Sol. hot EtOH, hot C_6H_6 . Insol. H_2O .

B, HCl : m.p. 195°.

B, HNO_3 : m.p. 179° decomp.

B_2, H_2PtCl_6 : m.p. 237°.

Alway, Viele, *Am. Chem. J.*, 1902, 28, 292.

Sieg, Dehn, *J. Am. Chem. Soc.*, 1940, 62, 3506.

Diphenyl-*p*-tolylguanidine (4-Methyltriphenylguanidine).

Isomer I: m.p. 104–5°.

Isomer II: m.p. 121°.

The properties of the unresolved mixture are described as follows. M.p. 128–9°. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Spar. sol. ligroin.

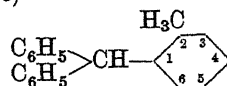
B, HCl : m.p. 221–2°.

B, HNO_3 : m.p. 196–7°.

Marckwald, *Ann.*, 1895, 286, 357.

Sieg, Dehn, *J. Am. Chem. Soc.*, 1940, 62, 3506.

Diphenyl-*o*-tolylmethane (2-Methyltriphenylmethane)



$C_{20}H_{18}$

MW, 258

Prisms from MeOH. M.p. 82–3°. Sol. Et_2O , EtOH, AcOH, $CHCl_3$, ligroin, C_6H_6 .

Bistrzycki, Gyr, *Ber.*, 1904, 37, 1249.

Diphenyl-*m*-tolylmethane (3-*Methyltriphenylmethane*).

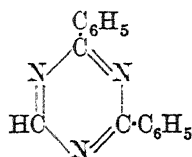
Prisms from MeOH. M.p. 62°. B.p. 354°/706 mm. Sol. Et₂O, CHCl₃, AcOH, C₆H₆, ligroin. Mod. sol. EtOH. Dil. sols. show blue fluor. Triboluminescent. Does not form a picrate.

Bistrzycki, Gyr, *Ber.*, 1904, 37, 1251.

Diphenyl-*p*-tolylmethane (4-*Methyltriphenylmethane*).

Prisms. M.p. 72°. B.p. above 360°. Sol. AcOH, C₆H₆, hot EtOH. Mod. sol. ligroin.

Bistrzycki, Gyr, *Ber.*, 1904, 37, 658.

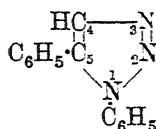
2 : 4-Diphenyl-1 : 3 : 5-triazine (*Diphenylcyanidine*)

C₁₅H₁₁N₃

MW, 233

Cryst. from EtOH. M.p. 75°. B.p. 205°/9 mm.

Krafft, Koenig, *Ber.*, 1890, 23, 2383.

1 : 5-Diphenyl-1 : 2 : 3-triazole

C₁₄H₁₁N₃

MW, 221

Leaflets from EtOH. M.p. 113-14°.

Dimroth, *Ber.*, 1902, 35, 4048.

2 : 4-Diphenyl-1 : 2 : 3-triazole.

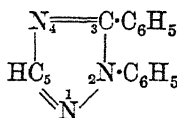
Lustrous cryst. from EtOH. M.p. 56-7°.

Ghigi, Pozzo-Balbi, *Gazz. chim. ital.*, 1941, 71, 228.

4 : 5-Diphenyl-1 : 2 : 3-triazole.

Needles from EtOH.Aq. M.p. 138-9°.

Stollé, Münch, Kind, *J. prakt. Chem.*, 1904, 70, 440.

2 : 3-Diphenyl-1 : 2 : 4-triazole

C₁₄H₁₁N₃

MW, 221

Needles from EtOH.Aq. M.p. 91°. Sol. EtOH, Et₂O, conc. HCl, hot H₂O. Spar. volatile in steam. Sublimes.

Picrate : m.p. 139°.

Cleve, *Ber.*, 1896, 29, 2673.

2 : 5-Diphenyl-1 : 2 : 4-triazole.

Needles from EtOH.Aq. M.p. 96-7°. Sol. EtOH, C₆H₆. Spar. sol. H₂O.

B,HCl : m.p. 180° decomp.

Picrate : m.p. 148°.

Einhorn, *Ann.*, 1905, 343, 230.

3 : 4-Diphenyl-1 : 2 : 4-triazole.

Cryst. from EtOH or ligroin. M.p. 142°. Sol. EtOH, CHCl₃, Me₂CO. Mod. sol. C₆H₆, ligroin. Very spar. sol. H₂O.

Picrate : m.p. 174°.

Marckwald, Bott, *Ber.*, 1896, 29, 2919.

3 : 5-Diphenyl-1 : 2 : 4-triazole.

Prisms from EtOH.Aq. M.p. 192°. B.p. about 280° decomp. Sol. EtOH, dil. alkalis. Insol. H₂O.

B,HCl : cryst. from EtOH. M.p. 203°.

Acetyl deriv. : m.p. 107-8°.

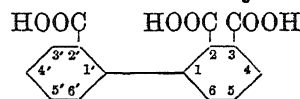
1-N-o-Tolyl : needles from EtOH. M.p. 87-8°.

1-N-p-Tolyl : needles from EtOH. M.p. 108-9°.

1-N-α-Naphthyl : m.p. 131-2°.

1-N-β-Naphthyl : cryst. from EtOH. M.p. 140-1°.

Wolchowe, *Monatsh.*, 1916, 37, 473.

Diphenyl-2 : 3 : 2'-tricarboxylic Acid

C₁₅H₁₀O₆

MW, 286

M.p. 195-6° decomp. (Re-melts at 210-12°).

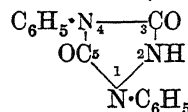
Charrier, Ghigi, *Ber.*, 1936, 69, 2242.

Diphenyl-2 : 4 : 3'-tricarboxylic Acid.

Needles from EtOH.Aq. Does not melt below 270°. Sol. Et₂O. Spar. sol. hot H₂O.

Bamberger, Hooker, *Ann.*, 1885, 229, 159.

Bucher, *J. Am. Chem. Soc.*, 1910, 32, 380.

1 : 4-Diphenylurazole (1 : 4-Diphenyl-3 : 5-diketodihydro-1 : 2 : 4-triazole)

C₁₄H₁₁O₂N₃

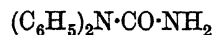
MW, 253

Leaflets from EtOH. M.p. 163°. Sol. EtOH, CHCl₃, AcOH. Spar. sol. cold C₆H₆, Et₂O. Insol. H₂O, ligroin. Strong base.

Busch, Frey, *Ber.*, 1903, 36, 1367.

sym.-Diphenylurea.

See Carbanilide.

unsym.-Diphenylurea (unsym.-*Diphenylcarbamide*)

C₁₃H₁₂ON₂

MW, 212

Needles. M.p. 189°. Dist. with caustic alkalis → diphenylamine.

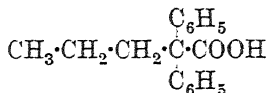
Michler, *Ber.*, 1876, 9, 396.

Ryan, O'Toole, *Proceedings Royal Society, Dublin*, 1923, 17, 149.

Diphenylurethane.

See under Diphenylcarbamic Acid.

1 : 1-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

MW, 254

M.p. 155-5°.

Benzyl ester: m.p. 68-9°.

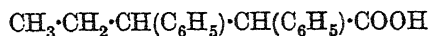
Amide: $\text{C}_{17}\text{H}_{19}\text{ON}$. MW, 253. M.p. 102°.

Anilide: m.p. 112°.

Danilov, *Chem. Abstracts*, 1924, 18, 1489.

Gilman et al., *J. Am. Chem. Soc.*, 1943, 65, 268.

1 : 2-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

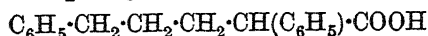
MW, 254

Exists in two stereoisomeric forms. (1) M.p. 152-3°. Sol. EtOH, Et₂O. Mod. sol. ligroin. (2) Plates from ligroin. M.p. 178°. Spar. sol. Et₂O, ligroin.

Nitrile: $\text{C}_{17}\text{H}_{17}\text{N}$. MW, 235. Two forms. (1) Cryst. from EtOH. M.p. 115°. B.p. 235-40°/20 mm. (2) B.p. 210-12°/20 mm.

Kohler, *Am. Chem. J.*, 1906, 35, 393.

1 : 4-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

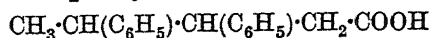
MW, 254

Needles from ligroin. M.p. 80-1°.

Nitrile: $\text{C}_{17}\text{H}_{17}\text{N}$. MW, 235. M.p. 79°.

Borsche, *Ber.*, 1912, 45, 624.

2 : 3-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

MW, 254

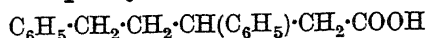
Two forms. (1) Needles from CCl₄-ligroin. M.p. 109°. Sol. EtOH, Et₂O, C₆H₆. (2) Needles from pet. ether. M.p. 132°.

Me ester: b.p. 203-4°/13 mm.

Meerwein, *J. prakt. Chem.*, 1918, 97, 269.

Spring, *J. Chem. Soc.*, 1934, 1334.

2 : 4-Diphenyl-*n*-valeric Acid



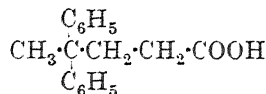
$\text{C}_{17}\text{H}_{18}\text{O}_2$

MW, 254

Needles from Me₂CO-Aq. M.p. 109-10°. Spar. sol. pet. ether.

Mannich, Butz, *Ber.*, 1929, 62, 462.

3 : 3-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

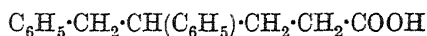
MW, 254

Cryst. from AcOH. M.p. 116-18°.

Helberger, *Ann.*, 1936, 522, 269.

Eijkman, *Chem. Weekblad.*, 1907, 4, 727.

3 : 4-Diphenyl-*n*-valeric Acid



$\text{C}_{17}\text{H}_{18}\text{O}_2$

MW, 254

Pale yellow viscous oil. B.p. 180-2°/0.1 mm. Misc. with common org. solvents except pet. ether and ligroin.

Me ester: $\text{C}_{18}\text{H}_{20}\text{O}_2$. MW, 268. B.p. 155-6°/0.1 mm.

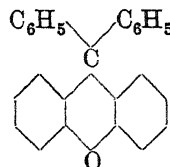
Et ester: $\text{C}_{19}\text{H}_{22}\text{O}_2$. MW, 282. B.p. 165-6°/0.07 mm.

Amide: $\text{C}_{17}\text{H}_{19}\text{ON}$. MW, 253. Cryst. from Et₂O-ligroin. M.p. 70-1° (in vac.).

Anilide: needles from ligroin. M.p. 112-3°.

Beyer, *Ber.*, 1937, 70, 1107.

5 : 5-Diphenylxanthene



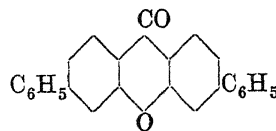
$\text{C}_{25}\text{H}_{18}\text{O}$

MW, 334

M.p. 200°. Sol. C₆H₆, Et₂O. Spar. sol. EtOH, boiling AcOH.

Ullmann, Engi, *Ber.*, 1904, 37, 2369.

2 : 8-Diphenylxanthone



$\text{C}_{25}\text{H}_{16}\text{O}_2$

MW, 348

Needles from MeOH-C₆H₆. M.p. 194°.

Schoeppe, Truesdail, *J. Am. Chem. Soc.*, 1937, 59, 376.

Diphenylxylene.

See Dibenzylbenzene.

Diphenylcarbinol.

See Hydroxymethyldiphenyl.

Diphosgene.

See Trichloromethyl chloroformate.

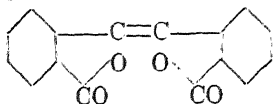
Dipthalide Ether.

See under *o*-Aldehydobenzoic Acid.

Dipthaloylstilbene.

See Anthraflavone.

Diphthalyl



$C_{16}H_{10}O_4$ MW, 264

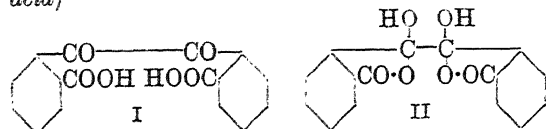
Needles from AcOH. M.p. 331° ($333-5^\circ$). Mod. sol. hot AcOH. Spar. sol. EtOH, Et₂O, CHCl₃, CS₂, toluene. Insol. H₂O.

Ruggli, Meyer, *Helv. Chim. Acta*, 1922, 5, 43.

Graebe, Trümper, *Ber.*, 1898, 31, 371.

Dischendorfer, *Monatsh.*, 1928, 50, 102.

Diphthalic Acid (Benzil-2 : 2'-dicarboxylic acid)



$C_{16}H_{10}O_6$ MW, 298

The yellow derivs. have the structure II, whilst the colourless derivs. have the structure I.

Cryst. from PhNO₂. M.p. $277^\circ \rightarrow$ phthalic anhydride + diphthalyl. Spar. sol. ord. org. solvents. Insol. H₂O.

Di-Me ester: $C_{18}H_{14}O_6$. MW, 326. (a) M.p. 276° . (b) Yellow cryst. M.p. 192° .

Di-Et ester: $C_{20}H_{18}O_6$. MW, 354. (a) M.p. 174° . (b) Yellow cryst. M.p. 155° .

Dichloride: $C_{16}H_8O_4Cl_2$. MW, 335. (a) M.p. $250-3^\circ$. (b) Yellow cryst. M.p. $194-6^\circ$.

Anhydride: $C_{16}H_8O_5$. MW, 280. M.p. 164° .

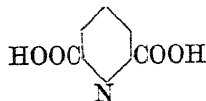
Di-phenylhydrazone: m.p. 175° decomp.

Dischendorfer, *Monatsh.*, 1928, 50, 100.

Fieser, Peters, *J. Am. Chem. Soc.*, 1932, 54, 3748.

Brand, Loehr, *J. prakt. Chem.*, 1925, 109, 353 (*Bibl.*).

Dipicolinic Acid (Pyridine-2 : 6-dicarboxylic acid)



$C_7H_5O_4N$ MW, 167

Needles + $1\frac{1}{2}H_2O$. from cold H₂O. M.p. anhyd. 252° decomp. (228°). Very spar. sol. EtOH. Decomp. above m.p. to pyridine and CO₂.

Di-Me ester: $C_9H_9O_4N$. MW, 195. M.p. 121° .

Di-Et ester: $C_{11}H_{13}O_4N$. MW, 223. M.p. 28° .

Di-phenyl ester: $C_{19}H_{13}O_4N$. MW, 319. Leaflets from EtOH. M.p. 179° .

Dichloride: $C_7H_3O_2NCl_2$. MW, 204. M.p. 61° . B.p. 284° .

Diamide: $C_7H_7O_2N_3$. MW, 165. Cryst. powder. M.p. 302° . Spar. sol. EtOH. Insol. H₂O, Et₂O.

Dinitrile: $C_7H_3N_3$. MW, 129. M.p. 123° .

Di-hydrazide: m.p. 280° .

Diazide: prisms from Et₂O. M.p. $110-11^\circ$ (explodes).

Meyer, *Monatsh.*, 1903, 24, 205.

Henze, *Ber.*, 1934, 67, 751.

Dipicrylamine.

See Hexanitrodiphenylamine.

Dipicrylhydrazine.

See Hexanitrohydrazobenzene.

Dipicryl selenide.

See 2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenyl selenide.

Dipicryl sulphide.

See 2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodiphenyl sulphide.

Dipicrylurea.

See 2 : 4 : 6 : 2' : 4' : 6'-Hexanitrocarbanilide.

Dipinene

$C_{20}H_{32}$ MW, 272

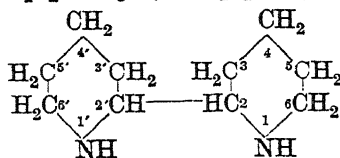
Dimer of α - and β -pinenes. B.p. $179-81^\circ/13$ mm., $127-8^\circ/1$ mm. D_{25}^{25} 0.9316. n_D^{25} 1.5149.

Carter, Smith, Read, *J. Soc. Chem. Ind.*, 1925, 44, 543r.

Dulou, *Chimie et Industrie*, 1932, 27 (*Special No.*), 651 (*Review*).

Ritter, Sharefkin, *J. Am. Chem. Soc.*, 1940, 62, 1508.

2 : 2'-Dipiperidyl ($\alpha\alpha$ -Dipiperidyl)



$C_{10}H_{20}N_2$ MW, 168

B.p. 259° .

$B_2C_6H_5NCS$: m.p. 178° .

Dinitroso: m.p. 159° .

Picrate: m.p. 120° .

Smith, *J. Am. Chem. Soc.*, 1924, 46, 1716; 1928, 50, 1936.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 28.

2 : 3'-Dipiperidyl ($\alpha\beta$ -Dipiperidyl).

dl-

M.p. $68-9^\circ$. B.p. $269-70^\circ$. Sol. H₂O, EtOH. Hygroscopic. Forms a very stable hydrochloride, sol. H₂O.

B_2HAuCl_4 : yellow cryst. M.p. $211-12^\circ$.

$B_2H_2PtCl_6$: orange yellow cryst. M.p. 238° .

Dinitroso: m.p. 88° .

Picrate: m.p. 225° .

l-

Needles from Et₂O. M.p. $66-8^\circ$. B.p. $113-4^\circ/5$ mm.

Chloroaurate: m.p. $211-2^\circ$.

$B_2H_2PtCl_6$: orange yellow cryst. M.p. $231-2^\circ$ decomp.

Dibenzoyl: prisms from pet. ether. M.p. 149–50°. $[\alpha]_D^{20} = -180^\circ$ in EtOH.

Dinitroso: needles from H₂O. M.p. 112–3°.

Picrate: cryst. from H₂O. M.p. 214–5° decomp.

Smith, *J. Am. Chem. Soc.*, 1928, 50, 1936; 1931, 53, 280.

Orechoff, Brodsky, *Ber.*, 1933, 66, 467.

3 : 3'-Dipiperidyl (33-Dipiperidyl).

M.p. 105°. B.p. 282°.

*B*₂*C*₆*H*₅*NCS*: m.p. 200°.

Dinitroso: m.p. 102°.

Smith, *J. Am. Chem. Soc.*, 1931, 53, 280.

3 : 4'-Dipiperidyl (3γ-Dipiperidyl).

M.p. 159–60°. B.p. 270°.

*B*₂*C*₆*H*₅*NCS*: m.p. 202°.

Dinitroso: m.p. 149°.

Picrate: m.p. 212°.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 28.

Smith, *J. Am. Chem. Soc.*, 1931, 53, 280.

4 : 4'-Dipiperidyl (γγ-Dipiperidyl).

Needles. M.p. 172°. Sol. H₂O, EtOH, Et₂O.

*B*₂*H*₄*AuCl*₄: decomp. above 220°.

*B*₂*H*₄*PtCl*₆: blackens at 195°.

*B*₂*C*₆*H*₅*NCS*: m.p. 225–9°.

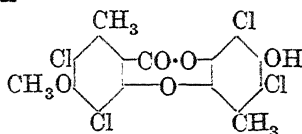
*HgCl*₂ add. comp.: m.p. 226–7° decomp.

Dinitroso: m.p. 149–50°.

Smith, *J. Am. Chem. Soc.*, 1924, 46, 1716;

1928, 50, 1936.

Diploicin



Suggested structure

*C*₁₆*H*₁₀*O*₅*Cl*₄ MW, 424

Found in lichen *Buellia canescens* (*Diploicia*, Dicks). M.p. 232° (225°). Insol. Et₂O, EtOH, AcOH, C₆H₆.

Acetyl: m.p. 234–5°.

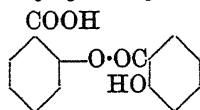
Me ether: cryst. from C₆H₆. M.p. 220°.

Zopf, *Ann.*, 1904, 336, 58.

Nolan *et al.*, *Chem. Abstracts*, 1934, 28, 6175; 1936, 30, 7109.

Nolan *et al.*, *Chemistry and Industry*, 1935, 577.

Diplosal (Salicyloyl-salicylic acid)



*C*₁₄*H*₁₀*O*₅

MW, 258

Cryst. from CHCl₃. M.p. 148–9°.

Acetyl: "Acesal." M.p. 161–2° (152°).

Benzoyl: m.p. 152°.

Me ester: *C*₁₅*H*₁₂*O*₅. MW, 272. M.p. 88°.

Et ester: *C*₁₆*H*₁₄*O*₅. MW, 286. M.p. 59°.

Chloride: *C*₁₄*H*₉*O*₄*Cl*. MW, 276.5. M.p. 99°. *Acetyl*: m.p. 104–5°.

Amide: *C*₁₄*H*₁₁*O*₄*N*. MW, 257. M.p. 185–9°. *Acetyl*: m.p. 153–9°.

Anhydride: see α-Disalicylide.

Anilide: m.p. 160–5°.

Anschütz, *Ber.*, 1919, 52, 1885, 1893.

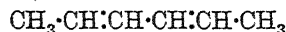
Anschütz, Riepenkröger, *Ann.*, 1924, 439, 1.

Schroeter, *Ber.*, 1919, 52, 2226–8.

Dipropargyl.

See 1 : 5-Hexadi-yne.

Dipropenyl (2 : 4-Hexadiene, 1 : 4-dimethyl-1 : 3-butadiene)



*C*₆*H*₁₀

MW, 82

B.p. 77.8–81.2°. *D*₄²⁰ 0.7156. *n*_D²⁰ 1.4469. Readily polymerises.

Pace, *Chem. Abstracts*, 1927, 21, 1964.

Farmer, Warren, *J. Chem. Soc.*, 1931, 3233.

Cortese, *Rec. trav. chim.*, 1929, 48, 567.

Adams, Geissman, *J. Am. Chem. Soc.*, 1939, 61, 2086.

Dipropin.

See under Propionic Acid.

Dipropionamide



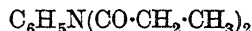
*C*₆*H*₁₁*O*₂*N*

MW, 129

Needles from Et₂O. M.p. 154°. Part. sublimates at 100°. B.p. 210–20°. Sol. EtOH. Spar. sol. H₂O, Et₂O, C₆H₆, pet. ether. Insol. ligroin. Heat of comb. 809.2 Cal.

Brunner, Grüner, Benes, *Monatsh.*, 1927, 48, 123.

Dipropionanilide (Dipropionylaniline)



*C*₁₂*H*₁₅*O*₂*N*

MW, 205

Cryst. from pet. ether. M.p. 44°. B.p. 179°, 30 mm., 164°/16 mm., 155°/11 mm. *k* = 5.0 × 10⁻⁹ at 28°.

Derick, Bornmann, *J. Am. Chem. Soc.*, 1913, 35, 1281.

Dipropionitrile (Propiodinitrile, 2-imino-1-methyl-n-valeronitrile)



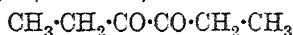
*C*₆*H*₁₀*N*₂

MW, 110

M.p. 47–8°. B.p. 257–8°. Sol. EtOH, Et₂O. Spar. sol. H₂O. At 330° → propionitrile. Na in EtOH → propylamine. Gradually decomp. by hot H₂O.

v. Meyer, *J. prakt. Chem.*, 1888, 38, 338.

Dipropionyl (3 : 4-Diketohexane, hexandione-3 : 4, diethyl α 3-diketone)



$\text{C}_6\text{H}_{10}\text{O}_2$ MW, 114
F.p. -10° . B.p. 130° , $49^\circ/13$ mm., $32^\circ/10$ mm. D_4^{20} 0.941. n_D^{20} 1.4130.

Dioxime : see Diethylglyoxime.

Semicarbazone : m.p. 270° decomp.

Oxazone : m.p. 161° .

2 : 4-Dinitrophenylhydrazone : m.p. $145-5.5^\circ$.

Urion, *Compt. rend.*, 1930, 191, 263;

Ann. chim., 1934, 1, 54.

Dipropionylaniline.

See Dipropionanilide.

Dipropionylethane.

See Octandione-3 : 6.

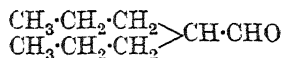
Dipropionylmethane.

See Heptandione-3 : 5.

Dipropionyl peroxide.

See under Perpropionic Acid.

Di-n-propylacetaldehyde (1-Propylvaleraldehyde)



$\text{C}_8\text{H}_{16}\text{O}$ MW, 128

B.p. $159-61^\circ$. D_4^{25} 0.8347. n_D^{25} 1.4142.

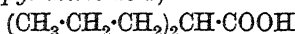
Oxime : b.p. $126^\circ/47$ mm.

Semicarbazone : m.p. $100-101^\circ$.

Béhal, Sommelet, *Bull. soc. chim.*, 1904, 31, 306.

Sou, *Chem. Abstracts*, 1936, 30, 4463.

Dipropylacetic Acid (Heptane-4-carboxylic acid, 1-propylvaleric acid)



$\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

B.p. $219-20^\circ$ ($221-2^\circ$). D_4^{20} 0.9215. $k = 2.85 \times 10^{-3}$ at 25° . Heat of comb. C_v 1151.5 Cal.

Thallium salt : needles from Me_2CO . M.p. $122-3^\circ$.

Et ester : $\text{C}_{10}\text{H}_{20}\text{O}_2$. MW, 172. B.p. 183° .

Amide : $\text{C}_8\text{H}_{17}\text{ON}$. MW, 143. M.p. $123-4^\circ$. Sol. EtOH.

Nitrile : 4-cyanoheptane. $\text{C}_8\text{H}_{15}\text{N}$. MW, 125. B.p. $183-4^\circ$.

p-Phenetidine : cryst. from C_6H_6 . M.p. 147° .

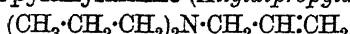
Kalischew, *Chem. Zentr.*, 1914, II, 1261.

Mishin, Karpov, *Chem. Abstracts*, 1936, 30, 6261.

Di-n-propylacetylene.

See 4-Octyne.

Dipropylallylamine (Allyldipropylamine)



$\text{C}_9\text{H}_{19}\text{N}$ MW, 141

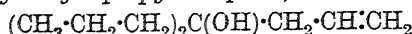
B.p. $145-50^\circ$ ($150-2^\circ$).

$\text{B}, \text{H}, \text{AuCl}_4, 2\text{H}_2\text{O}$: m.p. $88-9^\circ$ decomp.

$\text{B}_2, \text{H}_2, \text{PtCl}_6$: m.p. $152-3^\circ$.

Menschutkin, *Chem. Zentr.*, 1899, I, 1067.

Dipropylallylcarbinol (4-Propyl-1-heptenol-4, 4-hydroxy-4-propyl-1-heptene)



$\text{C}_{10}\text{H}_{20}\text{O}$ MW, 156

B.p. $192^\circ/770$ mm. D_4^{20} 0.8607. Heat of comb. C_p 1533.2 Cal.

Saytzeff, *Ann.*, 1879, 196, 110.

Dipropylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

M.p. -63° . B.p. 110° . D_4^{20} 0.7384. n_D^{20} 1.40455. Forms hydrates with $\frac{1}{2}\text{H}_2\text{O}$ and $1\text{H}_2\text{O}$. $k = 9.49 \times 10^{-4}$ at 25° .

B, HCl : m.p. $269-71^\circ$.

B, HBr : m.p. 271° .

B, HI : m.p. 229° decomp.

B, HAuBr_4 : m.p. 119° .

Picrate : m.p. 75° .

Skita, Keil, *Monatsh.*, 1929, 53-54, 759.

Dipropylaminoethyl Alcohol.

See N-[2-Hydroxyethyl]-dipropylamine.

Dipropylaniline



$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

B.p. $245-6^\circ$ ($238-41^\circ$), $127^\circ/10$ mm. D^{20} 0.9104.

Methiodide : m.p. 156° .

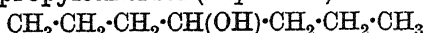
Slotta, Franke, *Ber.*, 1930, 63, 687.

Voss, Blanke, *Ann.*, 1931, 485, 280.

Emerson, Uraneck, *J. Am. Chem. Soc.*, 1941, 63, 749.

Billman, Radike, Mundy, *J. Am. Chem. Soc.*, 1942, 64, 2977.

Dipropylcarbinol (Heptanol-4)



$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

F.p. -41.5° . B.p. 154° , $63.8^\circ/16$ mm. D_4^{20} 0.8183. n_D^{20} 1.4205.

Benzoyl : b.p. $146-7^\circ/14$ mm.

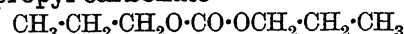
Acid phthaloyl : m.p. 60° .

Dillon, Lucas, *J. Am. Chem. Soc.*, 1928, 50, 1712 (*Bibl.*).

Lund, *Ber.*, 1937, 70, 1523.

Tuot, *Compt. rend.*, 1936, 202, 1339.

Dipropyl carbonate



$\text{C}_7\text{H}_{14}\text{O}_3$ MW, 146

B.p. 168.2° . D^{17} 0.949.

Röse, *Ann.*, 1880, 205, 231.

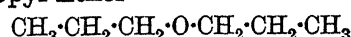
Dipropylcyanoacetic Acid.

See under Dipropylmalonic Acid.

Dipropyl Diketone.

See Dibutyryl.

Dipropyl Ether



$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

M.p. — 122°. B.p. 91°. D_4^{20} 0.7360.

Senderens, *Compt. rend.*, 1924, 179, 1015.

Wuyts, Lacourt, *Bull. soc. chim. Belg.*, 1930, 39, 157.

N. V. de Bataafsche Petroleum Maatschappij, B.P. 332,756, (*Chem. Abstracts*, 1931, 25, 302).

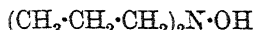
Dipropylethylene Glycol.

See Octandiol-4 : 5.

Dipropylglycollic Acid.

See 1-Hydroxydipropylacetic Acid.

N-Dipropylhydroxylamine



$\text{C}_6\text{H}_{15}\text{ON}$ MW, 117

Cryst. M.p. 29–29.5°. B.p. 153–6°, 72–4°/30 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow$ dipropylamine. Reduces AgNO₃ and NH₃.CuSO₄.

B.HCl : m.p. 88–9°.

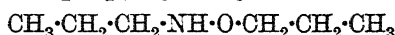
B.HBr : m.p. 74–5°.

Oxalate : cryst. from MeOH–Et₂O. M.p. 139°.

Cialtikian, *Chem. Abstracts*, 1930, 23, 4692.

Dunstan, Goulding, *J. Chem. Soc.*, 1899, 75, 803, 1010.

O : N-Dipropylhydroxylamine



$\text{C}_6\text{H}_{15}\text{ON}$ MW, 117

B.p. 85–6°. D_4^{25} 0.8141.

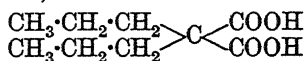
Hydrochloride : m.p. 146–6°.

Hecker, *Am. Chem. J.*, 1913, 50, 459.

Dipropyl Ketone.

See Butyrone.

Dipropylmalonic Acid (*Heptane-4 : 4-dicarboxylic acid*)



$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Cryst. from CHCl₃. M.p. 161° decomp. k (first) = 8.58×10^{-5} ; (second) = 3.1×10^{-6} at 25°. Heat of comb. C_p 1146.1 Cal.

Et ester : $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. M.p. 49°. B.p. 156°/15 mm. Amide : $\text{C}_{11}\text{H}_{21}\text{O}_3\text{N}$. MW, 215. M.p. 92°. Nitrile : $\text{C}_{11}\text{H}_{19}\text{O}_2\text{N}$. MW, 197. B.p. 241–2°, 129–32°/21–3 mm.

Di-Et ester : $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 248–9°, 125–6°/12 mm.

Dichloride : $\text{C}_9\text{H}_{14}\text{O}_2\text{Cl}_2$. MW, 225. B.p. 221–3°.

Diamide : $\text{C}_9\text{H}_{18}\text{O}_2\text{N}_2$. MW, 186. Needles. M.p. 214°. Mod. sol. hot H₂O.

Mononitrile : dipropylcyanoacetic acid. $\text{C}_9\text{H}_{15}\text{O}_2\text{N}$. MW, 169. M.p. 49–50° (41°), anhyd. 33–4°. B.p. 135–40°/0.2 mm. Amide : dipropylcyanoacetamide. $\text{C}_9\text{H}_{16}\text{ON}_2$. MW, 168. M.p. 153°.

Dinitrile : 4 : 4-dicyanoheptane. $\text{C}_9\text{H}_{14}\text{N}_2$. MW, 150. M.p. 46–7°. B.p. 223–4°. Sol. EtOH, Et₂O.

Dianilide : cryst. from MeOH. M.p. 168–8–5°.

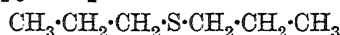
Fürth, *Monatsh.*, 1888, 9, 318.

See also Marshall, *Rec. trav. chim.*, 1932, 51, 233.

Dipropylphenylcarbinol.

See 4-Phenylheptanol-4.

Dipropyl sulphide



$\text{C}_6\text{H}_{14}\text{S}$ MW, 118

F.p. — 101.9°. B.p. 141–2°. D_4^{20} 0.8358. n_D^{20} 1.4481. Forms many well-defined, stable, molecular compounds with platinum salts.

Bost, Conn, *Organic Syntheses*, 1935, XV, 72.

Dipropyl sulphone



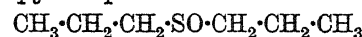
$\text{C}_6\text{H}_{14}\text{O}_2\text{S}$ MW, 150

M.p. 29–30°.

Fenton, Ingold, *J. Chem. Soc.*, 1929, 2341.

Wood, Travis, *J. Am. Chem. Soc.*, 1928, 50, 1226.

Dipropyl sulphoxide



$\text{C}_6\text{H}_{14}\text{OS}$ MW, 134

Needles. M.p. 14.5–15°. B.p. 82°/15 mm. D_4^{16} 1.026. n_D^{16} 1.426.

Levaillant, *Compt. rend.*, 1929, 188, 261.

Winssinger, *Bull. soc. chim.*, 1887, 48, 110.

sym.-Dipropylthiourea



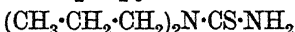
$\text{C}_7\text{H}_{16}\text{N}_2\text{S}$ MW, 160

Leaflets from H₂O. M.p. 71° (68°). Sol. Et₂O.

Chancel, *Compt. rend.*, 1893, 116, 62.

Hecht, *Ber.*, 1890, 23, 285.

unsym.-Dipropylthiourea



$\text{C}_7\text{H}_{16}\text{N}_2\text{S}$ MW, 160

M.p. 67°.

Wallach, *Ber.*, 1899, 32, 1874.

sym.-Dipropylurea

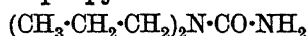


$\text{C}_7\text{H}_{16}\text{ON}_2$ MW, 144

Cryst. from hot H₂O. M.p. 105°. B.p. 255°. Sol. EtOH, Et₂O.

Chancel, *Bull. soc. chim.*, 1893, 9, 104.

unsym.-Dipropylurea



$\text{C}_7\text{H}_{16}\text{ON}_2$ MW, 144

Needles from pet. ether. M.p. 76°. Sol. EtOH, Et₂O.

Nitrate : m.p. 165°.

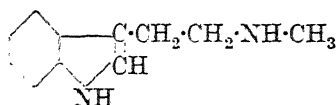
Picrate : m.p. 136°.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1798.

Dipropynylcarbinol.

See 2 : 5-Heptadienol-4.

Dipterine (N-Methyltryptamine, 3-[ω-methyl-aminoethyl]-indole)



C₁₁H₁₄N₂

MW, 174

Alkaloid present in *Girgensehnia diptera*, Bge. and *Arthropytum leptocladum*, M. Pop. Cryst. M.p. 90°.

B₂HCl : m.p. 180°.

B₂H₂PtCl₆ : m.p. 167-9°.

Benzoyl : m.p. 144-5°.

m-Chlorobenzoyl : prisms. M.p. 153°.

p-Nitrobenzoyl : golden-yellow plates. M.p. 134°.

Phenylcarbamyl deriv. : m.p. 153°.

Picrate : m.p. 191°.

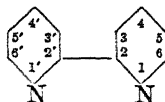
Picrolonate : m.p. 242-3°.

Manske, *Chem. Abstracts*, 1932, 26, 725.

Yurashevskii, Stepanov, *J. Gen. Chem. U.S.S.R.*, 1939, 9, 2203.

Yurashevskii, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 1781; 1941, 11, 157.

2 : 2'-Dipyridyl



C₁₀H₈N₂

MW, 156

Prisms from pet. ether. M.p. 69.5°. B.p. 272.5°. Spar. sol. H₂O. Ferrous salts → red col. Used in analysis of heavy metals.

Picrate : m.p. 157-8.5°.

Smith, *J. Am. Chem. Soc.*, 1931, 53, 280; 1930, 52, 403.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 26 (Bibl.).

Wibaut, Overhoff, *Rec. trav. chim.*, 1928, 47, 761.

2 : 3'-Dipyridyl.

B.p. 287-9° (298°). Sol. Et₂O. Insol. H₂O.

Picrate : m.p. 149.5° (153-4°).

Dipicrate : m.p. 165-8°.

Orechoff, Menschikoff, *Ber.*, 1932, 65, 234.

Smith, *J. Am. Chem. Soc.*, 1931, 53, 280; 1930, 52, 402.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 26.

2 : 4'-Dipyridyl.

B.p. 280-2°. Insol. H₂O.

Picrate : m.p. 208°.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 27.

3 : 3'-Dipyridyl.

M.p. 68°. B.p. 291-2° (300-1°), 190-2°/25 mm. Misc. with H₂O and EtOH in all proportions. Prac. insol. Et₂O. D²⁰ (liq.) 1.1635, D⁵⁰ 1.1493. KMnO₄(H₂SO₄) → nicotinic acid. Na + amyl alcohol → 3 : 3'-dipiperidyl.

Picrate : m.p. 232° (230°).

Smith, *J. Am. Chem. Soc.*, 1930, 52, 400.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 26.

Kabachnik, Reson, *Chem. Abstracts*, 1937, 31, 2608.

3 : 4'-Dipyridyl.

Plates from pet. ether. M.p. 62°. B.p. 297°. Sol. cold H₂O, less sol. hot. KMnO₄ → nicotinic and isonicotinic acids.

Picrate : sinters at 210°. M.p. 215°.

Smith, *J. Am. Chem. Soc.*, 1931, 53, 280; 1924, 46, 417.

Morgan, Burstall, *J. Chem. Soc.*, 1932, 26.

4 : 4'-Dipyridyl.

Cryst. + 2H₂O from H₂O, m.p. 73° : m.p. anhyd. 114° (171-2°). B.p. 305° (293°/743 mm.). Sol. EtOH, CHCl₃, C₆H₆, hot H₂O. Mod. sol. Et₂O. Sublimes. KMnO₄ → isonicotinic acid. Na + EtOH → 4 : 4'-dipiperidyl.

B₂HNO₃ : m.p. 256°.

Dipicrate : m.p. 286° corr.

Di-nitroso deriv. : m.p. 150.6-151.2° corr.

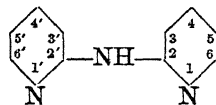
Smith, *J. Am. Chem. Soc.*, 1931, 53, 279; 1924, 46, 417.

Dimroth, Frister, *Ber.*, 1922, 55, 3694.

Dimroth, Heene, *Ber.*, 1921, 54, 2939.

Arens, Wibaut, *Rec. trav. chim.*, 1942, 61, 452.

2 : 2'-Dipyridylamine



C₁₀H₉N₃

MW, 171

Cryst. from hot C₆H₆. M.p. 84° : after solidification re-melts at 95°. B.p. 307-8°, 176-8°/13 mm.

B₂HCl, 3H₂O : needles. M.p. 115°.

Sulphate : needles. M.p. 248°.

B₂HAuCl₄ : yellow needles. M.p. 245°.

B₂H₂PtCl₆ : m.p. 160° decomp.

Picrate : m.p. 227-8°.

Wibaut, Dingemanse, *Rec. trav. chim.*, 1923, 42, 243.

Kahlbaum, D.R.P. 479,282, (*Chem. Abstracts*, 1929, 23, 4778).

Tschitschibabin, Preobrashensky, *Ber.*, 1928, 61, 199 (Bibl.).

4 : 4'-Dipyridylamine.

Needles from hot H_2O . M.p. 273-5°. Sol. hot EtOH. Spar. sol. Me_2CO . Insol. Et_2O , C_6H_6 , $CHCl_3$, ligroin.

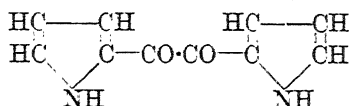
$B, 2HCl$: m.p. above 300°.

Nitrate : m.p. 226° decomp.

$B, H_2PtCl_6, 3H_2O$: decomp. above 280°.

Picrate : m.p. 235° decomp. (170-4°).

Koenigs, Jung, *J. prakt. Chem.*, 1933, 137, 145.

2 : 2'-Dipyrroyl (2 : 2'-Dipyrrolyl $\alpha\beta$ -diketone)

$C_{10}H_8O_2N_2$ MW, 188

Pale yellow cryst. M.p. 199.5-200°. *o*-Phenylenediamine \rightarrow dipyrrolylquinoxaline, m.p. 158°.

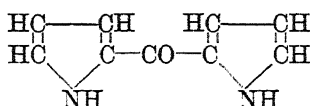
Monoxime : yellow cryst. M.p. 147°.

Di-phenylhydrazone : reddish needles. M.p. 146°.

Oddo, *Gazz. chim. ital.*, 1911, 41, i, 248.

2 : 2'-Dipyrrolyl Diketone.

See 2 : 2'-Dipyrroyl.

2 : 2'-Dipyrrolyl Ketone (Pyrroline)

$C_9H_8ON_2$ MW, 160

Prisms from MeOH. M.p. 160-1° (156-7°).

Hydrazone : m.p. 115-7°.

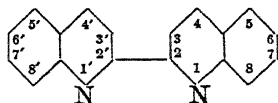
Oddo, *Gazz. chim. ital.*, 1920, 50, ii, 267.

Hess, Anselm, *Ber.*, 1921, 54, 2317.

Tschelintzev, Skvortzov, *Chem. Abstracts*, 1915, 9, 1472.

Dipyrrolylquinoxaline.

See under 2 : 2'-Dipyrroyl.

2 : 2'-Diquinolyl

$C_{18}H_{12}N_2$ MW, 256

Leaflets. M.p. 196°.

Picrate : yellow needles. M.p. 210° (215-6°).

Smirnoff, *Helv. Chim. Acta*, 1921, 4, 807.

Wibaut, Willink, Nieuwenhuis, *Rec. trav. chim.*, 1935, 54, 804.

2 : 3'-Diquinolyl.

Yellow plates or needles from C_6H_6 . M.p. 176-7° (175°). B.p. above 400°. Sol. hot EtOH. Mod. sol. Et_2O , hot $CHCl_3$, hot C_6H_6 . Insol. H_2O .

$B, HAuCl_4$: pale yellow needles. M.p. 248°.

B, H_2PtCl_6, H_2O : reddish yellow needles. M.p. 278°.

Methiodide : m.p. 286° decomp.

Mills, Ordish, *J. Chem. Soc.*, 1928, 86.

Koller, Ruppertsberg, *Monatsh.*, 1931, 58, 241.

2 : 5'-Diquinolyl.

Yellow cryst. from Et_2O -ligroin. M.p. 115°. Spar. sol. ligroin.

Miller, Kinkelin, *Ber.*, 1885, 18, 1913.

Ueda, *J. Pharm. Soc. Japan*, 1937, 57, 212.

2 : 6'-Diquinolyl.

Plates from EtOH. M.p. 144°. Sol. EtOH, C_6H_6 . Spar. sol. Et_2O .

Methiodide : m.p. 231-2° decomp.

Brezina, *Monatsh.*, 1887, 8, 141.

Weidel, *Monatsh.*, *ibid.*, 123, 139.

2 : 7'-Diquinolyl.

Plates from EtOH. M.p. 159-60°. Spar. sol. Et_2O , C_6H_6 .

Methiodide : yellow needles from MeOH.Aq. M.p. 263°.

Picrate : m.p. 240°.

Miller, Kinkelin, *Ber.*, 1885, 18, 1911.

Ueda, *J. Pharm. Soc. Japan*, 1937, 57, 212.

3 : 3'-Diquinolyl.

M.p. 271°.

$B, 2HCl, 4H_2O$: m.p. 301°.

$B, HAuCl_4$: m.p. 280-2°.

B, H_2PtCl_6 : m.p. above 300°.

$B, H_2Cr_2O_7$: m.p. 205-6°.

Dipicrate : m.p. above 300°.

Reich, Serpek, *Helv. Chim. Acta*, 1920, 3, 143.

Uyeda, *Chem. Abstracts*, 1931, 25, 5427.

3 : 4'-Diquinolyl.

Amorphous powder from pet. ether. M.p. 83-4°.

Picrate : m.p. 244°.

Di-ethiodide : m.p. 198°.

Mills, Ordish, *J. Chem. Soc.*, 1928, 85.

4 : 4'-Diquinolyl.

Prisms from pet. ether. M.p. 166°. Sol. EtOH, C_6H_6 .

Clemon, Perkin, *J. Chem. Soc.*, 1924, 125, 1622.

4 : 6'-Diquinolyl.

Cryst. from C_6H_6 . M.p. 122°. Insol. Et_2O .

Picrate : m.p. 264°.

Koenigs, Nef, *Ber.*, 1887, 20, 632.

5 : 5'-Diquinolyl.

Needles. M.p. 175°. Sol. EtOH. Spar. sol. Et_2O .

B, HCl : m.p. 292°.

Picrate : m.p. above 300°.

Methiodide : m.p. 272°.

Ueda, *J. Pharm. Soc. Japan*, 1937, 57, 212.

6 : 6'-Diquinolyl.

Leaflets from EtOH. M.p. 181° (178°). Sol. C_6H_6 . Mod. sol. EtOH, Et_2O . Spar. sol. hot H_2O .

Di-methiodide : m.p. above 290°.

Di-ethiodide : m.p. 270° decomp.

Ostermayer, Henrichsen, *Ber.*, 1884, 17, 2444.

Fischer, *Monatsh.*, 1884, 5, 418.

Ullmann, Gilli, *Ann.*, 1904, 332, 80.

6 : 8'-Diquinolyl.

Leaflets from EtOH. M.p. 148°. Spar. sol. Et_2O .

Picrate : yellow needles. M.p. 268° decomp.

Monomethiodide : yellow needles. M.p. 126°.

Fischer, *Monatsh.*, 1885, 6, 548.

7 : 7'-Diquinolyl.

Needles. M.p. 171-2°. Sol. EtOH. Spar. sol. Et_2O .

Picrate : m.p. 300°.

Monomethiodide : decomp. at 310°.

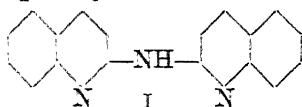
Ceda, *J. Pharm. Soc. Japan*, 1937, 57, 212.

8 : 8'-Diquinolyl.

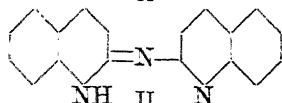
Plates or leaflets. M.p. 205-7°. Sol. $CHCl_3$. Mod. sol. hot EtOH, Me_2CO , CCl_4 , C_6H_6 .

$B,2HAuCl_4$: m.p. 285° decomp.

Niementowski, Seifert, *Ber.*, 1905, 38, 764.

2 : 2'-Diquinolylamine

or



$C_{18}H_{13}N_3$ MW, 271

(I) Pale yellow needles from hot EtOH. M.p. 151-4°.

(II) Orange cryst. from hot EtOH. M.p. 170°.

N-Acetyl deriv. : m.p. 192-3°.

B,HCl : yellow prisms. M.p. above 305°.

$B,HAuCl_4$: orange needles. M.p. 306°.

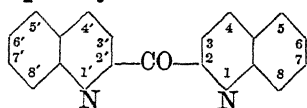
N-Nitroso deriv. : decomp. at 238°.

Picrate : m.p. 286°.

Dipicrate : m.p. 297°.

Diepolder, Deuerlein, *J. prakt. Chem.*, 1923, 106, 55.

Hamer, *J. Chem. Soc.*, 1924, 125, 1353.

2 : 2'-Diquinolyl Ketone

$C_{19}H_{12}ON_2$

MW, 284

Prisms from EtOH. M.p. 164°.

Oxime : prisms. M.p. 201°.

Phenylhydrazone : m.p. 199°.

Anil : m.p. 161°.

Picrate : m.p. 179°.

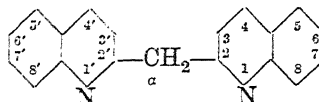
Scheibe, Schmidt, *Ber.*, 1922, 55, 3159.

6 : 6'-Diquinolyl Ketone.

Needles from EtOH.Aq. M.p. 174°.

$B,2HCl$: needles. Does not melt below 200°.

Noelting, Schwartz, *Ber.*, 1891, 24, 1609.

2 : 2'-Diquinolylmethane (Di- α -quinolylmethane)

$C_{19}H_{14}N_2$ MW, 270

(a) Red cryst. M.p. 103°. (b) Colourless cryst. M.p. 102-3°. Sol. ord. org. solvents to colourlessols. becoming yellowish red on warming.

Picrate : red needles. Decomp. at 239°.

Dipicrate : m.p. 210° decomp.

Methiodide : decomp. about 205°.

Scheibe, *Ber.*, 1921, 54, 790.

Scheibe, Schmidt, *Ber.*, 1922, 55, 3159.

6 : 6'-Diquinolylmethane.

Needles from EtOH. M.p. 160°.

Picrate : yellow needles from EtOH. M.p. 195-7°.

Borsche, Kienitz, *Ber.*, 1910, 43, 2334.

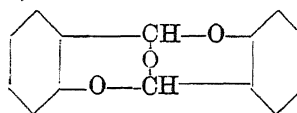
Diresorcinol.

See 3 : 5 : 3' : 5'-Tetrahydroxydiphenyl.

Disacryl.

See under Acrolein.

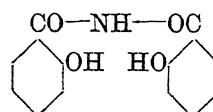
Disalicylaldehyde (3 : 4 : 7 : 8-Dibenz-2 : 6 : 9-bis-dioxan)



$C_{14}H_{10}O_3$ MW, 226

Needles from EtOH. M.p. 130°. Sublimes.

Adams, Fogler, Kreger, *J. Am. Chem. Soc.*, 1922, 44, 1126 (*Bibl.*).

Disalicylamide

$C_{14}H_{11}O_4N$ MW, 257

Yellow needles from EtOH. M.p. 203° (201-2°). Mod. sol. hot EtOH, hot AcOH. Spar. sol. Et_2O . Insol. H_2O . Sol. alkalis and conc. H_2SO_4 . Hot aq. alkalis \rightarrow salicylic acid. Forms metallic derivs.

Diacetyl deriv.: m.p. 114–16°.

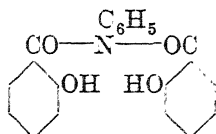
N-Phenyl: see Disalicylanilide.

Cousin, Volmar, *Bull. soc. chim.*, 1914, 15, 415.

Anschütz, *Ber.*, 1919, 52, 1887.

McConnan, *J. Chem. Soc.*, 1907, 91, 199.

Disalicylanilide (*N-Phenyldisalicylamide*, *disalicyloylaniline*)



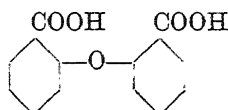
$C_{20}H_{15}O_4N$

M.p. 165°.

MW, 333

Anschütz, *Ber.*, 1919, 52, 1890.

Disalicylic Acid (*Anhydrosalicylic acid*, *diphenyl ether 2 : 2'-dicarboxylic acid*)



$C_{14}H_{10}O_5$

MW, 258

Cryst. from tetrachloroethane. M.p. 230° decomp. Sol. EtOH, MeOH, AcOH, hot Et₂O, hot PhNO₂. Insol. H₂O, C₆H₆, CHCl₃, AcOEt, Py, toluene, ligroin.

Di-Me ester: $C_{16}H_{14}O_5$. MW, 286. M.p. 65–5°.

Di-Et ester: $C_{18}H_{18}O_5$. MW, 314. B.p. 220°/12 mm.

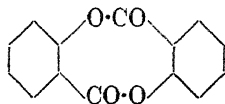
Dichloride: $C_{14}H_8O_3Cl_2$. MW, 295. M.p. 161°.

Diamide: $C_{14}H_{12}O_3N_2$. MW, 256. M.p. 265°.

Dianilide: m.p. 194–5°.

Anschütz, Claasen, *Ber.*, 1922, 55, 684.

α -Disalicylide (*Diplosal anhydride*, *cis-disalicylide*)



$C_{14}H_8O_4$

MW, 240

Rhombic from CHCl₃. M.p. 214–17° (213°), 234° decomp. (rapid heat). Mod. sol. CS₂. Spar. sol. ord. org. solvents. *Cis* form.

Anschutz, Riepenkröger, *Ann.*, 1924, 439, 1.

Schroeter, *Ber.*, 1919, 52, 2227.

Anschutz, Neher, *Ber.*, 1944, 77, 634.

Baker, Ollis, Zealley, *J. Chem. Soc.*, 1951, 201.

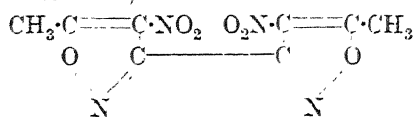
" β " Disalicylide.

See Trisalicylide.

Disalicylideneacetone.

See 2 : 2'-Dihydroxydistyryl Ketone.

Dislite (*Dyslyte*, 5 : 5'-dimethyl-4 : 4'-dinitro-3 : 3'-di-isoxazole)



$C_8H_6O_6N_4$

MW, 254

Formed by heating citraconic acid with HNO₃. Long needles, m.p. 189°. Difficultly sol. boiling EtOH. Sol. conc. HNO₃ without change. Unaffected by conc. HCl, conc. H₂SO₄, or boiling Br. and only slightly affected by KMnO₄ in hot H₂SO₄. Hot aq. alkalis → brownish-red sol., with decomp. to NH₃, nitrite and acetate.

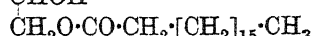
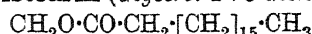
Di-benzaldehyde deriv.: $C_8H_2O_6N_4:(CHPh)_2$. Lemon-yellow, m.p. approx. 250° decomp.

Bassett, *J. Chem. Soc.*, 1872, 25, 98.

Fusco, *Gazz. chim. ital.*, 1938, 68, 380.

Fusco, Zumin, *Gazz. chim. ital.*, 1946, 76, 223.

α : α' -Distearin (*Glycerol 1 : 3-distearate*)



$C_{39}H_{76}O_5$

MW, 624

Cryst. from CHCl₃ or ligroin. M.p. 79–1° (78–5°).

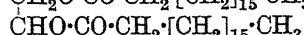
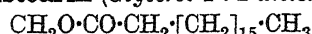
2-Acetyl: m.p. 64°.

2-p-Nitrobenzoyl: m.p. 61°.

Heiduschka, Schuster, *J. prakt. Chem.*, 1928, 120, 149.

Averill, Roche, King, *J. Am. Chem. Soc.*, 1929, 51, 869 (*Bibl.*).

α : β -Distearin (*Glycerol 1 : 2-distearate*)



$C_{39}H_{76}O_5$

MW, 624

Cryst. from ligroin. M.p. 78–2°.

3-Acetyl: m.p. 59°.

3-p-Nitrobenzoyl: m.p. 74–5°.

Grün, Corelli, *Z. angew. Chem.*, 1912, 25, 668.

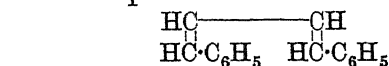
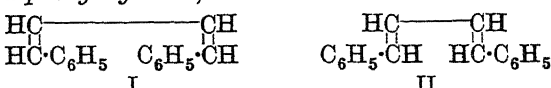
Kreis, Hafner, *Ber.*, 1903, 36, 1124.

Fairbourn, *J. Chem. Soc.*, 1930, 382.

Distyrene.

See 1 : 3-Diphenyl-1-butylene and 1 : 4-Diphenyl-1-butylene.

Distyryl (1 : 4-Diphenyl-1 : 3-butadiene, 1 : 4-diphenylerythrene)



$C_{16}H_{14}$

MW, 206

Exists in three stereoisomeric forms, viz. *cis* (I), *trans* (II), and *cis-trans* (III).

Cis form :

Leaflets or needles. M.p. 70°. Sol. Et₂O, CHCl₃, C₆H₆, pet. ether, hot AcOH. Spar. sol. EtOH. Slowly changes to *trans* form under the influence of light.

Trans form :

Leaflets. M.p. 152.5°. B.p. 350°. Sol. EtOH. Spar. sol. Et₂O.

Picrate : m.p. 152-3°.

Cis-trans form :

Oily liq. Only stable in absence of light. Light → *trans* form.

Kelter, Schwarz, *Ber.*, 1912, 45, 1952.

Kuhn, Winterstein, *Helv. Chim. Acta*, 1928, 11, 98, 103.

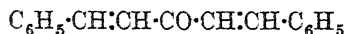
Corson, *Organic Syntheses*, 1936, XVI, 28.

Busch, Weber, *J. prakt. Chem.*, 1936, 146, 54.

Distyrylethylene Glycol.

See Hydrocinnamoin.

Distyryl Ketone (Dibenzylideneacetone)



C₁₇H₁₄O MW, 234

Plates or leaflets from AcOEt. M.p. 113°. Decomp. on dist. Sol. CHCl₃, Me₂CO. Spar. ol. Et₂O. Very spar. sol. EtOH. Insol. H₂O. Forms add. comps. with HCl, HBr, aniline, trichloroacetic acid, etc. Heat of comb. C_p 2090 Cal., C_v 2088.3 Cal.

Oxime : m.p. 142-4°. *Acetyl deriv.* : m.p. 93-4°. *Benzoyl deriv.* : m.p. 112°.

Semicarbazone : needles. M.p. 187-90°.

Phenylhydrazone : yellow needles. M.p. 152-3° (147°).

p-Nitrophenylhydrazone : m.p. 173°.

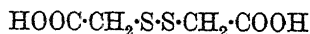
Picrate : orange cryst. M.p. 114°.

Hemi-1 : 3 : 5-trinitrobenzene add. comp. : light yellow. M.p. 115°.

Bis-1 : 3 : 5-trinitrobenzene add. comp. : light yellow. M.p. 127°.

Conrad, Dolliver, *Organic Syntheses*, 1932, XII, 22 (*Bibl.*).

Disulphidoacetic Acid (Dithioglycollic acid, dithiodiglycollic acid, sym.-dicarboxydimethyl disulphide, dimethyl disulphide dicarboxylic acid)



C₄H₆O₄S₂ MW, 182

Leaflets from C₆H₆-AcOEt. M.p. 108-9° (100°). Sol. H₂O, EtOH, Et₂O. Spar. sol. C₆H₆. *k* (first) = 6.5 × 10⁻⁴ at 25°; (second) = 5.2 × 10⁻⁵ at 25°.

Di-Me ester : C₈H₁₀O₄S₂. MW, 210. B.p. 154°/16 mm. D₄¹⁶ 1.2905. n_D¹⁶ 1.51517.

Di-Et ester : C₈H₁₄O₄S₂. MW, 238. B.p. 164°/14 mm. D₄¹⁶ 1.2036. n_D¹⁶ 1.50085.

Diamide : C₄H₈O₂N₂S₂. MW, 180. M.p. 157°.

Dianilide : m.p. 165-6° (160-1°).

Holmberg, *Ber.*, 1910, 43, 224 (*Footnote*).

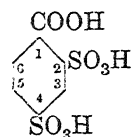
Larsson, *Chem. Abstracts*, 1928, 22, 4470.

Kalle, D.R.P. 194,039, (*Chem. Zentr.*, 1908, I, 1221).

I.G., D.R.P. 601,642, (*Chem. Zentr.*, 1935, I, 164).

Stoner, Dougherty, *J. Am. Chem. Soc.*, 1941, 63, 987.

2 : 4-Disulphobenzoic Acid (Benzoic acid 2 : 4-disulphonic acid)



C₇H₆O₈S₂ MW, 282

Cryst. from HCl. M.p. above 285°. Sol. H₂O. Insol. EtOH, Et₂O.

4-Amide : C₇H₇O₇NS₂. MW, 281. M.p. 165°.

2 : 4-Diamide : C₇H₈O₆N₂S₂. MW, 280. M.p. 182-3°. *1-Et ester* : C₉H₁₂O₆N₂S₂. MW, 308. M.p. 199-200°.

Blomstrand, *Ber.*, 1872, 5, 1088.

3 : 5-Disulphobenzoic Acid (Benzoic acid 3 : 5-disulphonic acid).

Hygroscopic cryst.

Dichloride : C₇H₄O₆Cl₂S₂. MW, 319. M.p. 183°.

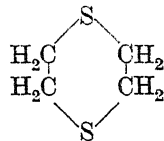
Trichloride : C₇H₃O₅Cl₃S₂. MW, 337.5. M.p. 86.5-87°.

Triamide : C₇H₉O₅N₃S₂. MW, 279. M.p. 290° (some decomp. at 230°).

Graves, Adams, *J. Am. Chem. Soc.*, 1923, 45, 2451.

Brunner, *Monatsh.*, 1928, 50, 218.

1 : 4-Dithian



C₄H₈S₂ MW, 120

Colourless prisms. M.p. 111-12°. B.p. 199-200°/760 mm. Sublimes even at ordinary temp. Vol. with steam and EtOH. Sol. EtOH, Et₂O, CS₂, hot AcOH. Difficultly sol. H₂O.

Masson, *J. Chem. Soc.*, 1886, 49, 234.

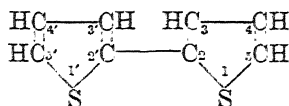
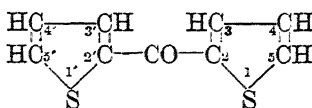
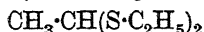
Crafts, *Compt. rend.*, 1862, 54, 1277.

Husemann, *Ann.*, 1863, 126, 281.

Mansfield, *Ber.*, 1886, 19, 697.

Dithienone.

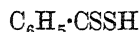
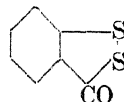
See Dithienyl Ketone.

2 : 2'-Dithienyl ($\alpha\alpha'$ -Dithienyl) $C_8H_6S_2$ MW, 166M.p. 33° . B.p. 260° , $125-8^\circ/12$ mm. Sol. EtOH, Et₂O, AcOH.Steinkopf, Roch, *Ann.*, 1930, **482**, 260.**3 : 3'-Dithienyl** ($\beta\beta'$ -Dithienyl).Leaflets with blue cast from ligroin. M.p. 132° . Sol. Et₂O, C₆H₆, CHCl₃, CS₂. Spar. sol. AcOH, ligroin.Auwers, Bredt, *Ber.*, 1894, **27**, 1741.**2 : 2'-Dithienyl Ketone** (2 : 2'-Dithienone) $C_8H_6OS_2$ MW, 194Needles from EtOH. M.p. $87-8^\circ$. B.p. 326° . Sol. ord. org. solvents. Insol. H₂O.Phenylhydrazone : m.p. 137° .Thomas, Couderc, *Bull. soc. chim.*, 1918, **23**, 290.Steinkopf, Hempel, *Ann.*, 1932, **495**, 162.**3 : 3'-Dithienyl Ketone** (3 : 3'-Dithienone).Needles from pet. ether. M.p. $72-3^\circ$. Volatile in steam.Steinkopf, Schmitt, *Ann.*, 1938, **533**, 268.**Dithioacetal** (Acetaldehyde dithioacetal) $C_6H_{14}S_2$ MW, 150Fuming oil. B.p. $185-7^\circ$ slight decomp. Stable to acids and alkalis. KMnO₄ in acid sol. \rightarrow disulphone, cryst. from H₂O, m.p. 75° , b.p. about 320° .Fromm, *Ann.*, 1889, **253**, 139.**Dithioacetanilide.**

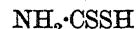
See under 4 : 4'-Diaminodiphenyl disulphide.

Dithioacetic Acid (Methylcarbothionic acid) $C_2H_4S_2$ MW, 92Red oil. B.p. $37^\circ/15$ mm. Sol. ord. org. solvents. Insol. cold H₂O. D₂₀ 1.24. Volatile in steam. Na, K, Ba, Ca, Mg, and Al salts sol. H₂O. Displaces acetic and formic acids from their salts. H₂O \rightarrow thioacetyl disulphide.Me ester : C₃H₆S₂. MW, 106. Reddish yellow oil. B.p. 142° , $81^\circ/95$ mm., $71^\circ/70$ mm. D₄²¹ 1.096. n_D²⁰ 1.5898.Et ester : C₄H₈S₂. MW, 120. Yellow liq. B.p. $128-32^\circ$, $43^\circ/11$ mm. D₄²⁸ 0.9807. n_D²⁵ 1.5303. Rapidly oxidises in air."Anhydride" : C₄H₆S₃. MW, 150. Cryst. from Et₂O. M.p. 225° .Sakurada, *Chem. Abstracts*, 1927, **21**, 3609.Houben, Pohl, *Ber.*, 1907, **40**, 1304.**Dithioaniline.**

See 4 : 4'-Diaminodiphenyl disulphide.

Dithiobenzoic Acid $C_7H_6S_2$ MW, 154Reddish blue oil. Resinifies on standing in air. Sol. EtOH, Et₂O. Insol. H₂O.Pb salt : red cryst. from C₆H₆. M.p. 204.5° .Hg salt : coppery cryst. M.p. 150° .Me ester : C₈H₈S₂. MW, 168. Red oil. B.p. $275-80^\circ$ decomp., $154-7^\circ/22$ mm., $141-2^\circ/12$ mm.Et ester : C₉H₁₀S₂. MW, 182. B.p. $165-8^\circ/19$ mm., $158-62^\circ/13$ mm. ($122-5^\circ/70$ mm.).Benzyl ester : C₁₄H₁₂S₂. MW, 244. M.p. 55° .Disulphide : persulphide. Dithiobenzoyl disulphide. C₆H₅·CS·S·CS·C₆H₅. C₁₄H₁₀S₄. MW, 306. Dark red cryst. M.p. 92.5° . Sol. Et₂O, abs. EtOH, AcOH, C₆H₆.White, *Proc. Chem. Soc.*, 1914, **30**, 37.Sakurada, *Chem. Abstracts*, 1927, **21**, 3609.Houben, *Ber.*, 1906, **39**, 3224.**Dithiobenzoyl** $C_7H_4OS_2$ MW, 168Pale yellow needles. M.p. 77° . Sol. most org. solvents. Sol. Na₂S \rightarrow yellow sol. Vol. in steam. Unaffected by dil. aq. alkalis. Zn + AcOH \rightarrow thiosalicylic acid.Smiles, McClelland, *J. Chem. Soc.*, 1922, **86**.Schonberg, Mostafa, *J. Chem. Soc.*, 1941, **793**.**Dithiobenzoyl disulphide.**

See under Dithiobenzoic Acid.

Dithiocarbamic Acid (Aminodithioformic acid, dithiocarbonic amide) CH_3NS_2 MW, 93Needles. Sol. EtOH, Et₂O. Decomp. by H₂O.Me ester : C₂H₅NS₂. MW, 107. M.p. 42° . Insol. H₂O. N-Acetyl : yellow prisms. M.p. 119° .

Et ester : see Dithiourethane.

Propyl ester : C₄H₉NS₂. MW, 135. Prisms. M.p. 58° . Sol. EtOH, C₆H₆. Insol. H₂O.N-Acetyl : m.p. 78° .Isopropyl ester : m.p. 97° .

n-Butyl ester : $C_5H_{11}NS_2$. MW, 149. M.p. 46–7°.

Isoamyl ester : $C_6H_{13}NS_2$. MW, 163. M.p. 52°. Sol. EtOH, C_6H_6 . *N*-Acetyl : m.p. 84°.

Allyl ester : $C_4H_7NS_2$. MW, 133. M.p. 32°.

Benzyl ester : m.p. 91°.

Mulder, *Ann.*, 1873, 168, 232.

Roshdestwenski, *Chem. Zentr.*, 1910, I, 911.

I.G., B.P. 307,728, (*Chem. Abstracts*, 1930, 24, 129).

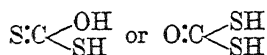
Nikaido, U.S.P. 1,541,433, (*Chem. Abstracts*, 1925, 19, 2210).

Mathes, U.S.P. 2,117,619, (*Chem. Zentr.*, 1938, II, 1129).

Dithiocarbanilic Acid.

See Phenylthiocarbamic Acid.

Dithiocarbonic Acid



CH_2OS_2

MW, 94

Acid not known in the free state.

O-Et ester : see Xanthogenic Acid.

SS-Di-Me ester : $OC(S-CH_3)_2$. $C_3H_6OS_2$. MW, 122. B.p. 168°. D_4^{25} 1.1913. n_D^{20} 1.5504.

SS-Di-Et ester : $OC(S-C_2H_5)_2$. $C_5H_{10}OS_2$. MW, 150. B.p. 196–7°. Sol. EtOH, Et_2O .

Insol. H_2O . D_4^{25} 1.085. n_D^{20} 1.5237.

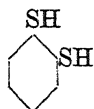
Diphenyl ester : $C_{13}H_{10}OS_2$. MW, 246. M.p. 43°.

Amide : see Dithiocarbamic Acid.

Delépine, *Bull. soc. chim.*, 1903, 29, 56.

Schmitt, Glutz, *Ber.*, 1868, 1, 166.

Dithiocatechol (o-Phenylene dimercaptan, o-dimercaptobenzene, 1 : 2-disulphydrylbenzene)



$C_6H_6S_2$

MW, 142

M.p. 28°. B.p. 238–9°, 119–20°/17 mm. Sol. EtOH, Et_2O , C_6H_6 , AcOEt.

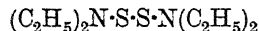
1 : 2-Diacetyl : m.p. 86.5–88.5°.

1 : 2-Dibenzoyl : m.p. 94–5°.

Hurtley, Smiles, *J. Chem. Soc.*, 1926, 1826.

Guha, Chakladar, *J. Indian Chem. Soc.*, 1925, 21, 318.

Dithiodiethylamine (Diethylamine NN-disulphide)



$C_8H_{20}N_2S_2$

MW, 208

B.p. 137–8°/29 mm. Volatile in steam.

Michaelis, Luxembourg, *Ber.*, 1895, 28, 166.

I.C.I., B.P. 331,016, D.R.P. 519,449, U.S.P. 1,842,711, (*Chem. Abstracts*, 1932, 26, 1620).

Levi, *Gazz. chim. ital.*, 1931, 61, 289.

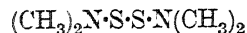
Dithiodiethylaniline.

See Tetraethyldiaminodiphenyl disulphide.

Dithiodiglycolic Acid.

See Disulphidoacetic Acid.

Dithiodimethylamine (Dimethylamine NN-disulphide)



$C_4H_{12}N_2S_2$

MW, 152

Reddish yellow oil. B.p. 170–80° decomp., 82–3°/23 mm. Volatile in steam.

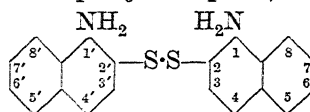
Michaelis, Luxembourg, *Ber.*, 1895, 28, 166.

Levi, *Gazz. chim. ital.*, 1931, 61, 286.

Dithiodimethylaniline.

See Tetramethyldiaminodiphenyl disulphide.

2 : 2'-Dithio-1 : 1'-dinaphthylamine (1 : 1'-Dinaphthylamine 2 : 2'-disulphide, 1 : 1'-diamino-2 : 2'-dinaphthyl disulphide)



$C_{20}H_{16}N_2S_2$

MW, 348

Yellow leaflets from EtOH. M.p. 131–2°. Spar. sol. EtOH.

Jacobson, *Ber.*, 1887, 20, 1900.

4 : 4'-Dithio-1 : 1'-dinaphthylamine.

Needles. M.p. 168°. Sol. AcOH. Spar. sol. EtOH, MeOH.

1 : 1'-N-Diacetyl : m.p. 265°.

Zincke, Schütz, *Ber.*, 1912, 45, 475.

5 : 5'-Dithio-1 : 1'-dinaphthylamine.

Plates from EtOH. M.p. 192–3°.

1 : 1'-N-Diacetyl : plates from AcOH. M.p. 274° decomp.

Ekbom, *Ber.*, 1890, 23, 1121.

6 : 6'-Dithio-1 : 1'-dinaphthylamine.

Needles from EtOH. M.p. 166°. Sol. EtOH, C_6H_6 . Spar. sol. Et_2O , ligroin.

1 : 1'-N-Diacetyl : m.p. 276°.

Ekbom, *Ber.*, 1891, 24, 332.

8 : 8'-Dithio-1 : 1'-dinaphthylamine.

Yellow needles from EtOH.Aq. M.p. 118°.

Reissert, *Ber.*, 1922, 55, 870.

Dithioethylene Glycol.

See Ethylene Dithioglycol.

1 : 2-Dithioglycerol (2 : 3-Dimercapto-propanol, British anti-Lewisite, BAL, dimer-caprol)



$C_3H_8OS_2$

MW, 124

B.p. 82–4°/0.8 mm. D_4^{20} 1.2463. n_D^{20} 1.5749. Forms complexes with metals. Anti-arsenical.

Used medicinally in metallic poisoning.

3-Me ether : b.p. 68°/1.0 mm.

1 : 2-Ethylidene ether : m.p. 57-5°. B.p. 115°/0.8 mm.

1 : 2-Isopropylidene ether : cryst. from C_6H_6 -petrol. M.p. 54-5°. B.p. 105°/1.0 mm.

1 : 2-Benzylidene ether : cryst. from C_6H_6 -petrol. M.p. 77°. B.p. 207°/1.5 mm. decomp.

1 : 2-Cyclohexylidene ether : m.p. 70°. B.p. 150°/0.8 mm.

3-Glucoside : (BAL-Intrav.). Unstable. α -Form : Ba salt sol. H_2O . Insol. MeOH. $[\alpha]_D^{20} + 45^\circ$ in H_2O . β -Form : Ba salt, $[\alpha]_D^{20} - 16^\circ$ in H_2O . Hexa-acetyl : $[\alpha]_D^{21} - 18^\circ$ in MeOH.

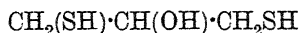
Sjöberg, *Ber.*, 1942, 75, 13.

Stocken, *J. Chem. Soc.*, 1947, 592.

Peppel, Signaigo, U.S.P. 2,402,665; *Chem. Abstracts*, 1946, 40, 5762.

Fraser, Owen, Shaw, *Biochem. J.*, 1947, 41, 328.

1 : 3-Dithioglycerol (1 : 3-Dimercapto-2-propanol, 1 : 3-dimercaptoisopropyl alcohol)



$C_3H_8OS_2$ MW, 92

B.p. 94°/12 mm., 82°/1.5 mm. D_4^{20} 1.2386. n_D^{20} 1.5700.

Hg deriv. : cryst. from Py. M.p. 185°.

Rheinboldt, Tetsch, *Ber.*, 1937, 70, 675.

Sjöberg, *Ber.*, 1942, 75, 13.

Dithioglycollic Acid.

See Disulphidoacetic Acid.

Dithiohydroquinone (p-Phenylene dimercaptan, 1 : 4-dimercaptobenzene, 1 : 4-disulphydrylbenzene)



$C_6H_6S_2$ MW, 142

Leaflets from EtOH.Aq. M.p. 98°. Sol. EtOH, AcOH, C_6H_6 . Easily oxidised to a yellow, amorphous p-phenylene disulphide ($C_6H_4S_2$)_n.

Di-Me ether : $C_8H_{10}S_2$. MW, 170. Leaflets from MeOH. M.p. 85°.

Di-Et ether : $C_{10}H_{14}S_2$. MW, 198. M.p. 46-5°.

Di-phenyl ether : leaflets from EtOH. M.p. 81-5°. B.p. 265°/14 mm.

Diacetyl : plates from pet. ether. M.p. 126°.

Parekh, Guha, *J. Indian Chem. Soc.*, 1934, 11, 95.

Pollak, *Monatsh.*, 1914, 35, 1457.

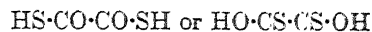
Dithionaphthol.

See Dimercaptonaphthalene.

Dithionyl diphenylene.

See Diphenylene disulphoxide.

Dithio-oxalic Acid



$C_2H_2O_2S_2$ MW, 122

Acid only known in aqueous sol.

Di-Me ester : $C_4H_6O_2S_2$. MW, 150. M.p. 83° (80°). B.p. 218°.

Di-Et ester : $C_6H_{10}O_2S_2$. MW, 178. M.p. 27-27.5°. B.p. 238-40° (235°).

Dipropyl ester : $C_8H_{14}O_2S_2$. MW, 206. B.p. 158°/15 mm.

Di-p-tolyl ester : $C_{16}H_{14}O_2S_2$. MW, 302. M.p. 178°.

Diamide : dithio-oxamide, $C_2H_4N_2S_2$. MW, 120. Orange cryst. M.p. 41°. Sublimes.

Dianilide : dithio-oxanilide. M.p. 134°.

Auger, Billy, *Compt. rend.*, 1903, 136, 555.

Arndt, Milde, Eckert, *Ber.*, 1923, 56, 1982.

Mingoa, *Gazz. chim. ital.*, 1926, 56, 839.

Jones, Tasker, *J. Chem. Soc.*, 1909, 95, 1904.

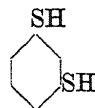
Dithio-oxamide.

See under Dithio-oxalic Acid.

Dithio-oxanilide.

See under Dithio-oxalic Acid.

Dithioresorcinol (m-Phenylene dimercaptan, 1 : 3-dimercaptobenzene, 1 : 3-disulphydrylbenzene)



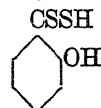
$C_6H_6S_2$ MW, 142

Leaflets. M.p. 27° (25°). B.p. 245°, 176-7°/100 mm., 123°/17 mm., 116°/11 mm. Sol. ord. org. solvents.

sym.-Trinitrobenzene add. comp. : yellow cryst. M.p. 76-77°.

Zincke, Krüger, *Ber.*, 1912, 45, 3471.

Dithiosalicylic Acid (o-Hydroxydithiobenzoic acid. Note : diphenyl disulphide 2 : 2'-dicarboxylic acid is frequently referred to in the literature as dithiosalicylic acid)



$C_7H_6OS_2$ MW, 170

Orange needles from pet. ether. M.p. 48-50°. Sol. EtOH, Et₂O, C_6H_6 , MeOH. Mod. sol. H_2O to red sol. The Hg salt is the powerful anti-septic Thioargyrium.

Me ester : $C_8H_8OS_2$. MW, 184. M.p. 10-20°. Me ether : $C_9H_{10}OS_2$. MW, 198. M.p. 43-4°. B.p. 170-1°/13 mm.

Bloch, Höhn, D.R.P. 214,888, (*Chem. Zentr.*, 1909, II, 1780).

Bruni, Levi, *Atti accad. Lincei*, 1923, 32, i, 5.

Dithiourethane (*Dithiocarbamic ethyl ester, ethyl aminodithioformate*)



$\text{C}_3\text{H}_7\text{NS}_2$ MW, 121

Leaflets from Et_2O . M.p. $41-2^\circ$. Sol. EtOH, Et_2O . Insol. H_2O . Decomp. on heating above m.p.

N-Acetyl: yellow needles. M.p. 123° . Sol. EtOH, Et_2O , hot H_2O .

Delépine, *Bull. soc. chim.*, 1903, 29, 49, 52.

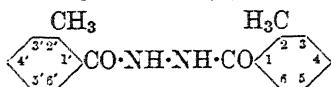
Dithizone.

See Diphenylthiocarbazone.

Dithizonic Acid.

See Diffractaic Acid.

Di-o-toluyldihydrazine (2 : 2'-Dimethyldibenzoyldihydrazine, o-hydrazoditoluyl)



$\text{C}_{16}\text{H}_{16}\text{O}_2\text{N}_2$ MW, 268

Needles from EtOH. M.p. 217° . Sol. EtOH, CHCl_3 . Prac. insol. H_2O , Et_2O .

Stollé, Stevens, *J. prakt. Chem.*, 1904, 69, 372.

Di-m-toluyldihydrazine (3 : 3'-Dimethyldibenzoyldihydrazine, m-hydrazoditoluyl).

Needles from EtOH. M.p. $214-16^\circ$. Sol. EtOH, CHCl_3 . Insol. H_2O , Et_2O .

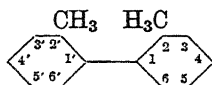
Stollé, Stevens, *J. prakt. Chem.*, 1904, 69, 373.

Di-p-toluyldihydrazine (4 : 4'-Dimethyldibenzoyldihydrazine, p-hydrazoditoluyl).

Needles from EtOH. M.p. $253-4^\circ$. Sol. EtOH. Spar. sol. C_6H_6 , CHCl_3 . Insol. H_2O , Et_2O .

Authenrieth, Thomae, *Ber.*, 1924, 57, 436.

2 : 2'-Ditolyl (2 : 2'-Dimethyldiphenyl, ooditolyl)



$\text{C}_{14}\text{H}_{14}$ MW, 182

Cryst. from EtOH. M.p. 18° . B.p. $258^\circ/738$ mm. Sol. EtOH, Et_2O , C_6H_6 . $\text{KMnO}_4 \rightarrow$ diphenic acid.

Turner, *Chem. Abstracts*, 1921, 15, 670.

Short, Stromberg, Wiles, *J. Chem. Soc.*, 1936, 321.

Kharasch, Fields, *J. Am. Chem. Soc.*, 1941, 63, 2305.

2 : 3'-Ditolyl (2 : 3'-Dimethyldiphenyl, omditolyl).

B.p. 270° . Sol. EtOH, Et_2O , C_6H_6 . $\text{CrO}_3 \rightarrow$ isophthalic acid.

Schultz, *Ber.*, 1884, 17, 471.

2 : 4'-Ditolyl (2 : 4'-Dimethyldiphenyl, opditolyl).

B.p. $273-6^\circ$. Sol. EtOH, Et_2O . $\text{CrO}_3 \rightarrow$ terephthalic acid.

Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, 48, 1380.

3 : 3'-Ditolyl (3 : 3'-Dimethyldiphenyl, mmditolyl).

M.p. $5-7^\circ$. B.p. $286-7^\circ/713$ mm. Sol. EtOH, Et_2O , C_6H_6 . D_4^{25} 0.9993. $\text{CrO}_3 \rightarrow$ isophthalic acid.

Ullmann, Meyer, *Ann.*, 1904, 332, 43.

Schlenk, Brauns, *Ber.*, 1915, 48, 666.

Müller, Töpel, *Ber.*, 1939, 72, 286.

Kornblum, *Organic Syntheses*, 1941, XXI, 30.

3 : 4'-Ditolyl (3 : 4'-Dimethyldiphenyl, mpditolyl).

M.p. $14-15^\circ$. B.p. $288-9^\circ/752$ mm. D_4^{25} 0.998. n_D^{25} 1.59713.

Kruber, *Ber.*, 1932, 65, 1390.

Hey, Jackson, *J. Chem. Soc.*, 1934, 648.

4 : 4'-Ditolyl (4 : 4'-Dimethyldiphenyl, ppditolyl).

Prisms from Et_2O . M.p. 125° (121°). B.p. 295° ($292-3^\circ/752$ mm.).

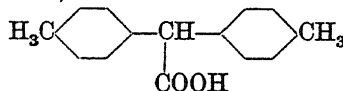
Gomberg, Pernert, *J. Am. Chem. Soc.*, 1926, 48, 1380.

Gardner, Borgstrom, *J. Am. Chem. Soc.*, 1929, 51, 3377.

Kruber, *Ber.*, 1932, 65, 1390.

Müller, Töpel, *Ber.*, 1939, 72, 286.

Di-p-tolylacetic Acid (*Di-p-tolylmethane- α -carboxylic acid*)



$\text{C}_{16}\text{H}_{16}\text{O}_2$ MW, 240

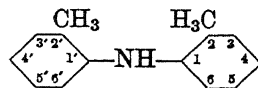
Needles from AcOH. M.p. 144° . Sol. EtOH, Et_2O , CHCl_3 . Very spar. sol. H_2O .

Me ester: $\text{C}_{17}\text{H}_{18}\text{O}_2$. MW, 254. M.p. $36-7^\circ$.

Et ester: $\text{C}_{18}\text{H}_{20}\text{O}_2$. MW, 268. M.p. 65° .

Fritsch, Feldmann, *Ann.*, 1899, 306, 81.

2 : 2'-Ditolylamine (2 : 2'-Dimethyldiphenylamine)



$\text{C}_{14}\text{H}_{15}\text{N}$ MW, 197

Cryst. with blue cast. M.p. $52-3^\circ$. B.p. $312^\circ/727.5$ mm., $192^\circ/23$ mm.

N-Benzoyl: m.p. $114-5^\circ$.

S.C.I., B.P. 250,819, (*Chem. Abstracts*, 1927, 21, 1273).

Battegay, Silbermann, Fischer, *Chem. Abstracts*, 1932, 26, 3781.

2 : 3'-Ditolylamine (2 : 3'-Dimethyldiphenylamine).

Pale yellow oil at -15° . B.p. $187^\circ/22$ mm.

N-Benzoyl: m.p. 103-4°.

Gibson, Johnson, *J. Chem. Soc.*, 1929, 2748.

2 : 4'-Ditolylamine (2 : 4'-Dimethyldiphenylamine).

B.p. 183°/19 mm.

S.C.I., B.P. 250,819, (*Chem. Abstracts*, 1927, 21, 1273).

Gibson, Johnson, *J. Chem. Soc.*, 1929, 2748.

3 : 3'-Ditolylamine (3 : 3'-Dimethyldiphenylamine).

M.p. 53°. B.p. 319-20° (321-4°). Sol. EtOH, Et₂O. Volatile in steam.

Merz, Müller, *Ber.*, 1887, 20, 549.

Morgan, Pratt, *J. Soc. Chem. Ind.*, 1932, 51, 283r.

3 : 4'-Ditolylamine (3 : 4'-Dimethyldiphenylamine).

B.p. above 300°.

B.HCl: m.p. 202-3°.

N-Benzoyl: m.p. 118-19°.

Scholl, Seer, *Ber.*, 1911, 44, 1247.

Gibson, Johnson, *J. Chem. Soc.*, 1929, 2748.

4 : 4'-Ditolylamine (4 : 4'-Dimethyldiphenylamine).

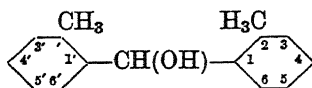
Cryst. from pet. ether. M.p. 79°. B.p. 330-5°.

Wieland, Roth, *Ber.*, 1920, 53, 223.

Di-p-tolylcarbamie ethyl Ester.

See Di-p-tolylurethane.

2 : 2'-Ditolylcarbinol (2 : 2'-Dimethylbenzhydrol)



C₁₅H₁₆O MW, 212

Cryst. from EtOH. M.p. 119-119.5°.

Boyd, Hatt, *J. Chem. Soc.*, 1927, 908.

Hatt, *J. Chem. Soc.*, 1929, 1631.

2 : 4'-Ditolylcarbinol (2 : 4'-Dimethylbenzhydrol).

Prisms from pet. ether. M.p. 61-61.5°.

Hall, *J. Chem. Soc.*, 1929, 1631.

4 : 4'-Ditolylcarbinol (4 : 4'-Dimethylbenzhydrol).

Needles from EtOH. M.p. 69°. Sol. EtOH, CHCl₃, Me₂CO, AcOH. Insol. H₂O.

Cohen, *Rec. trav. chim.*, 1919, 38, 119.

Ditolyl carbonate.

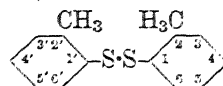
See under Cresol.

Ditolyl Diketone.

See Tolil.

Dict. of Org. Comp.—II.

Di-o-tolyl disulphide (2 : 2'-Dimethyldiphenyl disulphide)



C₁₄H₁₄S₂ MW, 246

Leaflets from EtOH. M.p. 38-9°. Sol. Et₂O.

Taboury, *Ann. chim.*, 1908, 15, 47.

Di-m-tolyl disulphide (3 : 3'-Dimethyldiphenyl disulphide).

Liq. at -22°. B.p. about 150° decomp. Sol. EtOH, Et₂O.

Hübner, Post, *Ann.*, 1873, 169, 51.

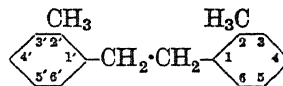
Di-p-tolyl disulphide (4 : 4'-Dimethyldiphenyl disulphide).

Cryst. from EtOH. M.p. 48°. B.p. 210-15°/20 mm. Sol. Et₂O, EtOH.

Reilly, Drumm, Daly, *Chem. Abstracts*, 1931, 25, 1828.

Slota, Franke, *Ber.*, 1930, 63, 681.

sym.-Di-o-tolyloethane (2 : 2'-Dimethyldibenzyl)



C₁₆H₁₈ MW, 210

Leaflets from EtOH. M.p. 66-7°. B.p. 177°/20 mm.

Carré, *Bull. soc. chim.*, 1909, 5, 489.

sym.-Di-m-tolyloethane (3 : 3'-Dimethyldibenzyl).

B.p. 298°, 163°/10 mm. D₂₀²⁵ 0.9703. n_D²⁵ 1.5566.

Carré, *Bull. soc. chim.*, 1909, 5, 488.

Friedmann, *Chem. Zentr.*, 1916, II, 486.

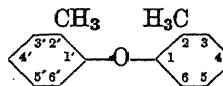
Dover, Hensley, *Ind. Eng. Chem.*, 1935, 27, 337.

sym.-Di-p-tolyloethane (4 : 4'-Dimethyldibenzyl).

Leaflets from EtOH. M.p. 85° (82-3°). B.p. 178°/18 mm.

Meyer, Hofmann, *Monatsh.*, 1916, 37, 690.

Di-o-tolyl Ether (2 : 2'-Dimethyldiphenyl ether)



C₁₄H₁₄O MW, 198

B.p. 274°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Insol. H₂O. D₂₀²⁴ 1.047.

Sabatier, Mailhe, *Compt. rend.*, 1910, 151, 493.

Di-m-tolyl Ether (3 : 3'-Dimethyldiphenyl ether).

B.p. 284°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Insol. H₂O. D₂₀²¹ 1.0323.

Sabatier, Mailhe, *Compt. rend.*, 1910, 151, 493.

Di-*p*-tolyl Ether (4 : 4'-Dimethyldiphenyl ether).

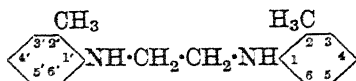
Prisms. M.p. 50°. B.p. 285°. Sol. Et₂O, C₆H₆. Mod. sol. EtOH. Insol. H₂O.

Sabatier, Mailhe, *Compt. rend.*, 1910, 151, 493.

Ditolyethylene.

See Dimethylstilbene.

sym.-Di-*o*-tolylethylenediamine (Ethyl-enedi-*o*-tolylidiamine, 2 : 2'-dimethyldiphenylethylenediamine, di-*o*-toluidinoethane)



C₁₆H₂₀N₂ MW, 240

M.p. 78° (70.5°). Sol. EtOH, Et₂O, AcOH. Insol. H₂O.

B, 2HNO₃ : m.p. 152°.

B, HgCl₂ : plates. M.p. 110°.

Mills, *J. Chem. Soc.*, 1900, 77, 1021.

sym.-Di-*m*-tolylethylenediamine.

Plates. M.p. 58.5°.

B, 2HNO₃ : m.p. 153°.

B, 2HCl : needles from EtOH. M.p. 128°.

HgCl₂ add. comp. : rosettes. M.p. 79-80°.

Mills, *J. Chem. Soc.*, 1900, 77, 1022.

sym.-Di-*p*-tolylethylenediamine.

M.p. 97.5° (95°).

B, 2HNO₃ : m.p. 166.5°.

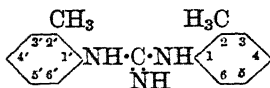
B, HgCl₂ : m.p. 133°.

Mills, *J. Chem. Soc.*, 1900, 77, 1022.

Di-tolylglycollic Acid.

See Tolilic Acid.

Di-*o*-tolylguanidine (2 : 2'-Dimethyl-sym.-diphenylguanidine)



C₁₅H₁₇N₃ MW, 239

Cryst. from EtOH.Aq. M.p. 179° (175-6°).

Sol. Et₂O. Rubber vulcanisation accelerator.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.

Schlösser, D.R.P. 630,966, (*Chem. Abstracts*, 1937, 31, 111).

Di-*m*-tolylguanidine.

Needles from EtOH. M.p. 116-17°.

Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.

Di-*p*-tolylguanidine.

Plates from EtOH. M.p. 169-70°.

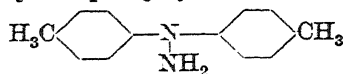
Naunton, *J. Soc. Chem. Ind.*, 1926, 45, 378T.

Perkin, *J. Chem. Soc.*, 1880, 37, 696.

sym.-Ditolylhydrazine.

See Dimethylhydrazobenzene.

unsym.-Di-*p*-tolylhydrazine (4 : 4'-Dimethyl-unsym.-diphenylhydrazine)



C₁₄H₁₆N₂ MW, 212

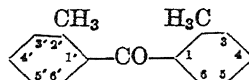
Leaflets from EtOH. M.p. 93°. Green sol. in conc. H₂SO₄.

N-Acetyl : m.p. 171-2°.

Wieland, *Ber.*, 1908, 41, 3500.

Vesely, Haas, *Chem. Abstracts*, 1928, 22, 4472.

2 : 2'-Ditolyl Ketone (2 : 2'-Dimethylbenzophenone)



C₁₅H₁₄O MW, 210

Prisms from EtOH. M.p. 72° (64-7°). B.p. 307-8°, 175-80°/17 mm. Sol. ord. org. solvents. Insol. ligroin.

Oxime : prisms from EtOH. M.p. 105°.

2 : 4-Dinitrophenylhydrazones : m.p. 190°.

Grignard, Bellet, Courtot, *Ann. chim.*, 1919, 12, 381.

Cook, *J. Chem. Soc.*, 1930, 1091.

Vavon, Décombe, *Compt. rend.*, 1942, 214, 360.

2 : 3'-Ditolyl Ketone (2 : 3'-Dimethylbenzophenone).

B.p. 228-31°/24 mm.

2 : 4-Dinitrophenylhydrazones : orange needles. M.p. 204-7°.

Newman, McCleary, *J. Am. Chem. Soc.*, 1941, 63, 1537.

2 : 4'-Ditolyl Ketone (2 : 4'-Dimethylbenzophenone).

B.p. 316-18° (300-3°), 175°/12 mm. Sol. EtOH, Et₂O, AcOH. D₄²⁰ 1.074.

Oxime : needles from EtOH. M.p. 122°.

Scharwin, Schorygin, *Ber.*, 1903, 36, 2025.

de Diesbach, Strebel, *Helv. Chim. Acta*, 1925, 8, 561.

3 : 3'-Ditolyl Ketone (3 : 3'-Dimethylbenzophenone).

M.p. 45°.

2 : 4-Dinitrophenylhydrazones : m.p. 223°.

Coops et al., *Rec. trav. chim.*, 1940, 59, 1109.

3 : 4'-Ditolyl Ketone (3 : 4'-Dimethylbenzophenone).

Needles from EtOH. M.p. 82°. B.p. 328-30°. Sol. Et₂O, CS₂, C₆H₆, CHCl₃, warm EtOH. Mod. sol. AcOH, pet. ether. D₄²⁰ 1.134.

Oxime : *syn.*, m.p. 143°; *anti.*, m.p. 119°.

Semicarbazones : m.p. about 183°.

Scharwin, Schorygin, *Ber.*, 1903, 36, 2027.

4 : 4'-Ditolyl Ketone (4 : 4'-Dimethylbenzophenone).

Cryst. from EtOH. M.p. 95°. B.p. 333-4°/725 mm. Sol. Et₂O, CHCl₃, CS₂, warm EtOH.

Oxime : prisms from EtOH. M.p. 163°.

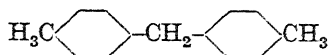
Hydrazone : cryst. from EtOH. M.p. 108-10°.

2 : 4-Dinitrophenylhydrazone : m.p. 220°.

Cohen, *Rec. trav. chim.*, 1919, **38**, 118.

Limpricht, *Ann.*, 1900, **312**, 92.

Di-*p*-tolylmethane (4 : 4'-Dimethyldiphenylmethane)



C₁₅H₁₆ MW, 196

Prisms. M.p. 28°. B.p. 285.5-286.5° (289-91°), 165°/12 mm. Sol. EtOH, Et₂O. D₂₀ 0.9800. Does not form a picrate.

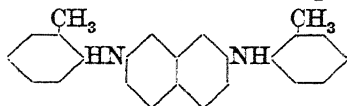
Friedel, Crafts, *Bull. soc. chim.*, 1885, **43**, 50.

Reichstein, Oppenauer, *Helv. Chim. Acta*, 1933, **16**, 1376.

Ditolylmethane- α -carboxylic Acid.

See Ditolylacetic Acid.

Di-*o*-tolyl-2 : 7-naphthylenediamine (2 : 7-Di-*o*-toluidinonaphthalene, 2 : 7-naphthylenedi-*o*-tolylamine, NN-di-*o*-tolylaminonaphthalene)



C₂₄H₂₂N₂ MW, 338

M.p. 106°. Sol. EtOH, Et₂O, AcOH.

Durand, Huguenin, D.R.P. 40,886.

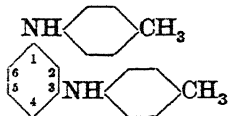
Di-*p*-tolyl-2 : 7-naphthylenediamine.

Needles from xylene. M.p. 236-7°. Insol. EtOH, Et₂O, AcOH.

Annaheim, *Ber.*, 1887, **20**, 1373.

Durand, Huguenin, D.R.P. 40,886.

Di-*p*-tolyl-*m*-phenylenediamine (*m*-Phenylenedi-*p*-tolylamine, 1 : 3-di-*p*-tolylaminobenzene)



C₂₀H₂₀N₂ MW, 288

Needles from EtOH. M.p. 138-9°. Spar. sol. EtOH, Et₂O, AcOH, C₆H₆.

Diacetyl : m.p. 176°.

Dibenzoyl : m.p. 152°.

Kym, *J. prakt. Chem.*, 1895, **51**, 333.

Di-*o*-tolyl-*p*-phenylenediamine.

Leaflets from AcOH. M.p. 135°. Sol. C₆H₆. Mod. sol. EtOH, Et₂O. Spar. sol. cold AcOH.

Diacetyl : needles from EtOH. M.p. 189°.

Dibenzoyl : needles from AcOH. M.p. 235°.

Philip, *J. prakt. Chem.*, 1886, **34**, 65.

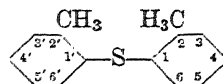
Di-*p*-tolyl-*p*-phenylenediamine.

Plates. M.p. 182°. Spar. sol. EtOH, AcOH, C₆H₆, pet. ether.

Diacetyl : cryst. from EtOH. M.p. 172-3°.

Hatschek, Zega, *J. prakt. Chem.*, 1886, **33**, 230.

Di-*o*-tolyl sulphide (2 : 2'-Dimethyldiphenyl sulphide)



C₁₄H₁₄S

MW, 214

Plates from EtOH. M.p. 64°. B.p. 285°, 174°/15 mm. Sol. Et₂O, CS₂, CHCl₃. Spar. sol. EtOH. Insol. H₂O.

Deuss, *Rec. trav. chim.*, 1909, **28**, 138.

Mauthner, *Ber.*, 1906, **39**, 3595.

Di-*m*-tolyl sulphide.

B.p. 174°/12 mm. Sol. Et₂O, CS₂. Insol. H₂O.

Mauthner, *Ber.*, 1906, **39**, 3595.

Bogert, Mandelbaum, *J. Am. Chem. Soc.*, 1923, **45**, 3052.

Di-*p*-tolyl sulphide.

Needles from EtOH. M.p. 57.3°. B.p. above 300°, 179°/11 mm. Sol. Et₂O, C₆H₆, hot EtOH, hot AcOH. Insol. H₂O.

Fischer, *Ber.*, 1915, **48**, 96.

***o* : *m*-Ditolyl sulphide** (2 : 3'-Dimethyldiphenyl sulphide).

B.p. 170°/11 mm.

Mauthner, *Ber.*, 1906, **39**, 3595.

***o* : *p*-Ditolyl sulphide** (2 : 4'-Dimethyldiphenyl sulphide).

B.p. 173°/11 mm. corr. D₄²⁰ 1.0889, D₄¹⁵ 1.0774.

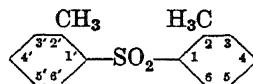
Bourgeois, *Ber.*, 1895, **28**, 2320, 2325.

***m* : *p*-Ditolyl sulphide** (3 : 4'-Dimethyldiphenyl sulphide).

Needles from EtOH. M.p. 27.8°. B.p. 179°/11 mm. corr.

Bourgeois, *Ber.*, 1895, **28**, 2320, 2325.

Di-*o*-tolyl sulphone (2 : 2'-Dimethyldiphenyl sulphone)



C₁₄H₁₄O₂S

MW, 246

Needles from EtOH. M.p. 134-5°. Sol. CHCl₃, CS₂, C₆H₆.

Purgotti, *Gazz. chim. ital.*, 1890, **20**, 31.

Di-*m*-tolyl sulphone.

Needles from EtOH. M.p. 94°.

Bogert, Mandelbaum, *J. Am. Chem. Soc.*, 1923, **45**, 3053.

Di-*p*-tolyl sulphone.

Prisms from C_6H_6 . M.p. 158° . B.p. $405^\circ/714$ mm. Sol. CS_2 , $CHCl_3$, C_6H_6 , hot EtOH. Spar. sol. Et_2O .

Otto, *Ber.*, 1879, 12, 1177.

Beckurts, Otto, *Ber.*, 1878, 11, 2068.

***o* : *m*-Ditolyl sulphone (2 : 3'-Dimethyldiphenyl sulphone).**

Leaflets from pet. ether. M.p. 82° .

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

***o* : *p*-Ditolyl sulphone (2 : 4'-Dimethyldiphenyl sulphone).**

Leaflets from pet. ether. M.p. 60° .

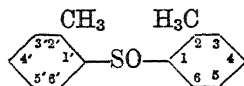
Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

***m* : *p*-Ditolyl sulphone (3 : 4'-Dimethyldiphenyl sulphone).**

Needles from AcOH. M.p. 116° .

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

Witt, Uerményi, *Ber.*, 1913, 46, 306.

Di-*o*-tolyl sulfoxide (2 : 2'-Dimethyldiphenyl sulfoxide)

$C_{14}H_{14}OS$

MW, 230

Cryst. from pet. ether. M.p. 121° .

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

Di-*m*-tolyl sulfoxide.

B.p. $215^\circ/15$ mm.

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

Di-*p*-tolyl sulfoxide.

Cryst. from pet. ether. M.p. 95° . Readily sol. EtOH, Et_2O , $CHCl_3$, AcOH, C_6H_6 . Spar. sol. cold ligroin.

Hampson, Farmer, Sutton, *Proc. Roy. Soc.*, 1933, A, 143, 151.

Parker, *Ber.*, 1890, 23, 1845.

***o* : *m*-Ditolyl sulfoxide (2 : 3'-Dimethyldiphenyl sulfoxide).**

B.p. $213^\circ/9$ mm.

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

***o* : *p*-Ditolyl sulfoxide (2 : 4'-Dimethyldiphenyl sulfoxide).**

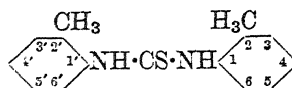
Prisms from pet. ether. M.p. 90° . B.p. $210^\circ/9$ mm.

Courtot, Frenkiel, *Comp. rend.*, 1934, 199, 557.

***m* : *p*-Ditolyl sulfoxide (3 : 4'-Dimethyldiphenyl sulfoxide).**

Leaflets from pet. ether. M.p. 72° .

Courtot, Frenkiel, *Compt. rend.*, 1934, 199, 557.

Di-*o*-tolylthiourea (2 : 2'-Dimethylthiocarbonyl anilide)

$C_{15}H_{16}N_2S$

MW, 256

Needles from EtOH. M.p. $165-6^\circ$. Sol. AcOH, C_6H_6 , hot EtOH. Insol. Et_2O . Sublimes. Volatile in steam.

Otterbacher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Dyson, George, *J. Chem. Soc.*, 1924, 125, 1704.

v. Braun, *Ber.*, 1900, 33, 2727.

Di-*m*-tolylthiourea.

Prisms. M.p. $111.5-112.5^\circ$. Sol. EtOH, CS_2 , C_6H_6 . Mod. sol. hot H_2O .

Snedker, *J. Soc. Chem. Ind.*, 1926, 45, 351r.

Dyson, George, *J. Chem. Soc.*, 1924, 125, 1704.

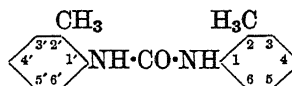
Di-*p*-tolylthiourea.

M.p. 178° . Mod. sol. EtOH. Insol. H_2O .

Dyson, George, *J. Chem. Soc.*, 1924, 125, 1704.

Hugershoff, *Ber.*, 1899, 32, 2246.

Snedker, *J. Soc. Chem. Ind.*, 1926, 45, 351r.

Di-*o*-tolylurea (2 : 2'-Dimethylcarbanilide, 2 : 2'-dimethyl-sym.-diphenylcarbamide)

$C_{15}H_{16}ON_2$

MW, 240

Needles. M.p. 256° (243° , 250°). Spar. sol. EtOH, C_6H_6 . Insol. H_2O . Sublimes.

Jadhav, *J. Indian Chem. Soc.*, 1931, 8, 683.

Mazourewitch, *Bull. soc. chim.*, 1924, 35, 1184.

Di-*m*-tolylurea.

Needles from EtOH. M.p. 220° (232° , 203°). Insol. H_2O .

B, HCl : m.p. 162° .

Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 794.

Jadhav, *J. Indian Chem. Soc.*, 1931, 8, 683.

Di-*p*-tolylurea.

Needles. M.p. 262–3° (260°). Spar. sol. cold EtOH. Insol. H₂O.

Mistry, Guha, *J. Indian Chem. Soc.*, 1930, 7, 794.

Jadhav, *J. Indian Chem. Soc.*, 1931, 8, 683.

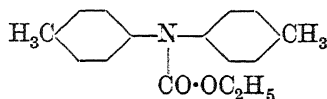
***o*:*m*-Ditolylurea (2:3'-Dimethylcarbanilide).**
Cryst. from EtOH. M.p. 140°.

Otterbacher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

***o*:*p*-Ditolylurea (2:4'-Dimethylcarbanilide).**
Cryst. from EtOH. M.p. 132°.

Otterbacher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Di-*p*-tolylurethane (Di-*p*-tolylcarbamic ethyl ester)



C₁₇H₁₉O₂N MW, 269

Leaflets from EtOH. M.p. 60–2°. Sol. EtOH, Et₂O, AcOH, C₆H₆, boiling ligroin.

Hammerich, *Ber.*, 1892, 25, 1824.

Di-*n*-tridecylcarbinol.

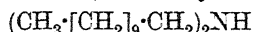
See Heptacosanol-14.

Di-*n*-tridecyl Ketone.

See Myristone.

Dityrin.

See 3:5-Di-iodotyrosine.

Diundecylamine (Dihendecylamine)

C₂₂H₄₇N MW, 325

Colourless needles from C₆H₆-EtOH (under nitrogen). M.p. 51·5–2·5°. B.p. 190–4°/0·8 mm.

Wright, Elderfield, *J. Org. Chem.*, 1946, 11, 111.

Di-*n*-undecylcarbinol.

See Tricosanol-12.

Di-*n*-undecyl Ketone.

See Laurone.

Diurea.

See *p*-Urazine.

Diureidoacetic Acid.

See Allantoic Acid.

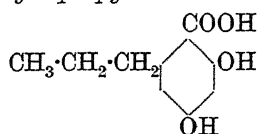
Diureidomalonic Acid.

See Uroxic Acid.

Diureidopropionic Acid.

See Homoallantoic Acid.

Divaric Acid (6-Propyl-β-resorcylic acid, 4:6-dihydroxy-o-propylbenzoic acid)



C₁₀H₁₂O₄

MW, 196

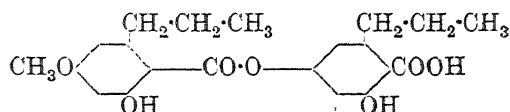
Needles from Et₂O. Plates from Me₂CO. M.p. 169° (179°). Easily sol. EtOH. Et₂O. Me₂CO. Spar. sol. cold H₂O. FeCl₃ → violet col. NaOCl → red-violet-blue-red col.

Me ester: m.p. 78°.

Hesse, *J. prakt. Chem.*, 1911, [2], 83, 38.

Sonn, Burkard, *Ber.*, 1928, 61, 2479.

Asahina, Akagi, Wake, *Ber.*, 1935, 68, 1130.

Divaricatic Acid

C₂₁H₂₄O₇

MW, 388

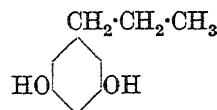
Constituent of *Evernia divaricata*. Needles from Me₂CO. M.p. 137°. Sol. EtOH, Et₂O, Me₂CO. Spar. sol. AcOH, CHCl₃, C₆H₆. Insol. pet. ether. Alc. FeCl₃ → violet col.

Diacetyl: needles from AcOEt. M.p. 145–6°. *Me ester*: C₂₂H₂₆O₇. MW, 402. Needles from MeOH. M.p. 76°. *Di-Me ether*: prisms from MeOH. M.p. 85°.

Asahina, Hirakata, *Ber.*, 1932, 65, 1665.

Asahina, Hiraiwa, *Ber.*, 1937, 70, 1826.

Divarinol (5-Propylresorcinol, 3:5-dihydroxy-1-propylbenzene)



C₉H₁₂O₂

MW, 152

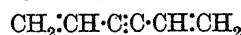
Leaflets from H₂O. M.p. 51° (anhyd. from C₆H₆, m.p. 83–4°). Sol. Et₂O, EtOH, Me₂CO, C₆H₆, AcOH, hot H₂O. Spar. sol. cold H₂O. Alk. sols. turn dark red in air. EtOH sol. + FeCl₃ → violet col.

Di-Me ether: C₁₁H₁₆O₂. MW, 180. B.p. 147°/29 mm., 126–7°/10 mm.

3:5-Diacetyl: m.p. 12–15°.

Mauthner, *J. prakt. Chem.*, 1924, 108, 275; 1922, 103, 391.

Asahina, *Ber.*, 1936, 69, 1643.

***sym.*-Divinylacetylene**

C₆H₆

MW, 78

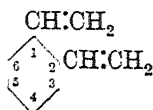
Colourless liq. becoming straw-coloured on exposure to light. B.p. 83·5°. D₄²⁰ 0·7851. n_D²⁰ 1·504.

Nieuwland, Calcott, Downing, Carter, *J. Am. Chem. Soc.*, 1931, 53, 4197.

du Pont, U.S.P. 1,829,502, (*Chem. Abstracts*, 1932, 26, 876).

Mita, *J. Chem. Soc. Japan*, 1943, 64, 633, (*Chem. Abstracts*, 1947, 41, 3742).

1 : 2-Divinylbenzene



$\text{C}_{10}\text{H}_{10}$ MW, 130
B.p. $78.5^\circ/11$ mm. D_4^{25} 0.934. n_D^{25} 1.5760.
Does not polymerise at ord. temp.

Deluchat, *Compt. rend.*, 1931, 192, 1387;
Ann. chim., 1934, 1, 182.

1 : 3-Divinylbenzene.

B.p. $52^\circ/3$ mm. D_4^{25} 0.926. n_D^{25} 1.5746.
Polymerises readily.

Johnston, Williams, *J. Am. Chem. Soc.*,
1947, 69, 2065.

Deluchat, *Compt. rend.*, 1931, 192, 1387;
Ann. Chim., 1934, 1, 182.

1 : 4-Divinylbenzene.

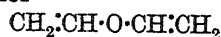
M.p. 31° . B.p. $85-6^\circ/16$ mm., $52^\circ/4$ mm.,
 $46-9^\circ/1-2$ mm. D_4^{20} 0.913. n_D^{25} 1.5835, n_D^{40} 1.5820.
Polymerises readily.

Lespieau, Deluchat, *Compt. rend.*, 1930,
190, 683.

Sabetay, *Compt. rend.*, 1931, 192, 1109.

Hochwalt, U.S.P. 2,390,368, (*Chem.*
Abstracts, 1946, 40, 1878).

Divinyl Ether



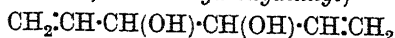
$\text{C}_4\text{H}_6\text{O}$ MW, 70
B.p. 39° .

Semmler, *Ann.*, 1887, 241, 114.

sym.-Divinylethylene.

See 1 : 3 : 5-Hexatriene.

Divinylethylene Glycol (3 : 4-Dihydroxy-1 : 5-hexadiene, 3 : 4-dihydroxydiallyl)



$\text{C}_6\text{H}_{10}\text{O}_2$ MW, 114

Meso :

M.p. $88-8.2^\circ$.

dl- :

M.p. 21.7° . B.p. $90.5-90.7^\circ/8$ mm.

Eutectic mixture consists of 21.5% meso- and
78.5% dl-.

The properties of an unresolved mixture have
been recorded as follows. B.p. $197-8^\circ$, $138-40^\circ/90$ mm., $97^\circ/13$ mm. Misc. with H_2O ,
 EtOH , Et_2O , CHCl_3 . D_4^{18} 1.007.

Di-Et ether : $\text{C}_{10}\text{H}_{18}\text{O}_2$. MW, 170. B.p.
 $224-6^\circ$, $111-13^\circ/10$ mm. D_4^0 0.911.

Risseghem, *Chem. Abstracts*, 1939, 33,
2103.

Griner, *Ann. chim.*, 1892, 26, 369.

Young, Cristol, Weiss, *J. Am. Chem. Soc.*,
1943, 65, 1245.

Divinylmethane.

See 1 : 4-Pentadiene.

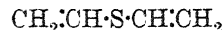
Divinylpentane.

See Nonadiene.

Divinylpropane.

See 3-Methyl-1 : 5-hexadiene.

Divinyl sulphide (Vinyl sulphide, divinyl thioether)



$\text{C}_4\text{H}_6\text{S}$ MW, 86

Colourless liq. with odour of garlic. B.p.
 $85-6^\circ$. D_4^{15} 0.9174. Polymerises readily.

Bales, Nickelson, *J. Chem. Soc.*, 1922,
121, 2137.

Alexander, McCombie, *J. Chem. Soc.*,
1931, 134, 1913.

Dixenyl.

See Benzerythrene.

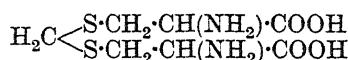
Dixenylhydrazine.

See Hydrazodiphenyl.

Di-xylylamine.

See Dimethyldibenzylamine.

Djenkolic Acid



$\text{C}_7\text{H}_{14}\text{O}_4\text{N}_2\text{S}_2$ MW, 254

Constituent of djenkol bean. Needles from
 H_2O or HCl . M.p. $300-350^\circ$ decomp. Neutral.
 $[\alpha]_D^{25} - 44.5^\circ$ in 1% HCl . Stable to boiling HCl .
 $\text{H}_2\text{SO}_4 \rightarrow$ cystine + $\text{H}\cdot\text{CHO}$. $\text{KCN}\text{O} \rightarrow$
hydantoin deriv., m.p. 200° .

B, HCl : m.p. $250-300^\circ$ decomp.

Di-Et ester : hydrochloride, m.p. 60° .

Dibenzoyl : m.p. 85° .

du Vigneaud, Patterson, *J. Biol. Chem.*,
1936, 114, 533.

van Veen, Hyman, *Rec. trav. chim.*, 1935,
54, 493.

Armstrong, du Vigneaud, *J. Biol. Chem.*,
1947, 168, 373.

D.M.

See 10-Chloro-5 : 10-dihydrophenarsazine.

Docosane

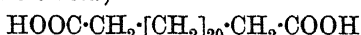


$\text{C}_{22}\text{H}_{46}$ MW, 310

Cryst. from Et_2O . M.p. 47° . B.p. $224^\circ/15$
mm. Mod. sol. hot EtOH . D_4^{20} 0.7549.

Levene, West, van der Scheer, *J. Biol.*
Chem., 1915, 20, 528.

Docosane-1 : 22-dicarboxylic Acid (Tetra-cosandioic acid)



$\text{C}_{24}\text{H}_{46}\text{O}_4$ MW, 398

M.p. $126.9-127.1^\circ$.

Di-Me ester : m.p. $75.0-75.2^\circ$.

Di-Et ester : m.p. $65.9-66.1^\circ$.

Siina, *Chem. Abstracts*, 1939, 33, 7278.

Docosanic Acid.

See Behenic Acid.

Docosanol.

See Docosyl Alcohol.

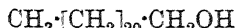
Docosenoic Acid.

See Brassidic Acid, Cetolic Acid and Erucic Acid.

Docosenol.

See Erucyl Alcohol.

Docosyl Alcohol (*Docosan-1, 1-hydroxydocosane*)



$\text{C}_{22}\text{H}_{46}\text{O}$ MW, 326

M.p. $70\cdot8^\circ$ ($73\cdot4^\circ$, 87°). Very sol. MeOH, EtOH.

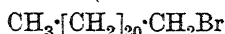
Sol. CHCl_3 , pet. ether. Spar. sol. Et_2O .

Phenylurethane: m.p. $86\cdot0$ – $86\cdot5^\circ$.

4-Methoxyphenylurethane: m.p. 98° .

3:4-Dimethoxyphenylurethane: m.p. $92\cdot5^\circ$.

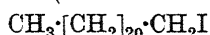
Francis, Collins, Piper, *Proc. Roy. Soc.*, 1937, A, 158, 695.

Docosyl bromide (*1-Bromodocosane*)

$\text{C}_{22}\text{H}_{45}\text{Br}$ MW, 389

Cryst. from Me_2CO . M.p. 44° . B.p. $225^\circ/0\cdot6$ mm. Spar. sol. EtOH, Et_2O .

v. Braun, Teuffert, Weissbach, *Ann.*, 1929, 472, 132.

Docosyl iodide (*1-Iododocosane*)

$\text{C}_{22}\text{H}_{45}\text{I}$ MW, 436

Two forms. (α). M.p. $41\cdot5^\circ$. (β). Scales from pet. ether. M.p. $48\cdot2^\circ$. B.p. $198^\circ/0\cdot23$ mm.

Francis, Collins, Piper, *Proc. Roy. Soc.*, 1937, A, 158, 704.

Decafluoropentane (*Perfluoropentane*)

C_5F_{12} MW, 288

B.p. 30° . M.p. -10° .

Simons, Block, *J. Am. Chem. Soc.*, 1937, 59, 1407.

Decahydrobenzidine.

See Perhydrobenzidine.

Decahydrobenzophenone.

See Dicyclohexyl Ketone.

Decahydrodiphenyl.

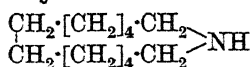
See Dicyclohexyl.

Decahydrodiphenylamine.

See Dicyclohexylamine.

Decamethylene chloride.

See 1:12-Dichlorododecane.

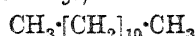
Decamethyleneimine

$\text{C}_{12}\text{H}_{25}\text{N}$ MW, 183

B.p. $156^\circ/25$ mm. D_4^{21} 0.8913. n_D^{21} 1.4800. pK 9.31.

Picrate: m.p. $153\cdot5$ – $154\cdot5^\circ$.

Ruzicka, Kobelt, Hafliger, Prelog, *Helv. Chim. Acta*, 1949, 32, 544.

Dodecane (*Dihexyl*)

$\text{C}_{12}\text{H}_{26}$ MW, 170

Constituent of American petroleum. M.p.

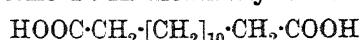
-12° . B.p. $214\cdot5^\circ$, $145^\circ/100$ mm., $98^\circ/15$ mm. D_4^{20} 0.7511.

Schrauth, Schenck, Stieckdorn, *Ber.*, 1931, 64, 1316.

Krafft, *Ber.*, 1882, 15, 1698.

Dodecane-1-carboxylic Acid.

See Tridecyllic Acid.

Dodecane-1:12-dicarboxylic Acid

$\text{C}_{14}\text{H}_{26}\text{O}_4$ MW, 258

Cryst. M.p. $125\cdot6^\circ$.

Di-Me ester: $\text{C}_{16}\text{H}_{30}\text{O}_4$. MW, 286. M.p. $43\cdot5^\circ$.

Erdtmann, *Acta. Chem. Scand.*, 1948, 2, 202.

Dodecanol.

See Dodecyl Alcohol, Ethylnonylcarbinol and *n*-Amyl-*n*-hexylcarbinol.

Dodecanone.

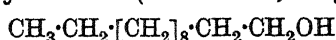
See Methyl *n*-decyl Ketone, Ethyl nonyl Ketone and *n*-Amyl *n*-hexyl Ketone.

4-Dodecenoic Acid.

See Linderic Acid.

2-Dodecyne.

See Methylnonylacetylene.

Dodecyl Alcohol (*Dodecanol-1, lauryl alcohol*)

$\text{C}_{12}\text{H}_{26}\text{O}$ MW, 186

Leaflets from EtOH.Aq. M.p. 26° . B.p. $255\cdot9^\circ$, $150^\circ/20$ mm., $145\cdot8^\circ/18$ mm. D_4^{20} 0.8201. Sulphuric esters are used as wetting agents and detergents.

Formyl: b.p. $145\cdot46^\circ/15$ mm.

Propionyl: b.p. $166\cdot68^\circ/20$ mm.

Butyryl: b.p. $194\cdot5^\circ/30$ mm. D_4^{25} 0.8562. n_D^{20} 1.4353.

Caproyl: f.p. $-4\cdot6^\circ$. B.p. $221\cdot3^\circ/20$ mm. D_4^{20} 0.8743. n_D^{25} 1.4382.

p-Bromobenzenesulphonyl: cryst. from pet. ether. M.p. 49° .

p-Toluenesulphonyl: cryst. from pet. ether. M.p. 30° .

Phenylurethane: needles from MeOH.Aq. M.p. 84° .

p-Diphenylurethane: m.p. 113° .

Ford, Marvel, *Organic Syntheses*, 1930, X, 62.

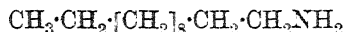
Schrauth, Schenck, Stieckdorn, *Ber.*, 1931, 64, 1317.

Adkins, Folkers, *J. Am. Chem. Soc.*, 1931, 53, 1096.

Palfray, Sabetay, *Bull. soc. chim.*, 1936, 3, 682.

Dodecylaldehyde.

See Lauric Aldehyde.

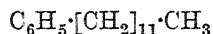
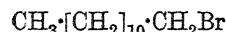
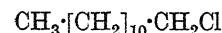
Dodecylamine (1-Aminododecane, laurylamine) $\text{C}_{12}\text{H}_{27}\text{N}$ MW, 185

M.p. 27–8°. B.p. 247–9°, 134–5°/15 mm.

B.HCl: m.p. 95°.

B₂H₂PtCl₆: yellow plates from EtOH. Decomp. at 215°.

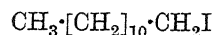
p-Toluenesulphonyl: m.p. 73°.

Wojcik, Adkins, *J. Am. Chem. Soc.*, 1934, 56, 2419.Wibaut, Heierman, Wagtendonk, *Rec. trav. chim.*, 1938, 57, 456.Braun, Lotz, *Ber.*, 1937, 70, 979.Krafft, *Ber.*, 1890, 23, 2363.**Dodecylbenzene** (Phenyldodecane, laurylbenzene) $\text{C}_{18}\text{H}_{30}$ MW, 246M.p. –7°. B.p. 179–80°/13 mm., 138°/2 mm. D₂₀²¹ 0.8598. n_D²⁰ 1.4743.I.G., F.P. 801,499, (*Chem. Zentr.*, 1937, I, 1016).Petrov, Lapteva, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 20, (*Chem. Abstracts*, 1938, 32, 5386).**Dodecyl bromide** (Lauryl bromide, 1-bromododecane) $\text{C}_{12}\text{H}_{25}\text{Br}$ MW, 249B.p. 199.5–201.5°/100 mm., 175–80°/45 mm., 134–35°/6 mm., 92–3°/0.2 mm. D₄²⁰ 1.0382. n_D²⁰ 1.4580.Reid, Ruhoff, Burnett, *Organic Syntheses*, 1935, XV, 24.**Dodecyl chloride** (Lauryl chloride, 1-chlorododecane) $\text{C}_{12}\text{H}_{25}\text{Cl}$ MW, 204.5B.p. 130°/15 mm., 116.5°/5 mm. D₄²⁰ 0.8673. n_D²⁰ 1.44255.Rothstein, *Bull. soc. chim.*, 1935, 2, 80.Vogel, *J. Chem. Soc.*, 1943, 636.**4-Dodecylenic Acid.**

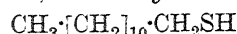
See Linderic Acid.

Dodecylic Acid.

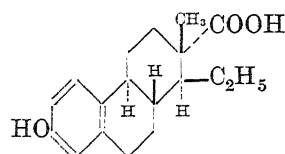
See Lauric Acid.

Dodecyl iodide (Lauryl iodide, 1-iodododecane) $\text{C}_{12}\text{H}_{25}\text{I}$ MW, 296

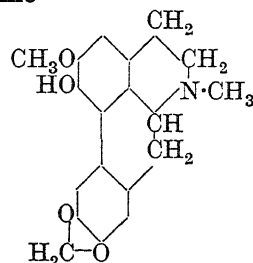
B.p. 145–50°/0.7 mm.

Levene, West, *J. Biol. Chem.*, 1914, 18, 478.**Dodecyl Mercaptan** (1-Mercaptododecane, lauryl mercaptan, thioldodecyl alcohol) $\text{C}_{12}\text{H}_{26}\text{S}$ MW, 202B.p. 165–9°/39 mm., 153–5°/24 mm., 142–5°/15 mm., 124°/5 mm., 111–12°/3 mm., 95–6°/1–1.5 mm. D₂₀²⁰ 0.8450. n_D²⁰ 1.45886.Noller, Gordon, *J. Am. Chem. Soc.*, 1933, 55, 1091.Henkel, F.P. 751,117, (*Chem. Abstracts*, 1934, 28, 1049).Eibel, Kirstahler, U.S.P. 2,031,529, (*Chem. Abstracts*, 1936, 30, 2202).**Dodecylvinylcarbinol.**

See 1-Pentadecenol-3.

Doisynolic Acid $\text{C}_{17}\text{H}_{22}\text{O}_3$ MW, 274Obtained by alk. fusion of oestrone. Cryst. from MeOH.Aq. M.p. 199–200°. [α]_D²⁰ +102° in EtOH. Highly oestrogenic.Me ester: cryst. from MeOH.Aq. M.p. 106–7°. [α]_D²⁰ +97° in EtOH. Benzoyl: cryst. from MeOH. M.p. 150–1°. [α]_D²⁰ +60° in CHCl₃.Heer, Miescher, *Helv. Chim. Acta*, 1945, 28, 156.Shoppee, *Annual Reports of the Chemical Society* (London), 1947, 44, 190 (*Bibl.*).**Dolantin.**

See Pethidine.

Domesticine $\text{C}_{18}\text{H}_{19}\text{O}_4\text{N}$ MW, 313Alkaloid occurring in *Naudani domestica*, Thunb. M.p. 115–17°. [α]_D +60.5°.

Me ether: as prepared from natural product is identical with d-epidicentrine.

Me ether:

dl-.

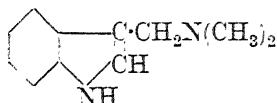
Prisms from MeOH. M.p. 142°. Resolved as tartrates. B.HCl: darkens at 255°. M.p. 265–70° decomp. Methosulphate: needles from EtOH. M.p. 238°. Picrate: orange prisms from EtOH. M.p. 202–4° decomp.

l.
Prisms from MeOH. M.p. 138–9°. $[\alpha]_D^{25}$
– 101° in CHCl₃.

d. *d*-Epicentrine.
Prisms from MeOH. M.p. 138–9°. $[\alpha]_D^{25}$
+ 102° in CHCl₃.

Kitasato, Shishidi, *Ann.*, 1937, 527, 176.

Donaxine (3-Dimethylaminomethylindole,
gramine)



C₁₁H₁₄N₂ MW, 174

Isolated from *Arundo donax*, Linn. Needles
from Me₂CO. M.p. 138–9°. Sol. EtOH, Et₂O,
CHCl₃. Insol. H₂O, pet. ether. Alkaline to
litmus.

Perchlorate: cryst. from H₂O. M.p. 150–1°.
Chloroplatinate: red needles from dil. HCl.
M.p. 180–1° decomp.

Methiodide: cryst. from MeOH. M.p. 176–
77°.

Picrate: cryst. from EtOH. M.p. 144–5°.

Wieland, Hsing, *Ann.*, 1936, 526, 188.

Kuhn, Stein, *Ber.*, 1937, 70, 567.

Orékhov, Norkina, Maximova, *Ber.*, 1935,
68, 436.

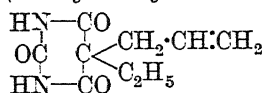
Dopa.

See β-[3:4-Dihydroxyphenyl]-α-alanine.

Dormigene.

See 1-Bromoisovalerylurea.

Dormin (5-Ethyl-5-allylbarbituric Acid)



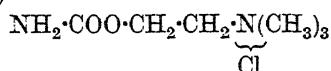
C₉H₁₂O₃N₂ MW, 196

M.p. 158°. Powerful hypnotic.

Östling, *Chem. Abstracts*, 1927, 21, 777.

Jacobsen, Wollstein, Christensen, *Chem.*
Abstracts, 1939, 33, 1041.

Doryl (*Lentine*, carbamylcholine chloride, car-
bocholine)



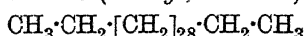
C₆H₁₅O₂N₂Cl MW, 182.5

Cryst. powder. M.p. 204–5°. Readily sol.
H₂O → neutral sol. Powerful parasymp-
athetic stimulator.

Kreitmair, *Chem. Zentr.*, 1933, II, 2698.

Kulakovski, *Chem. Abstracts*, 1944, 38,
1800.

Dotriacontane (*Dicetyl*, *lacceran*)



C₃₂H₆₆ MW, 450

Plates from Et₂O. M.p. 60–6°. B.p. 245°/1.5
mm. D_4^{20} 0.7791.

Levene, West, van der Scheer, *J. Biol.*
Chem., 1915, 20, 530.

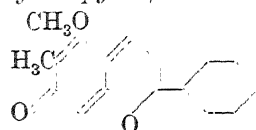
Dotriacontanol.

See Lacceryl.

D.P.N.

See Coenzyme I.

Drachorhodin (7-Hydroxy-5-methoxy-6-
methyl-2-phenylbenzopyran)



C₁₇H₁₄O₃ MW, 266

Cryst. red pigment from *Sanguis draconis*.
M.p. 168°.

Picrate: m.p. 217–20° decomp.

Perchlorate: m.p. 233–6°.

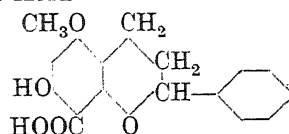
Brockmann, Junger, *Ber.*, 1943, 76, 751.

Robertson, Whalley, *J. Chem. Soc.*, 1950,
1882.

Dracocarmin.

See Dracorubin.

Dracoic Acid



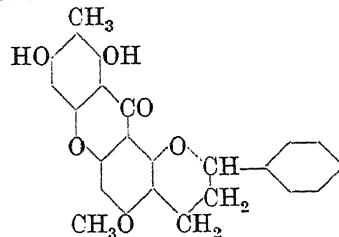
C₁₇H₁₆O₅ MW, 300

Needles from MeOH. M.p. 167°. Sol. C₆H₆.
Spar. sol. EtOH. FeCl₃ → violet-brown col.

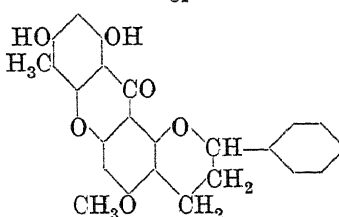
Me ester: C₁₈H₁₈O₅. MW, 314. Prisms
from MeOH. M.p. 145°. $[\alpha]_D^{25}$ –80.5° in
CHCl₃. FeCl₃ → steel-blue col.

Robertson, Whalley, Yates, *J. Chem.*
Soc., 1950, 3117.

Draconol



or

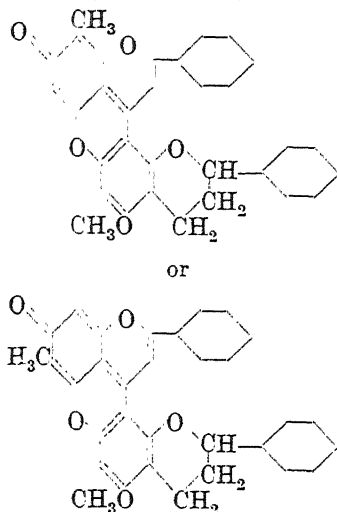


C₂₄H₂₀O₆ MW, 404

Cryst. from MeOH. M.p. 256° decomp.
B.HClO₄: yellow prisms. M.p. 206–8° decomp.
Methopерchlorate: m.p. 139–40° decomp.
Boracetic acid add. comp.: prisms. M.p. 269° decomp.

Robertson, Whalley, Yates, *J. Chem. Soc.*, 1950, 3117.

Dracorubin (Dracocarmin)



$C_{32}H_{24}O_5$ MW, 488
 Red pigment from *Sanguis draconis*. M.p. 314–15°. $[\alpha]_D^{25} -35^\circ$ in $CHCl_3$. $H_2O_2 \rightarrow$ draconol + dracoic acid.

Brockmann, Haase, *Ber.*, 1937, 70, 1733.
 Brockmann, Haase, Freienhner, *Ber.*, 1944, 77, 279.

Robertson, Whalley, Yates, *J. Chem. Soc.*, 1950, 1876, 3117.

Drimanol

$C_{16}H_{30}O$ MW, 238
 Cryst. M.p. 110–11°. $[\alpha]_D^{25} +13.4^\circ$.
Acetyl: needles. M.p. 28–9°.

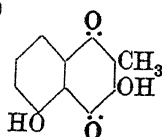
Appel, *Scientia*, 1948, 15, No. 1, 31,
 (*Chem. Abstracts*, 1948, 42, 9088).

Drimenol

$C_{16}H_{28}O$ MW, 236
 Constituent of bark and leaves of cinnamon, *Drymis winteri*, Forst. Cryst. from C_6H_6 , EtOH or Et_2O . M.p. 97–8°. B.p. 150.5–151°/3.5 mm. $[\alpha]_D^{25} -14.7^\circ$. Absorbs Br.

Appel, *Scientia*, 1948, 15, No. 1, 31,
 (*Chem. Abstracts*, 1948, 42, 9088).

Droserone (3 : 5-Dihydroxy-2-methyl-1 : 4-naphthoquinone)



$C_{11}H_8O_4$

MW, 204

Occurs in *Drosera Whittakeri* and *Drosera rotundifolia*. Pale yellow needles from EtOH or AcOH. M.p. 181°. Sol. EtOH, Et_2O , pet. ether, warm H_2O . Sublimes at 100–110°/3 mm.
Diacetyl: needles from MeOH. M.p. 119°.

Dioxime: m.p. 151°.

Lugg, Macbeth, Winzor, *J. Chem. Soc.*, 1937, 1597.

Rennie, *J. Chem. Soc.*, 1887, 51, 371; 1893, 63, 1083.

Thomson, *J. Chem. Soc.*, 1949, 1277.

Dryophantin

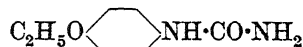
$C_{23}H_{28}O_{15}$ MW, 544

Pigment of red pea gall from *Quercus pedunculata*. Deep red needles with bronzy lustre from EtOH. M.p. 219–20°. Very sol. MeOH, EtOH, Me_2CO . Spar. sol. H_2O . Hyd. \rightarrow 1 mol. purpurogallin + 2 mols. glucose. Alc. NaOH \rightarrow blue sol. which becomes red on acidification.

Nierenstein, *J. Chem. Soc.*, 1919, 115, 1328.

Nierenstein, Thomas, *Analyst*, 1941, 66, 492.

Dulcin (p-Ethoxyphenylurea, p-phenetylurea, p-ureidophenetole, Sucrol)



$C_9H_{12}O_2N_2$ MW, 180

Cryst. from H_2O . M.p. 171–2° (160°). Sol. hot H_2O and ord. org. solvents. Sweetening agent. Very much sweeter than cane sugar.

N-Acetyl: m.p. 220°.

N-Benzoyl: m.p. 215–17°.

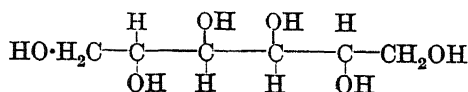
Uhthoff, Moragas, *Chem. Abstracts*, 1929, 23, 1889.

Riedel, D.R.P. 313,965, (*Chem. Zentr.*, 1919, IV, 738).

Sah, Chang, *Ber.*, 1936, 69, 2762.

Roura, *Chem. Abstracts*, 1942, 36, 2845.

Dulcitol (Dulcite, galacticol, melampyrin)



$C_6H_{14}O_6$ MW, 182

Occurs in *Melampyrum nemorosum* (Madagascar manna) and other plants. Prisms. M.p. 188.5°. B.p. 275–80°/1 mm. Sol. to 3% in cold H_2O . Very sol. hot H_2O . Spar. sol. EtOH. Insol. Et_2O . Heat of comb. C_v 729.1 Cal. Optically inactive. $k = 3 \times 10^{-14}$ at 18°. Does not reduce Fehling's. $HNO_3 \rightarrow$ mucic acid. HI \rightarrow 2- and 3-iodohexanes.

Hexa-acetyl: cryst. from MeOH. M.p. 171° (166°).

Hexabenzoyl: m.p. 189°.

Penta-nitrate: m.p. 75°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Hexa-nitrate: "nitrodulcitol." M.p. 94-5°. Reduces Fehling's.

Fischer, Hertz, *Ber.*, 1892, 25, 1261.

Lespieau, *Bull. soc. chim.*, 1934, 1, 1374.

Baker, *Nature*, 1949, 164, 1093.

Fletcher, Hudson, *J. Am. Chem. Soc.*, 1950, 72, 886.

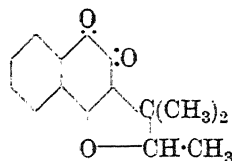
Dulcitolose.

See under Tagatose.

Dumasin.

See Cyclopentanone.

Dunnione



$C_{15}H_{14}O_3$

MW, 242

Occurs as deposits on the leaves of *Streptocarpus Dunnii*, Mast. Orange red needles from pet. ether or H_2O . M.p. 98-9°. Sol. alcohols, AcOH, Me_2CO , Et_2O , C_6H_6 , $CHCl_3$. Sol. H_2SO_4 , pptd. by H_2O . $[\alpha]_D^{18} + 310^\circ$ in $CHCl_3$. Hot HCl \rightarrow isomeric α -dunnione. Alkalis \rightarrow isomeric allodunnione.

Monosemicarbazone: yellow needles from MeOH.Aq. M.p. 232-3°.

Mono-2:4-dinitrophenylhydrazones: orange red needles from AcOH. M.p. 266-8°.

Price, Robinson, *J. Chem. Soc.*, 1940, 1493; 1939, 1522.

Duodenin.

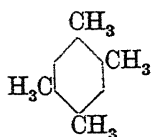
Hormone. The hypoglycemia-producing principle of the intestinal mucous membrane.

Nose, *Chem. Abstracts*, 1942, 36, 5525.

Duotal.

See under Guaiacol.

Durene (1:2:4:5-Tetramethylbenzene, *durol*)



$C_{10}H_{14}$

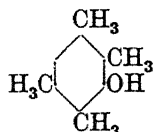
MW, 134

Leaflets with odour of camphor. M.p. 80°. B.p. 191-2°. Sol. EtOH, Et_2O , C_6H_6 . Sublimes. Volatile in steam. Dil. HNO_3 or CrO_3 in AcOH \rightarrow durylic acid.

Smith, *Organic Syntheses*, 1930, X, 32.

Braun, Nelles, *Ber.*, 1934, 67, 1098.

Durenol (2:3:5:6-Tetramethylphenol, 3-hydroxydurene, 3-hydroxy-1:2:4:5-tetramethylbenzene)



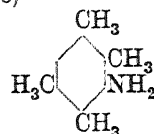
$C_{10}H_{14}O$

MW, 150

Prisms from EtOH. Needles from ligroin. M.p. 118-9°. B.p. 247-8°. Volatile in steam.

Kruber, Schmitt, *Ber.*, 1931, 64, 2277.

Duridine (3-Aminodurene, 3-amino-1:2:4:5-tetramethylbenzene)



$C_{10}H_{15}N$

MW, 149

Prisms from H_2O or MeOH.Aq. M.p. 75°. B.p. 261-2°. Volatile in steam. Ox. \rightarrow duroquinone.

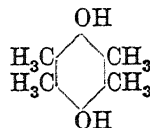
B.HCl: decomp. at 260°.

B. HNO_3 : decomp. at 200-5°.

N-Acetyl: prisms. M.p. 207°.

Willstätter, Kubli, *Ber.*, 1909, 42, 4160.

Durohydroquinone (*Hydroduroquinone*, 2:3:5:6-tetramethylhydroquinone, *dihydroxydurene*)



$C_{10}H_{14}O_2$

MW, 166

Needles from EtOH. M.p. 233°. Sinters at 220°. Spar. sol. Et_2O . $FeCl_3 \rightarrow$ duroquinone.

Mono-n-butyl ether: m.p. 81-2°.

Mono-sec.-butyl ether: m.p. 85-6°.

Di-n-butyl ether: m.p. 58°.

Mono-n-heptyl ether: m.p. 82-3°.

Di-n-heptyl ether: m.p. 56°.

Mono-n-octyl ether: m.p. 88°.

Di-n-octyl ether: m.p. 64°.

Mono-n-dodecyl ether: m.p. 96-7°. B.p. 160°/0.05 mm.

Di-n-dodecyl ether: m.p. 79-80°.

Monocetyl ether: m.p. 99-100°.

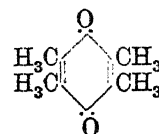
Dicetyl ether: m.p. 88-9°.

Diacetyl: needles from EtOH. M.p. 207°.

v. Pechmann, *Ber.*, 1888, 21, 1421.

Smith, Dobrovolny, *J. Am. Chem. Soc.*, 1926, 48, 1422.

Duroquinone (2:3:5:6-Tetramethyl-p-benzoquinone)



$C_{10}H_{12}O_2$

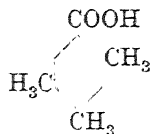
MW, 164

Yellow needles from ligroin. M.p. 111°. Sol. EtOH, Et_2O , C_6H_6 , hot ligroin. Sublimes. Volatile in steam. Easily reduces to durohydroquinone.

Smith, *Organic Syntheses*, 1930, X, 40.

Duryl Aldehyde.

See 2 : 4 : 5-Trimethylbenzaldehyde.

Durylic Acid (2 : 4 : 5-Trimethylbenzoic acid) $\text{C}_{10}\text{H}_{12}\text{O}_2$ MW, 164

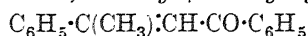
Needles from C_6H_6 . M.p. 150° . Sol. EtOH, Et_2O . Mod. sol. C_6H_6 . Prac. insol. H_2O . Volatile in steam.

Amide: $\text{C}_{10}\text{H}_{13}\text{ON}$. MW, 163. Needles from EtOH.Aq. M.p. $200-1^\circ$.

Nitrile: $\text{C}_{10}\text{H}_{11}\text{N}$. MW, 145. Needles from EtOH. M.p. 57.5° . B.p. 250° . Sol. ord. org. solvents. Insol. H_2O .

Mills, *J. Chem. Soc.*, 1912, 101, 2192.

Dypnone (*Phenyl α -methylstyryl ketone*, α -methylchalkone, α -methyl- β -benzoylstyrene)

 $\text{C}_{16}\text{H}_{14}\text{O}$ MW, 222

B.p. $340-5^\circ$ part. decomp., $225^\circ/22$ mm. D_4^{20} 1.108. Dil. alc. KOH \longrightarrow acetophenone.

Conc. alc. KOH \longrightarrow dypnopinacone.

syn.-*Oxime*: cryst. from EtOH. M.p. 134° .

anti-*Oxime*: needles. M.p. 78° .

Semicarbazone: prisms from C_6H_6 . M.p. 151° .

Kohler, *Am. Chem. J.*, 1904, 31, 658.

Delacre, *Ann. chim.*, 1914, 2, 71.

Calloway, Green, *J. Am. Chem. Soc.*, 1937, 59, 809.

Wayne, Adkins, *Organic Syntheses*, 1941, XXI, 39.

Dyslyte.

See Dislite.

E

Eburicoic Acid

$C_{30}H_{48}O_3$ MW, 456

Constituent of *Polyporus anthracophilus* Cooke, *P. eucalyptorum* Fr., *P. sulphureus* (Bull.) Fr., *Fomes officinalis* Fr., and *Lentinus dactyloides* Clrel., when grown on synthetic media. Cryst. from $CHCl_3$ -EtOH. M.p. 292-3°. $[\alpha]_D^{25} + 34^\circ$ in Py, $+ 50^\circ$ in $CHCl_3$.

Me ester: $C_{31}H_{50}O_3$. MW, 470. Cryst. from AcOEt. M.p. 146-7°. $[\alpha]_D^{25} + 45^\circ$.

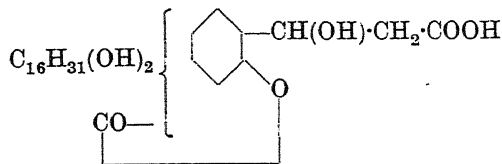
Acetyl deriv.: $C_{32}H_{50}O_4$. MW, 498. Occurs in mycelium of *Polyporus anthracophilus* growing on eucalyptus wood. Cryst. M.p. 259°. $[\alpha]_D^{25} + 42^\circ$. *Me ester*: $C_{33}H_{52}O_4$. MW, 512. Cryst. from MeOH. M.p. 157-8°. $[\alpha]_D^{25} + 48^\circ$.

Benzoyl deriv.: cryst. from Me_2CO . M.p. 166°. $[\alpha]_D^{25} + 57^\circ$. *Me ester*: cryst. from Me_2CO . M.p. 200-1°. $[\alpha]_D^{25} + 71^\circ$.

Kariyone, Kurono, *J. Pharm. Soc. Japan*, 1940, 60, 318.

Lahey, Strasser, *J. Chem. Soc.*, 1951, 873.
Gascoigne, Holker, Ralph, Robertson, *ibid.*, 2346.

Ecballiumic Acid



$C_{26}H_{38}O_7$ MW, 462

From elaterin. Cubes from MeOH. M.p. 257° decomp. Sol. MeOH, AcOH, AcOEt, Me_2CO . $[\alpha]_D^{25} - 57.9^\circ$ in Me_2CO .

Me ester: prisms from MeOH. M.p. 210°.

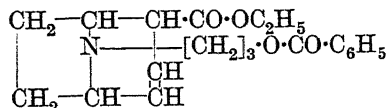
Monoacetyl: cryst. from MeOH.Aq. M.p. 265°.

Diacetyl: plates from MeOH.Aq. M.p. 246°.

Triacetyl: amorphous.

Borsche, Diacont, *Ann.*, 1937, 528, 39.

Eccaine



$C_{20}H_{25}O_4N$ MW, 343

Oil. Non-toxic anæsthetic.

B_2HCl : cryst. from EtOH-Et₂O. M.p. 117°. Sol. H₂O.

$B_2H_2PtCl_6$: m.p. 69-70°.

Picrate: m.p. 139-41°.

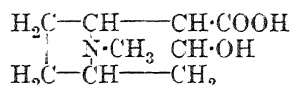
Methiodide: m.p. 194-5°.

v. Braun, Müller, *Ber.*, 1918, 51, 251.

Ecgonidine.

See Anhydroecgonine.

Ecgonine



$C_9H_{15}O_3N$ MW, 185

l.

Prisms $+ 1H_2O$ from EtOH.Aq. M.p. 198° decomp. M.p. anhyd. 205°. Sol. H₂O, EtOH. Insol. Et₂O. $[\alpha]_D - 45.4^\circ$. $KMnO_4 \rightarrow$ nor-*l*-ecgonine.

Me ester: $C_{10}H_{17}O_3N$. MW, 199. Occurs in Java cocoa leaves. Prisms from EtOH. M.p. 212° decomp. *Methiodide*: m.p. 164°. $[\alpha]_D^{20} - 17.6^\circ$. *Cinnamoyl*: see Cinnamoylcocaine.

Amide: $C_9H_{16}O_2N_2$. MW, 184. Prisms or plates from EtOH. M.p. 198°. Sol. H₂O. Insol. Et₂O, Me_2CO , C_6H_6 . *Hydrochloride*: m.p. 275° decomp. *Chloroplatinate*: m.p. 239° decomp. *Picrate*: needles from EtOH.Aq. M.p. 150°.

B_2HCl : plates. M.p. 246°. $[\alpha]_D - 57^\circ$.

$B_2H_2PtCl_6$: m.p. 226°.

Benzoyl: needles from H₂O. M.p. anhyd. 195°. $[\alpha]_D - 63.3^\circ$ in H₂O. *Me ester*: see β -Cocaine. *Et ester*: Homococaine, cocaethylene. Prisms from Et₂O. M.p. 108-9°. Similar to cocaine but less toxic. Not mydriatic.

dl.

Plates $+ 3H_2O$ from EtOH.Aq. M.p. 93-118°, anhyd. 203° (212° rapid heat.).

Me ester: *hydrochloride*, m.p. 195°. *Methiodide*: m.p. 162°.

B_2HCl : plates. M.p. 247°.

Chloroaurate: needles. M.p. 205°.

Willstätter, Bode, *Ann.*, 1902, 326, 61, 76.

Willstätter, Wolfes, Mäder, *Ann.*, 1923, 434, 111.

Liebermann, *Ber.*, 1888, 21, 2351.

Liebermann, Giesel, *ibid.*, 3197.

Einhorn, Norwall, *Ber.*, 1893, 26, 963.

 ψ -Ecgonine

$C_9H_{15}O_3N$ MW, 185

d.

Cryst. from EtOH. M.p. 254° (264°).

Me ester: $C_{10}H_{17}O_3N$. MW, 199. Cryst. from Et₂O. M.p. 115°. $[\alpha]_D^{20} + 19.5^\circ$ in H₂O. B_2HCl : $[\alpha]_D^{20} + 23.67^\circ$ in H₂O.

B_2HCl : prisms. M.p. 236°. $[\alpha]_D + 1.6^\circ$.

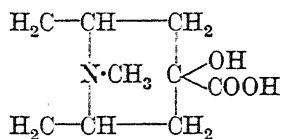
B_2HAuCl_4 : m.p. 220° decomp.

Methiodide: leaflets from MeOH. M.p. 209°.

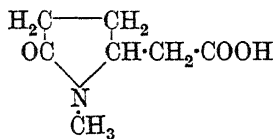
l-.

Me ester: m.p. 115°.

r-.

Cryst. from EtOH. M.p. 251° decomp. Sol. H₂O. Spar. sol. EtOH.*Me ester*: prisms. M.p. 125-6°. *Methiodide*: needles from EtOH. M.p. 182-5°.*B, HCl, 1/2 H₂O*: needles. M.p. 149°.*Chloroaurate*: needles. M.p. 213° decomp.Willstätter, Wolfes, Mäder, *Ann.*, 1923, 434, 124.Einhorn, Marquardt, *Ber.*, 1890, 23, 468.Willstätter, Bode, *Ber.*, 1901, 34, 1457. α -EcgonineC₉H₁₅O₃N

MW, 185

Cryst. from H₂O. M.p. 305° decomp. Sol. H₂O, EtOH.Aq.*Me ester*: C₁₀H₁₇O₃N. MW, 199. Prisms from Me₂CO or AcOEt. M.p. 114°. Sol. H₂O, EtOH. CHCl₃. Spar. sol. Et₂O. *B₂, H₂PtCl₆, 2H₂O*: m.p. 204°. *B, H₂AuCl₄*: orange-yellow leaflets from H₂O. M.p. 95-6°. *Methiodide*: needles from MeOH. M.p. 201-2°. *Picrate*: m.p. 189-91°.*Benzoyl*: cryst. from H₂O. M.p. 209° decomp. *Me ester*: see α -Cocaine.*B₂, H₂PtCl₆*: m.p. 223-4° decomp.*B, H₂AuCl₄, H₂O*: m.p. 183-4° decomp.Willstätter, *Ber.*, 1896, 29, 2216.**Ecgoninic Acid** (*N-Methyl-2-pyrrolidone-5-acetic acid*)C₇H₁₁O₃N

MW, 157

l-.

Prisms from AcOEt. M.p. 117-18°. Sol. AcOEt, Me₂CO, CHCl₃. Spar. sol. C₆H₆.*Me ester*: C₈H₁₃O₃N. MW, 171. B.p. 275°/13.5 mm.

r-.

Leaflets from AcOEt-C₆H₆. M.p. 93-5°. More soluble than l-form.*Ag salt*: needles from H₂O. M.p. 240° decomp.Willstätter, Bode, *Ber.*, 1901, 34, 519.Willstätter, Hollander, *ibid.*, 1818.Evans, Gray, Jackson, *J. Am. Chem. Soc.*, 1950, 72, 2727.

Echicerin

C₃₀H₄₈O₂

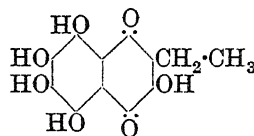
MW, 440

Constituent of *Echites scholaris*, Linn. Needles from EtOH. M.p. 157°. Sol. EtOH, Et₂O. CHCl₃, C₆H₆. [α]_D +63.75°. Na in pet. ether \rightarrow amorphous acid, C₃₀H₄₆O₄. Sol. conc. H₂SO₄ to yellow sol.*Bromide*: needles from EtOH. M.p. 116°.Jobst, Hesse, *Ann.*, 1875, 178, 58.

Echinenone

C₄₀H₅₈O(\pm 2H)MW, 554(\pm 2)Ketonic pigment isolated from sex glands of the sea urchin. Dark violet needles from pet. ether, C₆H₆ or MeOH. M.p. 192-3°. Absorption maxima in CS₂, 5200, 4800, 4500 Å. Possesses vitamin A activity. Ether sol. + HCl \rightarrow blue col.Lederer, *Compt. rend.*, 1935, 201, 300.Lederer, Moore, *Nature*, 1936, 137, 996.

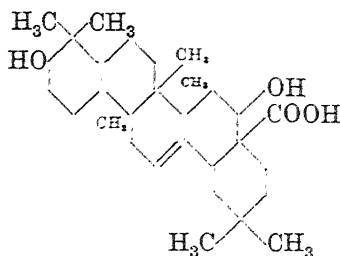
Echinulin.

Occurs in *Aspergillus echinulatus*. Colourless cryst. from EtOH. M.p. 242-3°. Insol. acids, alkalis.Quilico, Panizzi, *Ber.*, 1943, 76, 348.Quilico, *Gazz. chim. ital.*, 1948, 78, 111.**Echinochrome A** (3:5:6:7:8-Penta-hydroxy-2-ethyl-1:4-naphthoquinone)C₁₂H₁₀O₇

MW, 266

Pigment from mature ovaries of *Arbacia pustulosa* (sea urchin). Present as the prosthetic group of a high mol. weight complex which acts as a spermatozoa activating and agglutinating agent. Dark red needles from toluene. M.p. 220°. Sol. EtOH, Et₂O, Me₂CO. Spar. sol. CHCl₃. Prac. insol. pet. ether, H₂O. Sol. in dil. NaOH has bluish violet col. Absorption maxima in CHCl₃, 5330, 4970, 4620 Å; in C₆H₆, 5320, 4940, 4610 Å.*Tri-Me ether*: red needles. M.p. 129-30°. Absorption maxima in Et₂O, 5380, 5020, 4670 Å.Lederer, Glaser, *Compt. rend.*, 1939, 208, 1939; 1938, 207, 454.Kuhn, Wallenfels, *Ber.*, 1942, 75, 407; 1940, 73, 458; 1939, 72, 1407.Wallenfels, Gauhe, *Ber.*, 1942, 75, 413.Wallenfels, *ibid.*, 785.Goodwin, Lederer, Musajo, *Experientia*, 1951, 7, 375.

Echinocystic Acid

 $C_{30}H_{48}O_4$

MW, 472

Triterpenoid sapogenin obtained by hyd. of saponin from various species of *Echinocystis*. Cryst. from EtOH, Et₂O, AcOH or CCl₄. M.p. 305–12° decomp. $[\alpha]_{D}^{25} + 40.6^\circ$ in EtOH.

Me ester: m.p. 213–15°. $[\alpha]_{D}^{25} + 37.1^\circ$ in EtOH.

Diacetyl: m.p. 272–5°. $[\alpha]_{D}^{27} - 14.6^\circ$ in CHCl₃.

Bergsteinsson, Noller, *J. Am. Chem. Soc.*, 1934, 56, 1403.

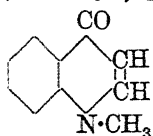
White, Noller, *J. Am. Chem. Soc.*, 1939, 61, 983.

Noller, Carson, *J. Am. Chem. Soc.*, 1941, 63, 2238.

Bilham, Kon, Ross, *J. Chem. Soc.*, 1942, 532.

Frazier, Noller, *J. Am. Chem. Soc.*, 1944, 66, 1267.

Jeger, Bischof, Ruzicka, *Helv. Chim. Acta*, 1948, 31, 1319.

Echinopsine (N-Methyl- γ -quinolone) $C_{10}H_9ON$

MW, 159

Alkaloid from seeds of *Echinops ritro*.

α -.

Cryst. from EtOH. M.p. 152°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. Et₂O.

B.HCl: m.p. 185–6°.

B.H₂PtCl₆: m.p. 210–12°.

Picrate: m.p. 223–4°.

β -.

Cryst. from EtOH. M.p. 135°.

Greshoff, *Rec. trav. chim.*, 1900, 19, 360.

Späth, Kolbe, *Monatsh.*, 1923, 43, 469.

Echitamidine

 $C_{20}H_{26}O_3N_2$

MW, 342

Constituent of bark of *Alstonia congensis*. Plates from Et₂O. M.p. 244° decomp. (B.H₂O: m.p. 135°.) Sol. H₂O, EtOH. $[\alpha]_{D}^{16} - 51.5^\circ$ in EtOH. Conc. HNO₃ \rightarrow blue col. \rightarrow yellow col.

B.HCl: m.p. 179° decomp.

B.HBr: m.p. 181° decomp.

B₂H₂SO₄: m.p. 169° decomp.

Picrate: m.p. 226–7° decomp.

Goodson, *J. Chem. Soc.*, 1932, 2628.

Echitamine (Ditaine)

 $C_{22}H_{25}O_4N_2$

MW, 384

Principal constituent of bark of *Alstonia congensis*. Prisms $+4H_2O$ from EtOH. Loses 3H₂O at 105°. B.H₂O, m.p. 206°. Sol. H₂O, EtOH, Et₂O. Insol. pet. ether. $[\alpha]_{D}^{20} - 28.8^\circ$ in EtOH. Conc. H₂SO₄ \rightarrow purple-red col.

B.HCl: m.p. 295°. Acetate:

$C_{22}H_{26}O_4N_2(O\cdot COCH_3)_2\cdot HCl$.

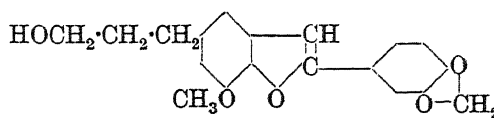
M.p. 271°.

B.HBr: m.p. 183°.

Goodson, Henry, *J. Chem. Soc.*, 1925, 127, 1640.

Hesse, *Ann.*, 1880, 203, 144.

Harnack, *Ber.*, 1880, 13, 1648.

Egonol (7-Methoxy-5-[γ -hydroxypropyl]-2-[3':4'-methylenedioxyphenyl]-coumarone) $C_{19}H_{18}O_5$

MW, 326

Constituent of the unsaponifiable portion of the seed oil of *Styrax japonicum*. Plates from butyl alcohol. M.p. 117.5–118°. B.p. 228–30°/0.15 mm. CHCl₃ sol. $+ SbCl_3$ -CHCl₃ slowly gives blue col.

Acetyl: plates from EtOH. M.p. 107°.

p-Nitrophenylurethane: yellow plates from dichloroethane. M.p. 208–9°.

Kawai, Miyoshi, *J. Chem. Soc. Japan*, 1936, 57, 1233; *Ber.*, 1938, 71, 1457.

Kawai, Nakamura, Sugiyama, *Proc. Imper. Acad., Tokyo*, 1939, 15, 45.

10:13-Eicosadienoic Acid

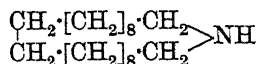
 $CH_3\cdot[CH_2]_4\cdot CH\cdot CH\cdot CH_2\cdot CH\cdot CH[CH_2]_9\cdot COOH$
 $C_{20}H_{36}O_2$

MW, 308

B.p. 198°/0.08 mm.

Karrer, Koenig, *Helv. Chim. Acta*, 1943, 26, 619.

Eicosamethyleneimine

 $C_{20}H_{41}N$

MW, 295

Cryst. M.p. 51.5°. pK 9.31.

Ruzicka et al., *Helv. Chim. Acta*, 1949, 32, 544.

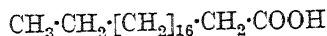
Eicosane (Didecyl)

$\text{CH}_3 \cdot \text{CH}_2 \cdot [\text{CH}_2]_{16} \cdot \text{CH}_2 \cdot \text{CH}_3$
 $\text{C}_{20}\text{H}_{42}$ MW, 282
 Leaflets from EtOH. M.p. 36–7°. B.p. 205°/15 mm. $D_{20}^{36.7}$ 0.7779.

Krafft, *Ber.*, 1886, 19, 2220.

Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, 52, 5280.

n-Eicosanic Acid (*Arachidic acid*, n-nona-decane-1-carboxylic acid, eicosoic acid, eicosanoic acid)



$\text{C}_{20}\text{H}_{40}\text{O}_2$ MW, 312
 Constituent of *Cascara sagrada*, and of arachis (earth-nut, pea-nut) oil as glyceride. Plates from EtOH. M.p. 77° (75°). B.p. 203–5°/1 mm. Sol. Et_2O , CHCl_3 , hot EtOH. D_{20}^{100} 0.8240. n_D^{100} 1.425.

Me ester: $\text{C}_{21}\text{H}_{42}\text{O}_2$. MW, 326. M.p. 54–5° (46–7°).

Et ester: $\text{C}_{22}\text{H}_{44}\text{O}_2$. MW, 340. M.p. 50° (42°). B.p. 295–7°/100 mm., 186–7°/2 mm.

Phenyl ester: $\text{C}_{26}\text{H}_{44}\text{O}_2$. MW, 388. M.p. 58–5°.

Anhydride: $\text{C}_{40}\text{H}_{78}\text{O}_3$. MW, 606. M.p. 77–5°.

Amide: $\text{C}_{20}\text{H}_{41}\text{ON}$. MW, 311. M.p. 108–9°.

Nitrile: $\text{C}_{20}\text{H}_{39}\text{N}$. MW, 293. M.p. 49–5°.

Bleyburg, Ulrich, *Ber.*, 1931, 64, 2512.

Adam, Dyer, *J. Chem. Soc.*, 1925, 127, 72.

Eicosanoic Acid.

See Eicosanic Acid.

Eicosanol.

See Eicosyl Alcohol.

Eicosanone-3.

See Ethyl n-heptadecyl Ketone.

Eicosanone-7.

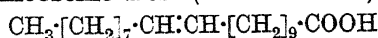
See n-Hexyl n-tridecyl Ketone.

1-Eicosene

$\text{C}_{20}\text{H}_{40}$ MW, 280

F.p. 28–5°. B.p. 151°/1.5 mm. n_D^{20} 1.4440.

Niemann, Wagner, *J. Org. Chem.*, 1942, 7, 229.

 Δ^{10} -Eicosenic Acid (*Eicosenoic acid*)

$\text{C}_{20}\text{H}_{38}\text{O}_2$ MW, 310

Cryst. from EtOH. M.p. 50°. B.p. 267°/15 mm.

Note. The name Eicosenic has also been given to Gadoleic Acid, *q.v.*

Bodenstein, *Ber.*, 1894, 27, 3403.

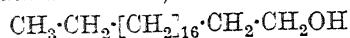
Eicosenoic Acid.

See Gadoleic Acid.

Eicosoic Acid.

See Eicosanic Acid.

Eicosyl Alcohol (1-Hydroxyeicosane, eicosanol, arachidic alcohol)



$\text{C}_{20}\text{H}_{42}\text{O}$ MW, 298

Wax. M.p. 65–5° (71°). B.p. 220°/3 mm. Sol. hot pet. ether, hot C_6H_6 . Ox. \rightarrow arachidic acid.

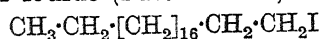
Acetyl: m.p. 40°.

Phenylurethane: m.p. 75–6°.

Adam, Dyer, *J. Chem. Soc.*, 1925, 127, 71.

Levene, Taylor, *J. Biol. Chem.*, 1924, 59, 905.

Haller, *Compt. rend.*, 1907, 144, 597.

Eicosyl iodide (1-Iodoeicosane)

$\text{C}_{20}\text{H}_{41}\text{I}$ MW, 409

Cryst. from Me_2CO . M.p. 42–3°. Zn + HCl \rightarrow eicosane.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, 20, 526.

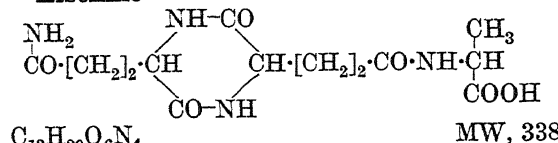
Levene, Taylor, *J. Biol. Chem.*, 1924, 59, 916.

Eicosylmalonic Acid.

See Heneicosane-1 : 1-dicarboxylic Acid.

Eikonogen.

See 1-Amino-2-naphthol-6-sulphonic Acid.

Eisenine

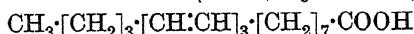
$\text{C}_{13}\text{H}_{20}\text{O}_6\text{N}_4$ MW, 338

Peptide occurring in *Eisenia bicyclis*. Cryst. from EtOH. M.p. 225–8°.

Tazawa, *Acta Phytochim.*, 1949, 15, 141, (*Chem. Abstracts*, 1950, 44, 3441).

Elæomargaric Acid.

See Elæostearic Acid.

Elæostearic Acid (*Elæomargaric acid*).

$\text{C}_{18}\text{H}_{30}\text{O}_2$ MW, 278

α - or *cis* :

Leaflets from EtOH. M.p. 49–9–2°. Sol. EtOH, Et_2O , CS_2 . D_{20}^{50} 0.9028. n_D^{25} 1.5043. n_D^{50} 1.5112. S or I \rightarrow β -form. Adds Br \rightarrow β -tetrabromide. Esters rearrange to β -esters.

β - or *trans* :

Leaflets from EtOH. M.p. 71–5–72°. D_{20}^{75} 0.8909. n_D^{25} 1.5022. Sol. hot EtOH, H_2O . Insol. Et_2O .

Me ester: $\text{C}_{19}\text{H}_{32}\text{O}_2$. MW, 292. B.p. 209–224°/10 mm. D_{20}^{12} 0.900. n_D^{12} 1.482.

Et ester: $C_{20}H_{34}O_2$. MW, 306. B.p. $232^\circ/14$ mm. n_D^{20} 1.502.

Bromide: m.p. 115° .

Böeseken, Hoogland, Smit, Broek, *Rec. trav. chim.*, 1927, 46, 619.

Böeseken, Ravenswaay, *Rec. trav. chim.*, 1925, 44, 241.

Kametaka, *J. Chem. Soc.*, 1903, 83, 1045.

Strain, *J. Am. Chem. Soc.*, 1941, 63, 3448.

Elaidic Acid (Trans isomer of oleic acid)



$C_{18}H_{34}O_2$ MW, 282

Plates from EtOH. M.p. $44-5^\circ$. Sol. EtOH, Et_2O . B.p. $234^\circ/15$ mm., $180-5^\circ/0.8$ mm. $D_{20}^{79.4}$ 0.8505. n_D^{20} 1.4308. SO_2 or S \rightarrow oleic acid. $HI \div P \rightarrow$ stearic acid.

Me ester: $C_{19}H_{36}O_2$. MW, 296. B.p. $213-15^\circ/15$ mm. D_{20}^{75} 0.8702. n_D^{25} 1.446.

Et ester: $C_{20}H_{38}O_2$. MW, 310. B.p. $217-19^\circ/15$ mm. D_{20}^{77} 0.8664. n_D^{25} 1.445.

Chloride: $C_{18}H_{33}OCl$. MW, 300.5. B.p. $216^\circ/13$ mm.

Anhydride: $C_{36}H_{66}O_3$. MW, 546. M.p. 51° .

Amide: $C_{18}H_{35}ON$. MW, 281. M.p. $93-4^\circ$.

Nitrile: $C_{18}H_{33}N$. MW, 263. M.p. -1° . B.p. $213^\circ/16$ mm.

Dibromide: see 8 : 9-Dibromostearic Acid.

Nitroschloride: m.p. $99-100^\circ$.

Harries, Thieme, *Ann.*, 1905, 343, 354.

Rankoff, *Ber.*, 1931, 64, 619.

Phillipi, *Monatsh.*, 1929, 51, 277 (*Bibl.*).

Baudart, *Compt. rend.*, 1943, 217, 399.

Gensler, Behrmann, Thomas, *J. Am. Chem. Soc.*, 1951, 73, 1071.

Elaidic Alcohol.

See Octadecenyl Alcohol.

Elaidolinolenic Acid

$C_{18}H_{30}O_2$ MW, 278

From treatment of linseed oil esters with Se. Colourless cryst. from pet. ether. M.p. $29-30^\circ$.

Kass, Nichols, Burr, *J. Am. Chem. Soc.*, 1941, 63, 1060.

Elaidyl Alcohol.

See Octadecenyl Alcohol.

α -Elaterin

$C_{28}H_{48}O_7$ MW, 486

Constituent of fruit of *Ecballium elaterium*, roots of *Citrullus colocynthis* Schrader, etc. Prisms from EtOH. M.p. 230° . Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Insol. H_2O . $[\alpha]_D^{25}$ -52.9° , $[\alpha]_D^{15}$ -36.6° in $CHCl_3$. Dark red sol. in conc. H_2SO_4 . Physiologically inactive.

Diacyl: m.p. $123-4^\circ$.

Power, Moore, *Pharm. J.*, 1919, [4], 29, 501; *J. Chem. Soc.*, 1909, 95, 1989.

Borsche, Diacont, *Ann.*, 1937, 528, 39.

Dict. of Org. Comp.—II.

β -Elaterin.

Constituent of fruit of *Ecballium elaterium*. Needles from EtOH. M.p. $190-5^\circ$. $[\alpha]_D^{25}$ $+13.9^\circ$. More sol. EtOH than α -elaterin. Physiologically active.

Power, Moore, *Pharm. J.*, 1919, [4], 29, 501; *J. Chem. Soc.*, 1909, 95, 1989.

Eleagnine

$C_{12}H_{14}N_2$ MW, 186

From bark of the *Eleagnus* genus. Cryst. M.p. $180-1.5^\circ$. Sublimes. Sol. Et_2O , $CHCl_3$, EtOH. Spar. sol. H_2O .

Hydrochloride: cryst. from EtOH- $CHCl_3$. M.p. $253.6-4.6^\circ$.

Massagetov, *J. Gen. Chem. U.S.S.R.*, 1946, 16, 139.

Elemene

$C_{30}H_{52}$ MW, 412

Oil. $[\alpha]_D$ -9.83° in $CHCl_3$.

Ruzicka et al., *Helv. Chim. Acta*, 1943, 26, 1659.

Elemenic Acid

$C_{30}H_{50}O_2$ MW, 442

M.p. $260.0-0.5^\circ$. $[\alpha]_D$ $+9.35^\circ$ in $CHCl_3$.

Me ester: m.p. $100.0-0.5^\circ$. $[\alpha]_D$ $+4.8^\circ$ in $CHCl_3$.

Chloride: m.p. $115-16^\circ$.

Ruzicka, Häusermann, Rey, *Helv. Chim. Acta*, 1942, 25, 1403.

Ruzicka et al., *Helv. Chim. Acta*, 1943, 26, 1659.

Elemenolic Acid (Dihydro- α -elemolic acid)

$C_{30}H_{50}O_3$ MW, 458

Needles. M.p. $237-8^\circ$. $[\alpha]_D$ -21.8° in $CHCl_3$.

Acetyl: cryst. from AcOH. M.p. $250-1^\circ$. $[\alpha]_D$ -33.1° in $CHCl_3$. *Me ester*: m.p. $130.5-1.0^\circ$. $[\alpha]_D$ -40.7° in $CHCl_3$.

Lieb, Mladenovic, *Monatsh.*, 1931, 58, 59. Ruzicka et al., *Helv. Chim. Acta*, 1932, 15, 1454.

Ruzicka, Rey, Spillmann, *Helv. Chim. Acta*, 1942, 25, 1375.

Elemenonic Acid (Dihydro- β -elemenonic acid)

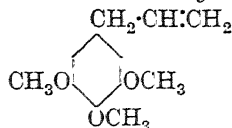
$C_{30}H_{48}O_3$ MW, 456

Needles from EtOH or AcOEt. M.p. $245-6^\circ$. $[\alpha]_D$ $+37.5^\circ$ in $CHCl_3$.

Oxime: colourless needles from MeOH or 90% EtOH. M.p. $233-4^\circ$ (240° after drying in vac. at 120°).

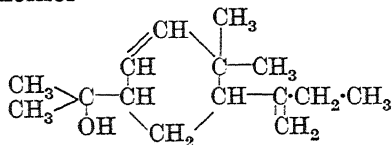
Ruzicka, Häusermann, *Helv. Chim. Acta*, 1942, 25, 439.

Ruzicka, Spillmann, Baumgartner, *Helv. Chim. Acta*, 1943, 26, 1638.

Elemicin (3:4:5-Trimethoxy-1-allylbenzene) $\text{C}_{12}\text{H}_{16}\text{O}_3$

MW, 208

Constituent of Elemi oil. B.p. 144–7°/10 mm. D_4^{20} 1.063. n_D^{20} 1.5288. Ozone \rightarrow trimethoxyphenylacetic acid. NaOH \rightarrow isoelemicin (3:4:5-trimethoxy-1-propenylbenzene), b.p. 153–6°/10 mm., D_4^{20} 1.077, n_D^{20} 1.547.

Semmler, *Ber.*, 1908, **41**, 1918, 2556.Mauthner, *Ann.*, 1917, **414**, 252.Smith, *Proceedings of the Royal Society of Victoria*, 1919, **32**, 14.Visweswara, Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1949, **30A**, 114, (*Chem. Abstracts*, 1950, **44**, 5876).Rao, Seshadri, Thiruvengadana, *Journal of Scientific and Industrial Research (India)*, 1949, **8B**, No. 6, 113, (*Chem. Abstracts*, 1950, **44**, 5877). **α -Elemol** $\text{C}_{15}\text{H}_{26}\text{O}$

MW, 222

Constituent of Manila elemi oil. M.p. 47°. B.p. 142–3°/12 mm. D_4^{18} 0.9345. n_D^{18} 1.4980. Warm H·COOH \rightarrow elemene. Se \rightarrow eudalene. Benzoyl: b.p. 160–4°/0.25 mm.

Phenylurethane: m.p. 112°.

Dihydro deriv.: m.p. 47°. B.p. 138°/12 mm. D_4^{15} 0.934. n_D^{15} 1.4925.Ruzicka, Pfeiffer, *Helv. Chim. Acta*, 1926, **9**, 841.Ruzicka, van Veen, *Ann.*, 1929, **476**, 70. **α -Elemolic Acid (Elemadienolic acid)** $\text{C}_{30}\text{H}_{48}\text{O}_3$

MW, 456

Isolated from Manila elemi resin. M.p. 224–5°. $[\alpha]_D - 25.6^\circ$ in CHCl_3 .Me ester: m.p. 144°. $[\alpha]_D - 17.6^\circ$ in CHCl_3 .Acetyl: m.p. 241–2°. $[\alpha]_D - 36^\circ$ in CHCl_3 .Mladenovic, Lieb, *Monatsh.*, 1931, **58**, 69.Ruzicka et al., *Helv. Chim. Acta*, 1932, **15**, 681; 1942, **25**, 1375; 1943, **26**, 1638.Arnold, Koller, Jeger, *Helv. Chim. Acta*, 1951, **34**, 555.Mazur, Koller, Jeger, Ruzicka, *Helv. Chim. Acta*, 1952, **35**, 141. **β -Elemolic Acid (epi-Elemadienolic acid)** $\text{C}_{30}\text{H}_{48}\text{O}_3$

MW, 456

Cryst. from MeOH. M.p. 234–5°. $[\alpha]_D + 9.5^\circ$ in CHCl_3 .Acetyl: needles from AcOEt–hexane. M.p. 243–9°. $[\alpha]_D + 25.6^\circ$ in CHCl_3 .Ruzicka, Häusermann, *Helv. Chim. Acta*, 1942, **25**, 439.Ruzicka et al., *Helv. Chim. Acta*, 1943, **26**, 1638. **γ -Elemolic Acid** $\text{C}_{30}\text{H}_{50}\text{O}_3$

MW, 458

Cryst. from EtOH. M.p. 281°. $[\alpha]_D^{20} + 68.76^\circ$.

Acetate: m.p. 180°.

Ruzicka et al., *Helv. Chim. Acta*, 1932, **15**, 681.Mladenovic, Lieb, *Monatsh.*, 1931, **58**, 69. **δ -Elemolic Acid** $\text{C}_{30}\text{H}_{46}\text{O}_3$

MW, 454

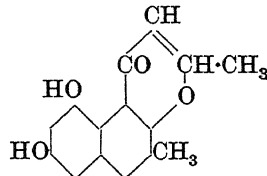
M.p. 217–19°.

Me ester: $\text{C}_{31}\text{H}_{48}\text{O}_3$. MW, 468. M.p. 112–13°. D^{118} 0.9958. n_D^{114} 1.4949.Ruzicka et al., *Helv. Chim. Acta*, 1932, **15**, 681. **α -Elemonic Acid (Isoelemadienonic acid)** $\text{C}_{30}\text{H}_{46}\text{O}_3$

MW, 454

M.p. 286–5°. $[\alpha]_D - 76^\circ$ in CHCl_3 .Me ester: m.p. 161–2°. $[\alpha]_D - 90^\circ$ in CHCl_3 .Oxime: needles from MeOH.Aq. M.p. 228°. $[\alpha]_D - 84^\circ$ in CHCl_3 .Ruzicka et al., *Helv. Chim. Acta*, 1942, **25**, 1375; 1943, **26**, 1639.Bilham, Kon, *J. Chem. Soc.*, 1942, 544. **β -Elemonic Acid (Elemadienonic Acid)** $\text{C}_{30}\text{H}_{46}\text{O}_3$

MW, 454

M.p. 224–5° (212–14°) from AcOEt or Me₂CO. $[\alpha]_D + 44.9^\circ$ in CHCl_3 .Me ester: m.p. 104–5°. $[\alpha]_D + 35^\circ$ in CHCl_3 .Ruzicka et al., *Helv. Chim. Acta*, 1942, **25**, 439, 1403; 1943, **26**, 1639.Bilham, Kon, *J. Chem. Soc.*, 1942, 544.**Eleutherinol** $\text{C}_{15}\text{H}_{12}\text{O}_4$

MW, 256

Constituent of *Eleutherine bulbosa*, Mill. De-comp. above 310°. Spar. sol. usual org. solvents and H₂O. Sol. warm AcOH, Py, cellosolve, nitrobenzene, hot anisole. Sol. NaOH to yellow sol. Reduces warm NH₃.AgNO₃.

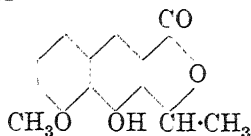
Di-Me ether: $\text{C}_{17}\text{H}_{16}\text{O}_4$. MW, 284. If crystallized below 90°, m.p. 186–7°; if crystallized above 150°, m.p. 174–5°.

Diacetyl: m.p. 188–9°.

Piperonylidene deriv.: yellow needles. M.p. 272–3°.

Ebnöther, Meifer, Schmid, *Helv. Chim. Acta*, 1952, 35, 910.

Eleutherol



$C_{14}H_{12}O_4$

MW, 244

Occurs in tubers of *Eleutherine bulbosa*. Needles from C_6H_6 . M.p. 203°. Sublimes at 170–80°/0.02 mm. $[\alpha]_D^{20} + 90^\circ$ $CHCl_3$. Sols. in EtOH show blue fluor. Conc. $H_2SO_4 \rightarrow$ yellow col. Reduces warm $AgNO_3 \cdot NH_3$.

Acetyl: cryst. from C_6H_6 –light petroleum. M.p. 181.5–182.5°.

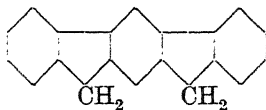
Me ether: $C_{15}H_{14}O_4$. MW, 258. Cryst. from Et_2O –light petroleum or C_6H_6 –light petroleum. M.p. 123°. $[\alpha]_D^{16} + 37^\circ$ in $CHCl_3$.

Schmid, Meyer, *Helv. Chim. Acta*, 1950, 33, 595.

Elgetol.

See under 3 : 5-Dinitro-*o*-cresol.

Ellagene



$C_{20}H_{14}$

MW, 254

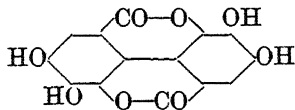
Small flat plates from C_6H_6 . M.p. 197°.

Picrate: m.p. 117°.

Dibenzylidene deriv.: fawn-col. cubes from EtOH.Aq. M.p. 107°.

Nierenstein, Webster, *J. Am. Chem. Soc.*, 1945, 67, 691.

Ellagic Acid



$C_{14}H_6O_8$

MW, 302

Occurs free and combined in galls. Needles + 2Py from Py. M.p. above 360°. Spar. sol. H_2O , EtOH. Insol. Et_2O . Sol. alkalis \rightarrow yellow sols. $FeCl_3 \rightarrow$ green col. KOH fusion \rightarrow hexahydroxydiphenyl. Zn dist. \rightarrow fluorene.

Tetra-acetyl: m.p. 343–6° (317–19°).

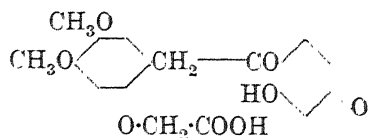
Tetracarbethoxyl: m.p. 244°.

Perkin, Nierenstein, *J. Chem. Soc.*, 1905, 87, 1415.

Nierenstein, *Helv. Chim. Acta*, 1931, 14, 912.

Zetzsche, Graef, *ibid.*, 240.

Elliptic Acid



$C_{20}H_{18}O_8$

MW, 386

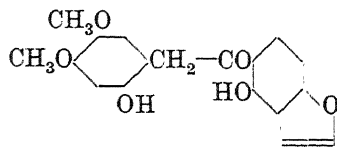
Hair-like needles from EtOH.Aq. M.p. 190°. $FeCl_3 \rightarrow$ blue-green col. $Ac_2O + AcOH \rightarrow AcONa \rightarrow$ dehydroelliptone.

Me ester: long needles from EtOH. M.p. 143°.

Et ester: needles from EtOH. M.p. 142°.

Harper, *J. Chem. Soc.*, 1939, 1424; 1942, 587.

Elliptol



$C_{18}H_{16}O_6$

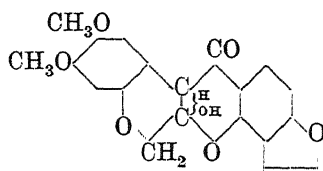
MW, 328

Narrow plates from MeOH.Aq. M.p. 163°.

Me ether: cryst. from MeOH. M.p. 137°.

Harper, *J. Chem. Soc.*, 1942, 587.

Elliptolone



$C_{20}H_{16}O_7$

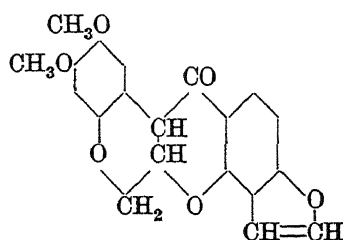
MW, 368

Prisms from EtOH. M.p. 228°. EtOH- $H_2SO_4 \rightarrow$ dehydroelliptone.

Acetyl: plates from EtOH. M.p. 175.5°.

Harper, *J. Chem. Soc.*, 1939, 1424.

Elliptone



$C_{20}H_{16}O_6$

MW, 352

l.

Constituent of roots of *Derris elliptica*. Needles from EtOH. M.p. 160° (171–2°; affected by type of glass used). $[\alpha]_D^{20} - 18^\circ$

in C_6H_6 , -55° in Me_2CO . $AcONa$ in $EtOH$ \rightarrow *dl*-form.

Oxime: (α -). Needles from $MeOH$. M.p. 222° . (β -). Needles from $MeOH$. M.p. 236° .

dl-

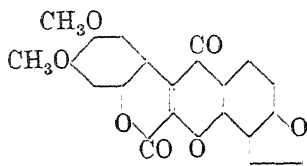
Needles from $EtOH$. M.p. 183° .

Oxime: (α -). Leaflets from $MeOH$. M.p. 259° . (β -). Prisms from $MeOH$. M.p. 261° .

Monoacetyl: prisms from $EtOH$. M.p. 200° .

Harper, *J. Chem. Soc.*, 1939, 1099, 1424; 1942, 587, 593.

Elliptonone



$C_{20}H_{12}O_7$ MW, 364

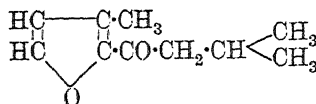
Yellow prisms from xylene. M.p. 315° .

Harper, *J. Chem. Soc.*, 1942, 587.

Elon.

See under *p*-Methylaminophenol.

Elsholtzione (Isobutyl 3-methylfuryl ketone, 3-methyl-2-isobutyrylfuran)



$C_{10}H_{14}O_2$ MW, 166

Constituent of *Elsholtzia cristata*. B.p. 210° , $91-4^\circ/12$ mm. D_{20}^{20} 0.9817. n_D^{20} 1.4842.

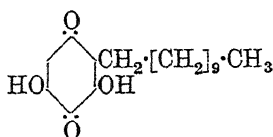
Oxime: m.p. 54° .

Semicarbazone: m.p. $171-2^\circ$.

Reichstein, Zschokke, Goerg, *Helv. Chim. Acta*, 1931, 14, 1277.

Asahina, Murayama, *Arch. Pharm.*, 1914, 252, 435.

Embelin (Embelic acid, 3 : 6-dihydroxy-2-n-undecyl-p-benzoquinone)



$C_{17}H_{26}O_4$ MW, 294

Constituent of *Embelia ribes*. Orange red plates from $Et_2O-C_6H_6$. M.p. 143° (with sublimation). Insol. H_2O . Reddish-violet sols. in alkalis. Gives coloured pptes. with many inorganic salts. Combines with primary amines. $KOH.Aq. \rightarrow$ 1-ketomyristic acid. Tautomerises. Anthelmintic.

Diacetyl: m.p. 54° .

Tetra-acetyl: m.p. $123-5^\circ$.

Dibenzoyl: m.p. $96.5-7^\circ$.

Tetra-oxime: m.p. 175° .

Di-semicarbazone: m.p. 236° .

Di-phenylhydrazone: m.p. $189-90^\circ$.

Benzylidene deriv.: m.p. 112° .

Di-benzylidene deriv.: m.p. 142° .

Di-methylamine deriv.: m.p. 216° .

Di-aniline deriv.: m.p. $167-8^\circ$.

Hefter, Feuerstein, *Arch. Pharm.*, 1900, 233, 15.

Hasan, Stedman, *J. Chem. Soc.*, 1931, 2112.

Kaul, Ray, Dutt, *J. Indian Chem. Soc.*, 1929, 6, 577.

Asano, Yamaguti, *J. Pharm. Soc. Japan*, 1940, 60, 105, (*Chem. Abstracts*, 1940, 34, 5069).

Fieser, Chamberlin, *J. Am. Chem. Soc.*, 1948, 70, 71.

Emetamine

$C_{29}H_{36}O_4N_2$ MW, 476

From roots of *Psychotria ipecacuanha*. Needles from $AcOEt$. M.p. $153-4^\circ$, $135-7^\circ$ (with one mol. ether). Sol. $EtOH$, C_6H_6 , $CHCl_3$. Spar. sol. Et_2O . Insol. H_2O , alkalis. Sol. conc. H_2SO_4 . $[\alpha]_D^{20} +13.6$.

B,2HCl: m.p. anhyd. $218-23^\circ$. $[\alpha]_D -17.5^\circ$.

B,2HBr: m.p. $210-25^\circ$. $[\alpha]_D -24.3^\circ$.

B,2HNO_3: m.p. $165-6^\circ$.

B,2H_2C_2O_4: m.p. 172° . $[\alpha]_D -6^\circ$.

Picrate: m.p. 173° .

Picrate, H_2O: m.p. $149-51^\circ$.

Brindley, Pyman, *J. Chem. Soc.*, 1927, 1071.

Karrer, Eugster, Rüttner, *Helv. Chim. Acta*, 1948, 31, 1219.

Emetine (*Cephæline methyl ether*. See formula under *Cephæline*)

$C_{29}H_{40}O_4N_2$ MW, 480

Principal alkaloid from roots of *Psychotria ipecacuanha*. Amorphous powder. M.p. 74° . Sol. $EtOH$, Et_2O , $CHCl_3$. Spar. sol. C_6H_6 . Insol. H_2O . $[\alpha]_D^{15} -32.7^\circ$. Sensitive to light.

N-Acetyl: m.p. $97-9^\circ$. *Chloroaurate*, m.p. $127-9^\circ$. *Chloroplatinate*, m.p. $213-17^\circ$ decomp.

B,2HCl: m.p. $235-55^\circ$. $[\alpha]_D +21^\circ$.

B,2HBr: m.p. $250-65^\circ$. $[\alpha]_D +15.2^\circ$.

B,2HNO_3: m.p. 245° .

B,2H_2SO_4: m.p. $205-45^\circ$.

d-Camphor-β-sulphonate: $C_{29}H_{40}O_4N_2 \cdot 2(C_{10}H_{16}O_4S)$. Needle clusters, m.p. $203-4^\circ$ from alc. Et_2O .

Methochloride: m.p. $192-5^\circ$.

Methiodide: m.p. 213–16°.

- Staub, *Helv. Chim. Acta*, 1927, 10, 826.
 Carr, Pyman, *J. Chem. Soc.*, 1914, 105, 1591.
 Späth, Liethe, *Ber.*, 1927, 60, 688.
 Ahl, Reichstein, *Helv. Chim. Acta*, 1944, 27, 366.
 Späth, Pailer, *Chem. Abstracts*, 1949, 43, 2624.
 Janot, *Bull. soc. chim.*, 1949, 185 (Bibl.).
 Battersby, Openshaw, *J. Chem. Soc.*, 1949, 3207, *Supplement* 59, 67.
 Sugawara, Kobayashi, *J. Pharm. Soc. Japan*, 1949, 69, 85, (*Chem. Abstracts*, 1950, 44, 1514).

Emicymarin

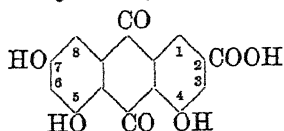
$C_{30}H_{46}O_9$ MW, 550

Cardiac glycoside from seeds of *Strophanthus emini*. Needles or prisms + MeOH from MeOH. M.p. 207°. Spar. sol. H_2O . $[\alpha]_{D}^{20} + 15.8^\circ$, $[\alpha]_{D}^{20} + 12.8^\circ$, in EtOH. Conc. $H_2SO_4 \rightarrow$ orange sol. Positive Legal reaction. MeOH-KOH \rightarrow isoemicymarin, m.p. about 270°. Boiling 2% HCl \rightarrow digitalose. Hyd. by Mannich procedure \rightarrow periplogenin.

Diacetyl deriv.: plates from MeOH. M.p. about 278°. $[\alpha]_{D}^{20} + 27.8^\circ$, $[\alpha]_{D}^{20} + 22.8^\circ$, in MeOH.

- Lamb, Smith, *J. Chem. Soc.*, 1936, 442.
 Katz, Reichstein, *Helv. Chim. Acta*, 1945, 28, 476.
 Euw, Reichstein, *Helv. Chim. Acta*, 1948, 31, 883.

Emodic Acid (4:5:7-Trihydroxyanthraquinone-2-carboxylic acid)



$C_{15}H_8O_7$ MW, 300

Metabolic product of *Penicillium cyclosum*, Westling. Orange red needles from AcOH or EtOH. Sublimed in vacuum, m.p. 363–5°. Spar. sol. ord. solvents.

Me ester: $C_{16}H_{10}O_7$. MW, 314. Orange red needles from MeOH. M.p. 268–9°. *Triacetyl*: pale yellow needles from AcOH. M.p. 188°.

Et ester: $C_{17}H_{12}O_7$. MW, 328. Reddish brown micro-needles from EtOH. M.p. 252°. Sol. alkalis with violet col.

Isobutyl ester: $C_{19}H_{16}O_7$. MW, 356. Orange red needles from C_6H_6 -pet. ether. M.p. 229°.

7-Me ether: $C_{16}H_{10}O_7$. MW, 314. Sublimes in vacuum in reddish brown needles. M.p. 300°. *Chloride*: cryst. from $SOCl_2$. M.p. 205°. *Amide*: light brown needles from Py. M.p.

292°. *Diacetyl*: greenish yellow needles from AcOH. M.p. 214–15°.

Tri-Me ether: $C_{19}H_{14}O_7$. MW, 342. Pale yellow micro-cryst. from EtOH. M.p. 270°.

Triacetyl: yellow needles or prisms from AcOH. M.p. 218–19°.

Eder, Hauser, *Helv. Chim. Acta*, 1925, 8, 126.

Anslow, Breen, Raistrick, *Biochem. J.*, 1940, 34, 159.

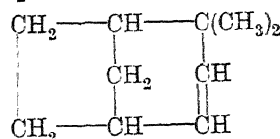
Emodin.

See Aloe-emodin and Frangula-emodin.

Enanthaldehyde.

See n-Heptaldehyde.

Endocamphene



$C_{10}H_{16}$ MW, 136

B.p. 170.6–1.6°.

Lipp, Götzen, Reinartz, *Ann.*, 1927, 453, 14.

Enneamethylene.

See Cyclononane.

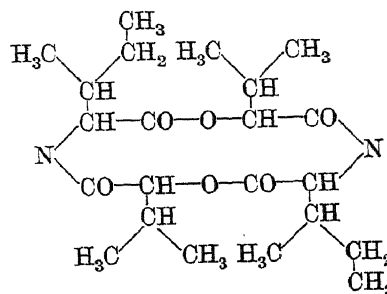
Enneaphyllin

$C_{90}H_{154}$ MW, 1234

From *Indigofera enneaphylla*. Rods from C_6H_6 . M.p. 98°. Sol. MeOH, EtOH, AcOEt, C_6H_6 , toluene, ethylbenzene. Spar. sol. Et_2O , CS_2 , pet. ether. Insol. Me_2CO , Py.

Chatterji, Dutt, *Chem. Abstracts*, 1938, 32, 2686.

Enniatine A



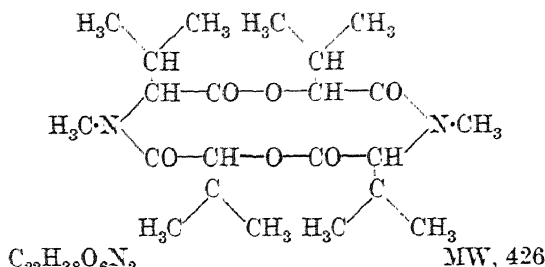
Suggested structure

$C_{24}H_{42}O_6N_2$ MW, 454

Antibiotic from *Fusaria*. Cryst. M.p. 122°. $[\alpha]_D^{18} - 86^\circ (-91^\circ)$. HCl \rightarrow d- α -hydroxyisovaleric acid + l-N-methylisoleucine. Possibly identical with lateritiin I, q.v.

Plattner, Nager, *Helv. Chim. Acta*, 1948, 31, 2192.

Enniatine B



Antibiotic from *Fusaria*. Cryst. M.p. 174–6°. $[\alpha]_D^{25} - 108^\circ$ in CHCl_3 . Insol. light petroleum. $\text{HCl} \rightarrow d\text{-}\alpha\text{-hydroxyisovaleric acid} + d\text{-N-methylvaline}$. Hyd. by alk. $\rightarrow d\text{-}\alpha\text{-hydroxyisovaleryl-}d\text{-N-methylvaline}$, m.p. 71.5°. $[\alpha]_D^{20} - 130.4^\circ$ in CHCl_3 .

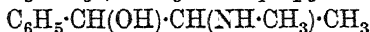
Plattner, Nager, *Helv. Chim. Acta*, 1948, 31, 665.

Plattner, Nager, Boller, *ibid.*, 594.

Enteramine.

See 5-Hydroxytryptamine.

Ephedrine (2-Methylamino-1-phenylpropanol-1, α -hydroxy- β -methylaminopropylbenzene)



$\text{C}_{10}\text{H}_{15}\text{ON}$ MW, 165

l.

Present in various species of *Ephedra*. Hydrated cryst. from H_2O . M.p. 40°. B.p. 225°. Sol. H_2O , EtOH, Et_2O , CHCl_3 . $[\alpha]_D^{20} - 6.3^\circ$ in EtOH.

B, HCl: m.p. 218°. $[\alpha]_D^{20} - 36.6^\circ$ (–34.9°) in H_2O .

B, HBr: m.p. 205°.

B, H₂PtCl₆: needles. M.p. 186°.

B, HAuCl₄: yellow needles. M.p. 128–31°.

Oxalate: m.p. 239–40°.

N-Acetyl: m.p. 85.5–6.5° corr. $[\alpha]_D^{20} + 8.1^\circ$ in EtOH, –63.2° in CHCl_3 . *Hydrochloride*: m.p. 106–7°. $[\alpha]_D^{20} + 5.6^\circ$ in 50% EtOH.

N-p-Nitrobenzoyl: pale yellow prisms. M.p. 187–8°. $[\alpha]_D^{20} - 51.77^\circ$ in CHCl_3 .

d.

Plates from H_2O . M.p. 40–40.5°.

B, HCl: plates from EtOH. M.p. 217–18°. $[\alpha]_D^{20} + 34.42^\circ$ in H_2O . More easily sol. than *l*-form.

N-p-Nitrobenzoyl: yellowish leaflets from EtOH. M.p. 187–8°. $[\alpha]_D^{20} + 51.12^\circ$ in CHCl_3 .

dl.

Needles from Et_2O or pet. ether. M.p. 76°. Sol. H_2O , EtOH, Et_2O , CHCl_3 , C_6H_6 .

B, HCl: plates from EtOH. M.p. 188–189.5°.

B, HAuCl₄: yellow cryst. M.p. 115°.

B₂, H₂PtCl₆: reddish-yellow needles or leaflets. M.p. 199° (183°) decomp.

N-Acetyl: m.p. 77–8.5°. *Hydrochloride*: m.p. 180°.

O-Acetyl hydrochloride: m.p. 201–1.5°.

N-p-Nitrobenzoyl: pale yellow plates from EtOH. M.p. 162°.

Methiodide: needles. M.p. 228–9°.

Nagai, Kanao, *Ann.*, 1929, 470, 157.

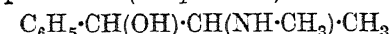
Emde, *Helv. Chim. Acta*, 1929, 12, 365, 405.

Späth, Göhring, *Monatsh.*, 1920, 41, 319.

Freudenburg, Braun, Schoeffel, *J. Am. Chem. Soc.*, 1932, 54, 234.

Hoffmann-La Roche A.G., D.R.P., 554,553, (*Chem. Zentr.*, 1932, II, 1693).

Welsh, *J. Am. Chem. Soc.*, 1947, 69, 128.

 ψ -Ephedrine (Isoephedrine)

$\text{C}_{10}\text{H}_{15}\text{ON}$ MW, 165

l.

Prisms from Et_2O . M.p. 118–118.5°. $[\alpha]_D^{20} - 51.93^\circ$ in EtOH.

B, HCl: needles from EtOH. M.p. 182–182.5°. $[\alpha]_D^{20} - 61.88^\circ$.

d.

Occurs in leaves of *Ephedra vulgaris*. Prisms from Et_2O . M.p. 117–18°. $[\alpha]_D^{20} + 51.24^\circ$ in EtOH. Sol. EtOH, Et_2O . Spar. sol. cold H_2O .

B, HCl: prisms from EtOH. M.p. 182–182.5°. $[\alpha]_D^{20} + 61.6^\circ$ in H_2O .

Oxalate: needles from EtOH. M.p. 219°.

N-Acetyl: m.p. 103.5–4°. $[\alpha]_D^{20} 110.4^\circ$ in 50% EtOH, 113.8° in EtOH, 121.8° in CHCl_3 .

O-Acetyl hydrochloride: m.p. 179.5–81°, $[\alpha]_D^{20} 98.6^\circ$ in H_2O .

N-p-Nitrobenzoyl: yellowish cryst. from EtOH. M.p. 177°. $[\alpha]_D^{20} + 140.8^\circ$ in CHCl_3 .

B, HAuCl₄: m.p. 126–126.5°.

dl.

Needles. M.p. 118°. B.p. 130°/16 mm. Sol. EtOH, C_6H_6 . Spar. sol. H_2O , Et_2O .

B, HCl: needles from EtOH. M.p. 164°.

Oxalate: prisms from EtOH. M.p. 218° decomp.

B, HAuCl₄: yellow prisms. M.p. 117°.

(B, HCl)₂, AuCl₃: yellow needles. M.p. 194°.

N-p-Nitrobenzoyl: prisms from EtOH. M.p. 165–6°.

Methiodide: cryst. from H_2O . M.p. 183°.

Picrate: m.p. 192°.

Späth, Koller, *Ber.*, 1925, 58, 1268.

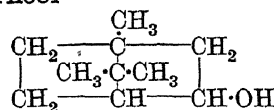
Nagai, Kanao, *Ann.*, 1929, 470, 157.

Emde, *Helv. Chim. Acta*, 1929, 12, 365.

Bossert, Brode, *J. Am. Chem. Soc.*, 1934, 56, 165.

Stevens, *J. Am. Chem. Soc.*, 1938, 60, 3089.

l-Epiborneol



$\text{C}_{10}\text{H}_{18}\text{O}$

MW, 154

Cryst. from pet. ether. M.p. 181–182.5°. Ox. \rightarrow *l*-epicamphor.

Acetyl: b.p. 114°/19 mm., $[\alpha]_D^{25} +15.63^\circ$. D_4^{25} 0.988.

Phenylurethane: needles from pet. ether. M.p. 82°.

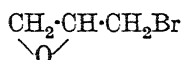
Dinitrobenzoate: m.p. 103°. $[\alpha]_D^{25} +28.37$.

Bredt, Pinten, *J. prakt. Chem.*, 1927, 115, 52.

Bredt, Perkin, *J. Chem. Soc.*, 1913, 103, 2222.

Bredt-Savelsberg, Bund, *J. prakt. Chem.*, 1931, 131, 48.

α -Epibromohydrin (3-Bromopropylene oxide)



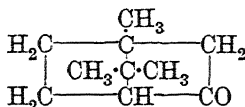
$\text{C}_3\text{H}_5\text{OBr}$ MW, 137

B.p. 134–6°, 61–2°/50 mm.

Braun, *J. Am. Chem. Soc.*, 1932, 54, 1250.

Braun, *Organic Syntheses*, 1936, XVI, 30.

Epicamphor (β -Camphor)



$\text{C}_{10}\text{H}_{16}\text{O}$ MW, 152

l.

M.p. 183.5–184° (corr.). B.p. 213°. $[\alpha]_D^{25} -58.21^\circ$ in C_6H_6 . Very sol. EtOH, Et₂O. Spar. sol. H₂O. Na + EtOH \rightarrow *l*-epiborneol. Ox. \rightarrow *d*-camphoric acid. Odour similar to that of *d*-camphor.

Oxime: needles from MeOH. M.p. 103–4°. $[\alpha]_D +100.5^\circ$.

Semicarbazone: needles from EtOH. M.p. 237–8° decomp.

Isonitroso deriv.: exists in two forms. M.p.'s 168–70° and 138–40°.

d.

M.p. 182°. $[\alpha]_D +58.4^\circ$ in C_6H_6 .

Oxime: needles from MeOH. M.p. 103°. $[\alpha]_D -98.9^\circ$.

Semicarbazone: needles. M.p. 237–8°.

dl.

Cryst. from pet. ether. M.p. 180°.

Oxime: needles from MeOH. M.p. 98–100°.

Bredt, Perkin, *J. Chem. Soc.*, 1913, 103, 2182.

Furness, Perkin, *J. Chem. Soc.*, 1914, 105, 2026.

Bredt, Bredt-Savelsberg, *Ber.*, 1929, 62, 2216.

Bredt, Drouven, Schumann, Scholl, *J. prakt. Chem.*, 1931, 131, 132.

Asahina, Ishidate, Momose, *Ber.*, 1934, 67, 1432.

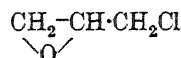
Epicatechin.

See under Catechin.

Epicentrine.

See under Domesticine.

α -Epichlorohydrin (3-Chloropropylene oxide)



$\text{C}_3\text{H}_5\text{OCl}$ MW, 92.5

B.p. 115–17°, 60–61°/100 mm. D_4^{20} 1.181. n_D^{20} 1.438. Insol. H₂O. Hot AcOH \rightarrow acetochlorohydrin. Ac₂O \rightarrow diacetochlorohydrin. Na or Na.Hg \rightarrow allyl alcohol. HI \rightarrow *n*-propyl chloride. EtOH + H₂SO₄ \rightarrow 1-chlorohydrin 3-Et ether.

Polyepichlorohydrin: needles from EtOH. M.p. 109–10°.

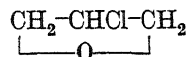
Clarke, Hartman, *Organic Syntheses*, Collective Vol. I, 228.

Fairbourn, Gibson, Stephens, *J. Chem. Soc.*, 1932, 1968.

Braun, *J. Am. Chem. Soc.*, 1932, 54, 1248.

Braun, *Organic Syntheses*, 1936, XVI, 30.

β -Epichlorohydrin (2-Chlorotrimethylene oxide)



$\text{C}_3\text{H}_5\text{OCl}$ MW, 92.5

B.p. 132–4°. More stable than the α -compound. Does not react with very dil. acids. PCl₅ \rightarrow CH₂:CCl-CH₂Cl. Na or Na.Hg \rightarrow allyl alcohol.

Bigot, *Ann. chim. phys.*, 1891, 22, 468.

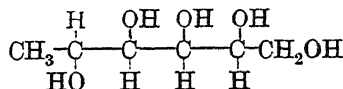
Epi-cholestanol.

See epi-Cholestanol.

Epidicentrine.

See under Domesticine.

Epifucitol



$\text{C}_6\text{H}_{14}\text{O}_5$ MW, 166

d.

Cryst. from H₂O. M.p. 104°. $[\alpha]_D^{21} +2^\circ$ in H₂O.

Di-benzylidene deriv.: needles from EtOH. M.p. 184°.

l.

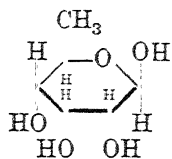
Cryst. from H₂O. M.p. 104°. $[\alpha]_D -2.3^\circ$ in H₂O.

Di-benzylidene deriv.: cryst. from EtOH. M.p. 183°. $[\alpha]_D +39.7^\circ$ in CHCl₃.

Votoček, Valentin, *Chem. Zentr.*, 1930, I, 2544.

Votoček, Kučerenko, *ibid.*, 2544.

Epifucose



Probable structure

 $C_6H_{12}O_5$

MW, 164

d-. (Epirhodeose).

Dextrorotatory syrup. $HNO_3 \rightarrow$ trihydroxyriboglutaric acid. $NaHg$ (acid) \rightarrow epi-*d*-fucitol. Epimeric with *d*-fucose (rhodose).

Phenylosazone: m.p. 170° . Decomp. at $177-80^\circ$.

Methylphenylhydrazone: m.p. 136° .

l-.

Yellow laevorotatory syrup. 12% $HCl \rightarrow$ methylfurfural. $NaHg$ (acid) \rightarrow epi-*l*-fucitol. Gives deep red col. with 1-naphthol in $EtOH +$ conc. H_2SO_4 . Epimeric with *l*-fucose.

Phenylosazone: m.p. $177-8^\circ$ decomp.

p-Bromophenylosazone: m.p. 204° .

Methylphenylhydrazone: m.p. 137° .

Votoček, Krauz, *Ber.*, 1911, 44, 362.

Votoček, Valentin, *Chem. Zentr.*, 1930, I, 2544.

Votoček, Červený, *Ber.*, 1915, 48, 658; *Chem. Zentr.*, 1928, I, 267.

Votoček, Kučerenco, *Chem. Zentr.*, 1930, I, 2544.

Epiglucosamine.

See under Glucosamine.

Epiglucosaminic Acid.

See under Glucosaminic Acid.

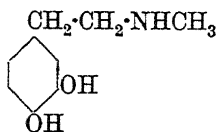
Epihydrin Alcohol.

See Glycide.

Epinephrine.

See *l*-Adrenaline.

Epinine (4-[β -Methylaminoethyl]-catechol, N-methyl-2-[3 : 4-dihydroxyphenyl]-ethylamine)

 $C_9H_{13}O_2N$

MW, 167

Clusters of spikes from $EtOH$. M.p. $188-9^\circ$ corr. Exhibits hæmostatic and pressor properties.

B, HCl : prisms from H_2O . M.p. $179-80^\circ$ corr. B, HBr : cryst. from $EtOH$. M.p. $169-71^\circ$.

B, H_2SO_4 : prisms from H_2O . M.p. $289-90^\circ$ corr.

$B, (COOH)_2$: hexagonal plates from H_2O . M.p. $194-5^\circ$ corr.

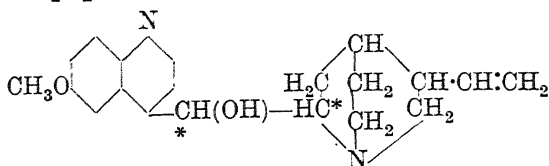
Kindler, Hesse, *Arch. Pharm.*, 1933, 271, 439.

Buck, *J. Am. Chem. Soc.*, 1930, 52, 4119.

Pyman, *J. Chem. Soc.*, 1910, 97, 272.

Bretschneider, *Chem. Abstracts*, 1949, 43, 2602.

Epiquinidine

 $C_{20}H_{24}O_2N_2$

MW, 324

Differs from quinidine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Cryst. from $AcOEt$. M.p. 113° . $[\alpha]_D^{20} + 103.7^\circ$ in $EtOH$.

$B, 2HCl$: cryst. from $EtOH$. M.p. 195.7° decomp. $[\alpha]_D^{20} + 45.5^\circ$ in $EtOH$.

B, HBr, H_2O : m.p. 240° .

B, HCN : m.p. 193° . $[\alpha]_D^{20} + 44.5^\circ$ in H_2O .

Acid tartrate: m.p. $130-5^\circ$ decomp.

Benzoyl: m.p. $128-31^\circ$. $[\alpha]_D^{25} + 166^\circ$.

Dibenzoyl-d-tartrate: cryst. from Me_2CO or $EtOH$. M.p. $166-7^\circ$ decomp. $[\alpha]_D^{24} + 1.9^\circ$ in $EtOH-CHCl_3$.

Double sulphate with epiquinine: $B_1, B_2, H_2SO_4, 6H_2O$: m.p. $101-3^\circ$. Decomp. at 115° . $[\alpha]_D^{20} + 38.5^\circ$ in H_2O .

Rabe, Höter, *J. prakt. Chem.*, 1940, 154, 66.

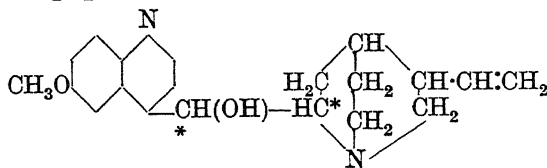
Rabe, Kindler, *Ber.*, 1939, 72, 263.

Suszko, Szelag, *Chem. Abstracts*, 1937, 13, 1816.

Dirscherl, Thron, *Ann.*, 1936, 521, 48.

Rabe, Kolbe, Hochstätter, *Ann.*, 1932, 492, 258.

Epiquinine

 $C_{20}H_{24}O_2N_2$

MW, 324

Differs from quinine in steric configuration at one of the carbon atoms marked *. Occurs in cinchona bark. Oil. $[\alpha]_D^{20} + 43.3^\circ$ in $EtOH$. Blue fluor. in H_2SO_4 .

$B, 2HCl$: cryst. from Me_2CO . M.p. 196° decomp. $[\alpha]_D^{21} + 33.3^\circ$ in $EtOH$.

$B, HBr, 3H_2O$: m.p. $71-7^\circ$. $[\alpha]_D^{20} + 32.9^\circ$ in H_2O .

Dibenzoyl-d-tartrate: cryst. from Me_2CO . M.p. 160° decomp. $[\alpha]_D^{25} - 22.4^\circ$ (26.3°) in EtOH.

Double sulphate with epiquinidine: see under Epiquinidine.

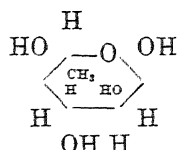
Rabe, Kindler, *Ber.*, 1939, 72, 263.

Rabe, Höter, *J. prakt. Chem.*, 1940, 154, 66.

Dirscherl, Thron, *Ann.*, 1936, 521, 48.

Rabe, Kolbe, Hochstätter, *Ann.*, 1932, 492, 258.

l-Epirhamnose (6-Deoxy-l-glucose)



$\text{C}_6\text{H}_{12}\text{O}_5$

MW, 164

Prisms, m.p. $142-4^\circ$, or needles, m.p. $143-5^\circ$, from MeOH-AcOEt. $[\alpha]_D^{25} - 84.7^\circ$ (initial, extrapolated), -30.1° (final) in H_2O .

Zissis, Richtmeyer, Hudson, *J. Am. Chem. Soc.*, 1951, 73, 4714.

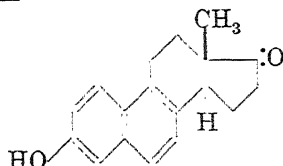
Epiphodeose.

See Epifucose.

ϵ -Acid (*Epsilon acid*).

See 1-Naphthol-3 : 8-disulphonic Acid.

Equilenin



$\text{C}_{18}\text{H}_{18}\text{O}_2$

MW, 266

d.

Estrogen present in urine of pregnant mares. Needles from MeOH. M.p. $250-1^\circ$ in vac. (M.p.'s determined in open capillary tubes are unsatisfactory due to oxidation). Spar. sol. EtOH. $[\alpha]_D^{25} + 87^\circ$ in dioxan.

Acetyl: m.p. $156-7^\circ$.

Benzoyl: needles from EtOH. M.p. $222-3^\circ$.

Monobromide: needles from propyl alcohol. M.p. $225-7^\circ$ decomp.

Oxime: needles from EtOH. M.p. $249-50^\circ$.

Semicarbazone: needles. M.p. 268° .

Picrate: orange prisms. M.p. $205-8^\circ$.

l-Menthoxycetyl: m.p. $174-4.5^\circ$. $[\alpha]_D^{30} + 18^\circ$ in C_6H_6 .

Methyl ether: m.p. $193.5-4^\circ$.

Benzyl ether: m.p. 178° . $[\alpha]_D^{30} + 68^\circ$, 71° in EtOH.

Trinitrobenzene add. comp.: yellow. M.p. $205.5-207^\circ$.

l. (synthetic).

M.p. $258-9^\circ$ corr. $[\alpha]_D^{30} - 85^\circ$ in dioxan.

d-Menthoxycetyl: m.p. $174.5-5^\circ$. $[\alpha]_D^{30} - 16^\circ$ in C_6H_6 .

dl. (synthetic).

M.p. $276-8^\circ$.

Methyl ether: m.p. $185-6.5^\circ$.

Acetyl: m.p. $159.5-60^\circ$.

Benzoyl: m.p. $248.5-9.5^\circ$.

Birch, Jaeger, Robinson, *J. Chem. Soc.*, 1945, 582.

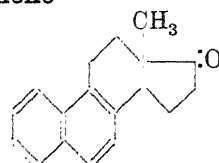
Bachmann, Cole, Wilds, *J. Am. Chem. Soc.*, 1940, 62, 824.

Johnson, Petersen, Gutsche, *J. Am. Chem. Soc.*, 1945, 67, 2274.

Girard et al., *Compt. rend.*, 1932, 195, 981; *Bull. soc. chim. biol.*, 1933, 15, 562.

Sandulesco, Tchong, Girard, *Compt. rend.*, 1933, 196, 137.

17-Equilenone



$\text{C}_{18}\text{H}_{18}\text{O}$

MW, 250

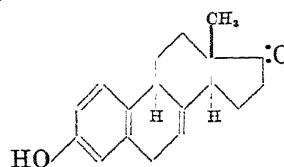
Two forms (geometrical isomers).

(1) Plates from MeOH- Me_2CO . M.p. $100-1^\circ$. Picrate: yellow needles from EtOH. M.p. $109.5-110.5^\circ$.

(2) Plates from Me_2CO -EtOH. M.p. $188.5-189.5^\circ$. Does not form a picrate.

Bachman, Wilds, *J. Am. Chem. Soc.*, 1940, 62, 2084.

Equilin



$\text{C}_{18}\text{H}_{20}\text{O}_2$

MW, 268

M.p. $238-40^\circ$. Sublimes in vacuo at $170-200^\circ$. $[\alpha]_D^{25} + 308^\circ$ in dioxan (1% sol.).

Semicarbazone: needles from Py. M.p. $265-7^\circ$.

Oxime: needles from EtOH.Aq. M.p. $221-3^\circ$.

Benzoyl: plates from EtOH. M.p. $197-8^\circ$.

Girard et al., *Compt. rend.*, 1932, 194, 1020.

Serini, Logemann, *Ber.*, 1938, 71, 186.

Equisetrin (Kaempferol 7-diglucoside)

$\text{C}_{27}\text{H}_{30}\text{O}_{16}$

MW, 610

Occurs in stem of *Equisetum arvense*, Linn. Yellow needles + $2\text{H}_2\text{O}$. M.p. $195-6^\circ$. Sol. alc. $\text{H}_2\text{SO}_4 \rightarrow$ kaempferol + glucose.

Nakamura, Hukuti, *J. Pharm. Soc. Japan*, 1940, 8, 179.

β -Equistanol $C_{30}H_{54}O$

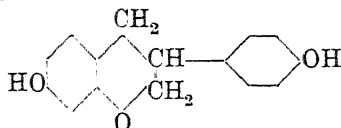
MW, 430

Sterol from stallion, bull, cow pregnancy and mare pregnancy urines. Needles from MeOH. M.p. 133°. Sol. Me_2CO , Et_2O . Spar. sol. MeOH.

Acetyl: plates. M.p. 124°.

Marker *et al.*, *J. Am. Chem. Soc.*, 1938, 60, 1555, 2443, 2932.

Equol

 $C_{15}H_{14}O_3$

MW, 242

Inactive phenol isolated from mare's urine. Cryst. from EtOH-Aq. M.p. 189–190.5°. $[\alpha]_{5461}^{25} -21.5^\circ$.

Di-Me ether: $C_{17}H_{18}O_3$. MW, 270. Cryst. from MeOH. M.p. 89°. $[\alpha]_{5461}^{25} -19.5^\circ$.

Diacetyl: cryst. from MeOH. M.p. 122.5°.

Dibenzoyl: cryst. from MeOH- $CHCl_3$. M.p. 187–9°. Forms liquid crystals.

Marrian, Haslewood, *Biochem. J.*, 1932, 26, 1227.

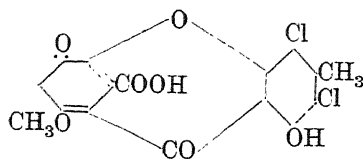
Marrian, Beall, *Biochem. J.*, 1935, 29, 1586.

Anderson, Marrian, *J. Biol. Chem.*, 1939, 127, 649.

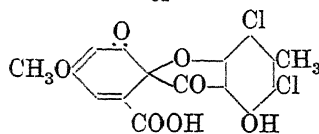
Wessely *et al.*, *Monatsh.*, 1938, 71, 215.

Wessely, Prillinger, *Ber.*, 1939, 72, 629.

Erdin



or



Suggested structures

 $C_{16}H_{10}O_7Cl_2$

MW, 385

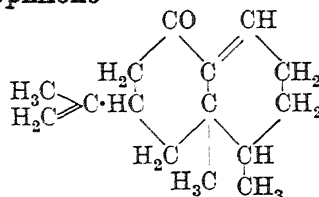
Metabolic product from *Aspergillus terreus*, Thom. M.p. 211° decomp. Sol. Et_2O .

Raistrick, Smith, *Biochem. J.*, 1936, 30, 1315.

Raphael, *Scientific Journal of the Royal College of Science*, 1948, 18, 52.

Calam, Clutterbuck, Oxford, Raistrick, *Biochem. J.*, 1939, 53, 579; 1947, 41, 462.

Eremophilone

 $C_{15}H_{22}O$

MW, 218

Constituent of oil from wood of *Eremophila Mitchellii*. Needles from MeOH. M.p. 41–2°. B.p. 171°/15 mm. $D_{25}^{20} 0.9994$. $n_D^{25} 1.5182$. $[\alpha]_{5461}^{25} -207^\circ$ in MeOH. Does not reduce Fehling's nor give col. with $FeCl_3$. $H_2O_2 \rightarrow$ eremophilone oxide, m.p. 63–4°. $Na + EtOH \rightarrow$ dihydroeremophilol, b.p. 168–70°/14 mm. Semicarbazone: m.p. 202–3°. $[\alpha]_{5461}^{25} -293^\circ$ in MeOH.

Hydroxymethylene deriv.: prisms from MeOH. M.p. 105°.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2744.

Bradfield *et al.*, *J. Chem. Soc.*, 1938, 767. Penfold, Simonsen, *J. Chem. Soc.*, 1939, 87.

Copp, Simonsen, *J. Chem. Soc.*, 1940, 415.

Ergamine.

See Histamine.

Ergine.

See under Lysergic Acid.

Ergobasine.

See Ergometrine.

Ergobasineine.

See Ergometrine.

Ergocalciferol.

See Calciferol.

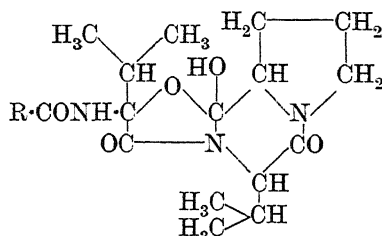
Ergoclavine

$C_{25}H_{30}O_4N_4$ ($C_{30}H_{37}O_5N_5$?) MW, 450

Occurs with ergotoxine. Platelets from EtOH. M.p. 176–7°. $[\alpha]_D^{25} +104^\circ$ in $CHCl_3$.

Jacobs, Craig, *J. Org. Chem.*, 1936, 1, 251.

Ergocornine



R-COOH = Lysergic Acid

 $C_{31}H_{39}O_5N_5$

MW, 561

Occurs with ergotoxine. M.p. 182–4°. Sol. EtOH, Me_2CO . $[\alpha]_D^{20} -188^\circ$ in $CHCl_3$. $[\alpha]_D^{20} -105^\circ$ in Py.

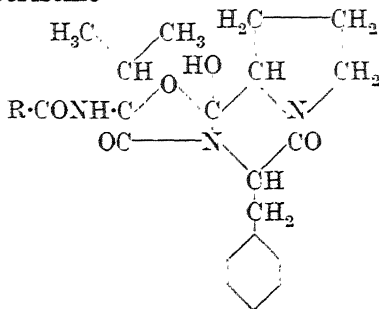
Ethanesulphonate: triangular prisms from EtOH. M.p. 209° decomp.

Ditoluyltartrate: m.p. 181°. Sol. MeOH. EtOH. $[\alpha]_D^{25} -103^\circ$.

Stoll, Hofmann, *Helv. Chim. Acta*, 1943, 26, 1570.

Stoll, Hofmann, Petrzilka, *Helv. Chim. Acta*, 1951, 34, 1544.

Ergocristine



R-COOH = Lysergic Acid

$C_{35}H_{39}O_5N_5$ MW, 609

Occurs with ergotoxine. M.p. 165–70° decomp. Sol. EtOH, Me₂CO. $[\alpha]_D^{25} -183^\circ$ in CHCl₃, $[\alpha]_{3461}^{25} -217^\circ$ in CHCl₃, $[\alpha]_D^{25} -93^\circ$ in Py.

Ethanesulphonate: hexagonal tablets from Me₂CO. M.p. 207°.

Ditoluyltartrate: m.p. 191° decomp. Sol. EtOH. $[\alpha]_D^{25} +58^\circ$ in EtOH.

Stoll, Hofmann, *Helv. Chim. Acta*, 1943, 26, 1570.

Stoll, Hofmann, Petrzilka, *Helv. Chim. Acta*, 1951, 34, 1544.

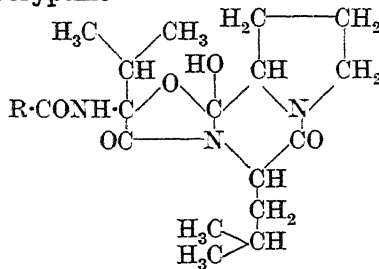
Ergocristinine

$C_{35}H_{39}O_5N_5$ MW, 609

Alkaloid of ergot (*Claviceps purpurea*). Prisms from AcOEt. M.p. 214° decomp. $[\alpha]_D^{25} +366^\circ$, $[\alpha]_{3461}^{25} +460^\circ$, in CHCl₃. Little physiological action. Boil in 1% H₃PO₄ in EtOH → ergocristine.

Stoll, Buckhardt, *Z. physiol. Chem.*, 1937, 250, 1; 1938, 251, 287.

Ergocryptine



R-COOH = Lysergic Acid

$C_{32}H_{41}O_5N_5$ MW, 575

Occurs with ergotoxine. Prisms from MeOH. M.p. 212–14° decomp. $[\alpha]_D^{25} -187^\circ$ in CHCl₃, $[\alpha]_{3461}^{25} -226^\circ$ in CHCl₃, $[\alpha]_D^{25} -112^\circ$ in Py, $[\alpha]_{3461}^{25} -133^\circ$ in Py.

Ethanesulphonate: prismatic clumps from alc. Et₂O. M.p. 204° decomp.

Ditoluyltartrate: m.p. 186° decomp. $[\alpha]_D^{25} -103^\circ$.

Stoll, Hofmann, *Helv. Chim. Acta*, 1943, 26, 1570.

Stoll, Hofmann, Petrzilka, *Helv. Chim. Acta*, 1951, 34, 1544.

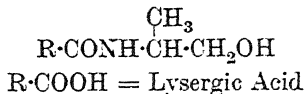
Ergocryptinine

$C_{32}H_{41}O_5N_5$ MW, 575

By action of alc. alkalis on ergocryptine. Thin prisms from EtOH. M.p. 240–2° decomp. $[\alpha]_D^{25} +408^\circ$ in CHCl₃, $[\alpha]_{3461}^{25} +508^\circ$ in CHCl₃, $[\alpha]_D^{25} +479^\circ$ in Py, $[\alpha]_{3461}^{25} +596^\circ$ in Py, $[\alpha]_D^{25} +396^\circ$ in Me₂CO, $[\alpha]_{3461}^{25} +493^\circ$ in Me₂CO.

Hofmann, Stoll, *Helv. Chim. Acta*, 1943, 26, 1570.

Ergometrine (*Ergobasine*, *ergonovine*, *ergotocine*, *ergostetrine*, *d-lysergic-d-β-hydroxyisopropylamide*)



R-COOH = Lysergic Acid

$C_{19}H_{23}O_2N_3$ MW, 325

Alkaloid of ergot (*Claviceps purpurea*). Needles from C₆H₆ or prisms from methyl ethyl ketone (both with solvent), m.p. 162–3° decomp. Plates + $\frac{1}{2}$ AcOEt from AcOEt, m.p. 130–2° decomp. Needles from Me₂CO, m.p. 212° decomp. $[\alpha]_D^{25} +91^\circ$ in H₂O, $[\alpha]_{3461}^{25} +62.6^\circ$ in EtOH. Sol. MeOH, EtOH, AcOEt, Me₂CO. Spar. sol. C₆H₆, CH₂Cl₂. Prac. insol. CHCl₃. Darkens in air. Absorption maximum 3160 Å. Alk. hyd. → lysergic acid + *d*-β-aminopropyl alcohol. Boil in MeOH → ergometrinine. Induces powerful rhythmic contractions in quiescent uterus.

B.HCl: needles. M.p. 245–6° decomp. $[\alpha]_D^{25} +63^\circ$ in H₂O.

B.HBr: needles. M.p. 236–7° decomp.

B₂(COOH)₂: needles. M.p. 193° decomp. $[\alpha]_D^{25} +55.4^\circ$ in H₂O.

Picrate: hydrated: yellow needles, m.p. 148° decomp. Anhydrous: red prisms, decomp. at 188–9°.

l-. (*l*-Lysergic-*l*-β-hydroxyisopropylamide).

Needles from C₆H₆. M.p. 159–62° (corr.) decomp. $[\alpha]_D^{25} -89^\circ$ in H₂O. No action on uterus.

Dudley, *Proc. Roy. Soc.*, 1935, B, 118, 478.

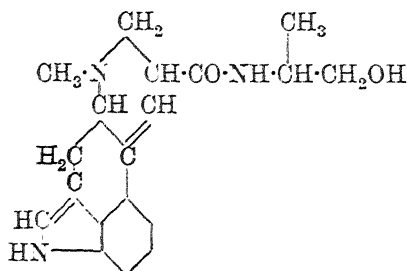
Stoll, Hofmann, *Z. physiol. Chem.*, 1938, 251, 155.

Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, 125, 289.

Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, 60, 1701.

Thompson, *J. Am. Pharm. Assocn.*, 1935, 24, 748.

Ergometrine (*Ergobasine*, *d-isolysergic-d- β -hydroxyisopropylamide*)



Probable constitution

 $C_{19}H_{23}O_5N_3$

MW, 325

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergometrine. Prisms from Me_2CO . M.p. $195-7^\circ$ decomp. $[\alpha]_{D}^{20} + 520^\circ$ in $CHCl_3$, $+ 413^\circ$ in $MeOH$. Only slight action on uterus. Acids or alkalis \rightarrow part. transformation to ergometrine.

B, HCl, H_2O : needles. M.p. $175-80^\circ$ decomp.

B, HBr, H_2O : needles from Et_2O-Me_2CO . Aq. M.p. $130-90^\circ$.

B, HNO_3 : prisms from $MeOH-Et_2O$. M.p. 235° decomp. $[\alpha]_{D}^{20} + 28.2^\circ$ in H_2O .

B, H_2SO_4 : prisms. Decomp. at 250° .

$B, HClO_4$: needles. Decomp. at 225° .

l-. (*l*-Isolysergic-*l*- β -hydroxyisopropylamide). Prisms from Me_2CO . M.p. 196° (corr.) decomp. $[\alpha]_{D}^{20} - 415^\circ$ in $CHCl_3$.

Smith, Timmis, *J. Chem. Soc.*, 1936, 1166, 1440.

Stoll, Hofmann, *Z. physiol. Chem.*, 1938, 251, 155.

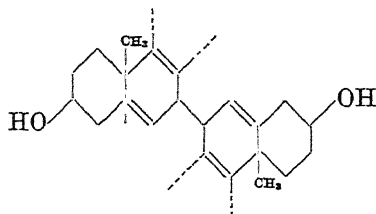
Craig, Shedlovsky, Gould, Jacobs, *J. Biol. Chem.*, 1938, 125, 289.

Jacobs, Craig, *J. Am. Chem. Soc.*, 1938, 60, 1701.

Ergonovine.

See Ergometrine.

Ergopinacol (*Bis-ergostadienol*)



Partial structure

 $C_{56}H_{86}O_2$

MW, 790

By action of light on ergosterol in absence of oxygen. Colourless needles from C_6H_6-EtOH . M.p. 205° .

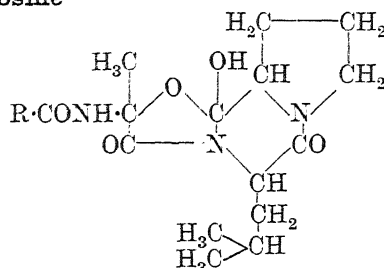
Diacyl: fine needles from C_6H_6-EtOH . M.p. $206.5-7.5^\circ$. $[\alpha]_{D}^{20} - 202^\circ$ in $CHCl_3$.

Dibenzoyl: fine needles from C_6H_6-EtOH . M.p. $206.5-7.5^\circ$. $[\alpha]_{D}^{20} - 160^\circ$ in $CHCl_3$.

Windaus, Borgeaud, *Ann.*, 1928, 460, 235.
Ando, Bull, *J. Chem. Soc. Japan*, 1939, 14, 285.

Windaus, Roosen-Runge, *Ber.*, 1940, 73, 321.

Ergosine



R-COOH = Lysergic Acid

 $C_{30}H_{37}O_5N_5$

MW, 547

Alkaloid of ergot (*Claviceps purpurea*). Prisms from $AcOEt$. M.p. 228° decomp. Sol. $CHCl_3$. Mod. sol. $MeOH, Me_2CO$. $[\alpha]_{D}^{20} - 193^\circ$, $[\alpha]_{D}^{20} - 161^\circ$, in $CHCl_3$. $[\alpha]_{D}^{20} + 16^\circ$ in Me_2CO . Powerful action on uterus. Acids \rightarrow ergosinine. Forms mol. comp. with ergosinine, m.p. 200° decomp.

B, HCl : plates + $1Me_2CO$. M.p. 235° decomp.

B, HBr : needles + $1Me_2CO$. Decomp at 230° .

B, HNO_3 : needles + $1Me_2CO$. Decomp. at 215° .

Methiodide: decomp. at 215° .

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Stoll, Hofmann, Petrzilka, *Helv. Chim. Acta*, 1951, 34, 1544.

Ergosinine

 $C_{30}H_{37}O_5N_5$

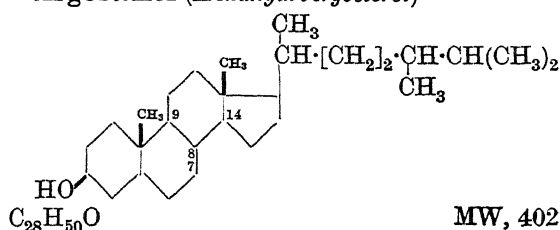
MW, 547

Alkaloid of ergot (*Claviceps purpurea*), isomeric with ergosine. Prisms from $EtOH, Me_2CO$. Aq., C_6H_6 or $AcOEt$. Decomp. at 228° . Needles + $\frac{1}{2}MeOH$ from $MeOH$. M.p. 220° decomp. $[\alpha]_{D}^{20} + 522^\circ$, $[\alpha]_{D}^{20} + 420^\circ$, in $CHCl_3$. $[\alpha]_{D}^{20} + 475^\circ$, $[\alpha]_{D}^{20} + 380^\circ$, in Me_2CO . Weak action on uterus. Acid hyd. \rightarrow leucine. Heat. with H_3PO_4 in $Me_2CO-EtOH \rightarrow$ ergosine. Mol. comp. with ergosine, see under ergosine.

B, HCl : decomp. at 206° .

Smith, Timmis, *J. Chem. Soc.*, 1937, 396.

Ergostanol (*Hexahydroergosterol*)



MW, 402

Needles from MeOH-Et₂O. M.p. 144-5°. $[\alpha]_D^{25} +15.94^\circ$ in CHCl₃.

Acetyl: needles from MeOH-Et₂O. M.p. 144-5°. $[\alpha]_D^{25} +5.95^\circ$ in CHCl₃.

Chloroacetyl: m.p. 200-1°.

Benzoyl: m.p. 163-5°.

m-Dinitrobenzoyl: m.p. 202-3°. $[\alpha]_D^{25} -14^\circ$ in CHCl₃.

p-Toluenesulphonyl: m.p. 150-1°.

Reindel, *Ann.*, 1928, 466, 141.

Heilbron, Sexton, *J. Chem. Soc.*, 1929, 921.

Ergosterol (Tetrahydroergosterol)

C₂₈H₄₈O MW, 400

α -. $\Delta^{8(14)}$ -Ergosterol.

Leaves from MeOH. M.p. 130-1°. $[\alpha]_D^{25} +17.86^\circ$ in CHCl₃.

Acetyl: leaves from EtOH. M.p. 110°. $[\alpha]_D^{25} +5.18^\circ$ in CHCl₃.

Benzoyl: needles from MeOH-Et₂O. M.p. 118°.

p-Toluenesulphonyl: m.p. 162-3° decomp.

β -. Δ^{14} -Ergosterol.

Plates from EtOH. M.p. 141-2°. $[\alpha]_D^{20} +19.4^\circ$ in CHCl₃.

Acetyl: plates from EtOH. M.p. 111-12°. $[\alpha]_D^{20} +13.1^\circ$ in CHCl₃.

Benzoyl: prisms from C₆H₆-EtOH. M.p. 158-60°. $[\alpha]_D^{20} +18.3^\circ$.

γ -. Δ^7 -Ergosterol.

M.p. 146°.

δ -. Δ^8 -Ergosterol.

M.p. 155°. $[\alpha]_D^{25} +39^\circ$.

Reindel, Walter, *Ann.*, 1928, 460, 212.

Heilbron, Sexton, *J. Chem. Soc.*, 1929, 921.

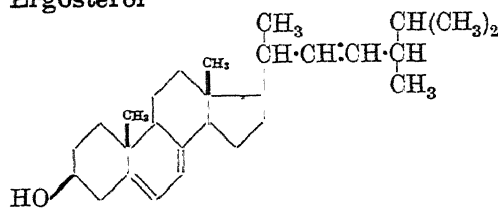
Heilbron, Wilkinson, *J. Chem. Soc.*, 1932, 1708.

Laucht, *Z. physiol. Chem.*, 1935, 237, 236.

Wieland, Benend, *Ann.*, 1943, 554, 1.

Barton, Cox, *J. Chem. Soc.*, 1949, 214.

Ergosterol



C₂₈H₄₄O

MW, 396

Occurs in yeast. Cryst. with H₂O of cryst. from EtOH, anhyd. from Et₂O. M.p. 163°. $[\alpha]_D^{25} -133^\circ$ in CHCl₃. Sol. CHCl₃, C₆H₆. Spar. sol. EtOH, Et₂O, AcOH, pet. ether. Ultra-violet irradiation \rightarrow mixture of compounds including Vitamin D. SbCl₃ in CHCl₃ \rightarrow violet col. Forms an insol. digitonide. Ac₂O \rightarrow ergosterol acetate and ergostatetraene-B

(m.p. 101-5°, $[\alpha]_D^{25} +97^\circ$). Hg(OAc)₂ \rightarrow dehydroergosterol.

Me ether: C₂₅H₄₆O. MW, 410. Cryst. from AcOEt-EtOH. M.p. 151-2°.

Acetyl: plates from Et₂O-EtOH. M.p. 175-6°.

Benzoyl: cryst. from EtOH. M.p. 168°. $[\alpha]_D^{25} -68^\circ$.

3-Naphthoyl: m.p. 175°.

3-Anthraquinonecarbonyl: yellowish. M.p. 195°.

Palmityl: leaflets from AcOEt. M.p. 107-8°.

Phenylurethane: prisms from EtOH. M.p. 185°.

Tanret, *Compt. rend.*, 1908, 147, 75.

Windaus, Inhoffen, Reichel, *Ann.*, 1934, 510, 248.

Dunn, Heilbron, Phipers, Samant, Spring, *J. Chem. Soc.*, 1934, 1576.

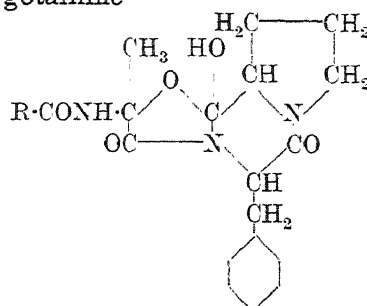
Windaus, Dimroth, *Ber.*, 1937, 70, 376.

Kennedy, Spring, *J. Chem. Soc.*, 1939, 250.

Ergostetrine.

See Ergometrine.

Ergotamine



R-COOH = Lysergic Acid

C₃₃H₃₅O₅N₅

MW, 581

Constituent of ergot alkaloids. Lysergic acid, NH₃, *d*-proline, phenylalanine and pyruvic acid are present in peptide combination. Rectangular plates from Me₂CO.Aq. M.p. 213-14° decomp. Easily sol. Py, PhNO₂. Sol. Et₂O, CHCl₃, C₆H₆. Insol. pet. ether. Sol. NaOH.Aq. Insol. Na₂CO₃. $[\alpha]_{5461}^{20} -181^\circ$. $[\alpha]_{5790}^{20} -159^\circ$ in CHCl₃. Boiling MeOH \rightarrow ergotamine. Alc. KOH \rightarrow ergine.

B.HCl: cryst. from 70% EtOH. M.p. 212°.

B.HBr: m.p. 213° decomp.

B₂.H₂SO₄: cryst. from MeOH. M.p. 205° decomp.

B₃.H₃PO₄: cryst. from 90% EtOH. M.p. 200° decomp.

d-Tartrate: gynergen. M.p. 203° decomp.

Methanesulphonate: m.p. 210° decomp.

Ethanesulphonate: m.p. 207° decomp.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390; 1932, 1543.

Soltys, *Ber.*, 1932, 65, 553.

Stoll, *Helv. Chim. Acta*, 1945, 28, 1283.

Stoll, Hofmann, Petrzilka, *Helv. Chim. Acta*, 1951, 34, 1544.

Ergotamine $C_{33}H_{35}O_5N_5$

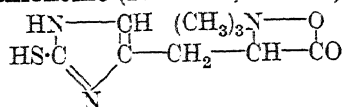
MW, 581

Constituent of ergot alkaloids. Plates from EtOH. M.p. 252° decomp. $[\alpha]_{D}^{25} +450^\circ$, $[\alpha]_{D}^{25} +385^\circ$ in $CHCl_3$. Easily sol. Py. Sol. $CHCl_3$, $PhNO_2$. Spar. sol. MeOH, EtOH, Me_2CO , $AcOEt$, C_6H_6 . Insol. pet. ether. Insol. dil. alkalis or alkali carbonates. Formed when ergotamine is boiled with MeOH. Alc. KOH \rightarrow ergine.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390; 1932, 1543.

Soltys, *Ber.*, 1932, 65, 553.

Stoll, *Helv. Chim. Acta*, 1945, 28, 1283.

Ergothioneine (Thioneine, thiasine) $C_9H_{15}O_2N_3S$

MW, 229

Plates $\div 2H_2O$. M.p. 290° decomp. $[\alpha]_D +116.5^\circ$. Gives ppt. with Meyer's reagent and $HgCl_2$, but not with picric or tannic acids. $FeCl_3 \rightarrow$ trimethylhistidine.

Akabori, *Ber.*, 1933, 66, 151.

Barger, Ewins, *J. Chem. Soc.*, 1911, 99, 2336.

Tanret, *Compt. rend.*, 1909, 149, 222.

Heath, Lawson, Rimington, *J. Chem. Soc.*, 1951, 2215.

Ergotinine $C_{35}H_{39}O_5N_5$

MW, 609

Occurs in *Claviceps purpurea*, parasitic on cereals. Prisms from Me_2CO . Aq. M.p. 239° decomp., sinters at 210° . $[\alpha]_{D}^{25} +459^\circ$ in $CHCl_3$. Slightly sol. H_2O . Mod. sol. hot EtOH, C_6H_6 . Alc. KOH \rightarrow ergine. Blue-violet fluor. in acid sols. Sol. in $H_2SO_4 + FeCl_3 \rightarrow$ orange col. changing to blue. Hyd. (EtOH $+ H_3PO_4$) \rightarrow ergocristine.

Barger, Carr, *J. Chem. Soc.*, 1907, 91, 337.
Barger, Ewins, *J. Chem. Soc.*, 1918, 113, 235.

Soltys, *Ber.*, 1932, 65, 553.

Smith, Timmis, *J. Chem. Soc.*, 1931, 1888.

Jacobs, Craig, *J. Biol. Chem.*, 1935, 110, 521; *J. Am. Chem. Soc.*, 1935, 57, 383.

Stoll, Hofmann, *Helv. Chim. Acta*, 1943, 26, 1570.

Ergotocine.

See Ergometrine.

Ergotoxine $C_{35}H_{39}O_5N_5$

MW, 625

Contains lysergic acid (as its amide, ergine), isobutyrylformic acid, proline and phenylalanine in peptide combination. Earlier preparations contained ergocristine, ergocryptine and ergocor-

nine, from which ergotoxine can be separated only with difficulty. Cryst. from Me_2CO or MeOH. M.p. $165\text{--}70^\circ$. Prisms $+ \frac{1}{2} C_6H_6$ from C_6H_6 . Loses C_6H_6 and melts at $190\text{--}200^\circ$. $[\alpha]_{D}^{25} -107^\circ$ in Py. Sol. EtOH, MeOH, Et_2O , boiling C_6H_6 , caustic alkalis. Insol. H_2O . Hot MeOH \rightarrow ergotinine. Alc. KOH \rightarrow ergine. Pptd. by alkaloid reagents.

B.HCl: plates. M.p. 205° .

$B_2H_3C_2O_4$: plates. M.p. 179° decomp.

$B_2H_3PO_4.H_2O$: needles. M.p. $186\text{--}7^\circ$ decomp.

$B_2C_2H_5SO_3H.2C_2H_5OH$: m.p. 209° .

$B_2C_2H_5SO_3H$: hexagonal tablets from Me_2CO . M.p. 207° .

Ditoluyltartrate ($C_{35}H_{39}O_5N_5$) $_2 \cdot C_{20}H_{18}O_8$: m.p. 191° decomp. (corr.). $[\alpha]_D^{25} +58^\circ$ in EtOH.

Smith, Timmis, *J. Chem. Soc.*, 1930, 1390; 1931, 1888.

Barger, Carr, *J. Chem. Soc.*, 1907, 91, 337.

Barger, Ewins, *J. Chem. Soc.*, 1918, 113, 235.

Soltys, *Ber.*, 1932, 65, 553.

Jacobs, Craig, *J. Biol. Chem.*, 1935, 110, 521; *J. Am. Chem. Soc.*, 1935, 57, 383.

Stoll, Hofmann, *Helv. Chim. Acta*, 1943, 26, 1570.

Erianthin $C_{20}H_{20}O_9$

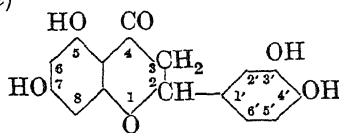
MW, 404

Flavone from *Blumea eriantha*. Yellow prisms from Me_2CO , or alc. $CHCl_3$. M.p. 154° .

Diacetyl: m.p. 163° .

Methyl deriv.: m.p. 141° .

Bose, Dutt, *J. Indian Chem. Soc.*, 1940, 17, 45.

Eriodictyol (5 : 7 : 3' : 4' - Tetrahydroxy-flavanone) $C_{15}H_{12}O_6$

MW, 288

Occurs in leaves of *Eriodictyon californicum* Dene, and *Eriodictyon glutinosum* Benth. Plates from EtOH. M.p. 267° . Mod. sol. hot EtOH, AcOH. Spar. sol. boiling H_2O . Sol. alkalis and alkali carbonates.

Acetyl deriv.: m.p. 137° .

3'-Me ether: see Homoeriodictyol.

7 : 3' : 4'-Tri-Me ether: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136° .

Shinoda, Sato, *Chem. Abstracts*, 1929, 23, 4210.

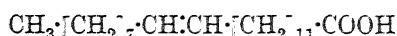
Tutin, *J. Chem. Soc.*, 1910, 97, 2054.

Power, Tutin, *J. Chem. Soc.*, 1907, 91, 895.

Eriodictyonone.

See Homoeriodictyol.

Erucic Acid (*cis*- Δ^{12} -Docosenoic acid. Cf. Brassidic Acid)



$\text{C}_{22}\text{H}_{42}\text{O}_2$ MW, 338

Present as glyceride in rape and many other vegetable oils. Cryst. from MeOH. M.p. 33·5–34°. B.p. 241–3°/5 mm. Nitrogen oxides \rightarrow brassidic acid.

Me ester: $\text{C}_{23}\text{H}_{44}\text{O}_2$. MW, 352. B.p. 221–2°/5 mm.

Et ester: $\text{C}_{24}\text{H}_{46}\text{O}_2$. MW, 366. B.p. 229–30°/5 mm.

Butyl ester: b.p. 211–12°/1 mm. n_D^{25} 1·4538.

Amide: $\text{C}_{22}\text{H}_{43}\text{ON}$. MW, 337. M.p. 65–6°.

Anhydride: $\text{C}_{44}\text{H}_{82}\text{O}_3$. MW, 658. M.p. 47·5–48°.

Nitrile: b.p. 238–40°. D_4^{25} 0·849. n_D^{25} 1·4603.

Anilide: m.p. 65–6°.

Noller, Talbot, *Organic Syntheses*, 1930, X, 44.

Holde, Zadek, *Ber.*, 1923, 56, 2052.

Dorée, Pepper, *J. Chem. Soc.*, 1942, 477.

Bowman, *J. Chem. Soc.*, 1950, 177.

Erucyl Alcohol (*Docosenol, docosenyl alcohol, 1-hydroxydocosene*)



$\text{C}_{22}\text{H}_{44}\text{O}$ MW, 324

Cryst. from Me_2CO or MeOH. M.p. 34·5–35·5°. B.p. 240·5–241·5°/10 mm., 199°/0·2 mm. Sol. EtOH, AcOH, C_6H_6 , pet. ether. Red. \rightarrow docosyl alcohol.

Dibromide: m.p. 45°.

Phenylurethane: m.p. 86–86·5°.

Willstätter, Mayer, Hüni, *Ann.*, 1911, 378, 101.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, 20, 527.

Bleyberg, Ulrich, *Ber.*, 1931, 64, 2504.

Erysocine

$\text{C}_{18}\text{H}_{21}\text{O}_3\text{N}$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from Et_2O . M.p. 162°. Sol. CHCl_3 . Mod. sol. EtOH, Et_2O . $[\alpha]_D^{25} + 238·1^\circ$. Weakly basic.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Erysovine

$\text{C}_{18}\text{H}_{21}\text{O}_3\text{N}$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Needles from EtOH. M.p. 204–5°. Sol. CHCl_3 . Mod. sol.

EtOH, Et_2O . $[\alpha]_D^{25} + 248^\circ$ in EtOH. Readily hyd. Weakly basic.

Folkers *et al.*, *J. Am. Chem. Soc.*, 1940, 62, 1677; 1942, 64, 1892.

Prelog *et al.*, *Helv. Chim. Acta*, 1949, 32, 453.

Koniuszy, Wiley, Folkers, *J. Am. Chem. Soc.*, 1949, 71, 875.

Kenner, Khorana, Prelog, *Helv. Chim. Acta*, 1951, 34, 1969.

Carmack, McKusick, Prelog, *ibid.*, 1601.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, 73, 589.

Erysonine

$\text{C}_{17}\text{H}_{19}\text{O}_3\text{N}$ MW, 285

Alkaloid from *Erythrina costaricensis*, Micheli. Cryst. from EtOH. M.p. 236–7°. $[\alpha]_D^{25} + 285·8^\circ$ in HCl.Aq., $[\alpha]_D^{25} + 272^\circ$ in morpholine.

Folkers *et al.*, *J. Am. Chem. Soc.*, 1941, 63, 1544.

Erysovine

$\text{C}_{17}\text{H}_{19}\text{O}_3\text{N}$ MW, 285

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 241–2°. Spar. sol. H_2O , CHCl_3 and hydroxylic solvents. $[\alpha]_D^{25} + 265·2^\circ$ in EtOH-glycerol. Aq. FeCl_3 containing drop of HCl \rightarrow green col. Weak base. Unstable in alk. sol.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, 62, 1677.

Koniuszy, Wiley, Folkers, *J. Am. Chem. Soc.*, 1949, 71, 875.

Kenner, Khorana, Prelog, *Helv. Chim. Acta*, 1951, 34, 1969.

Carmack, McKusick, Prelog, *ibid.*, 1601.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, 73, 589.

Erysothiopine

$\text{C}_{19}\text{H}_{21}\text{O}_7\text{NS}$ MW, 407

From seeds of *Erythrina glauca*, Willd. Cryst. from EtOH.Aq. as hydrate. M.p. 168–9°. $[\alpha]_D^{25} + 194^\circ$ in EtOH.

Folkers *et al.*, *J. Am. Chem. Soc.*, 1944, 66, 1083.

Erysothiovine

$\text{C}_{20}\text{H}_{23}\text{O}_7\text{NS}$ MW, 421

Alkaloid from seeds of *Erythrina glauca*, Willd. Cryst. $+2\text{H}_2\text{O}$ from H_2O . M.p. 187°. Sol. MeOH. $[\alpha]_D^{25} + 208^\circ$ in EtOH.

Folkers *et al.*, *J. Am. Chem. Soc.*, 1944, 66, 1083.

Erysovine

$\text{C}_{18}\text{H}_{21}\text{O}_3\text{N}$ MW, 299

Alkaloid with curare-like action isolated from several species of *Erythrina*. Prisms from Et₂O. M.p. 178–9°. Sol. CHCl₃. Mod. sol. EtOH, Et₂O. $[\alpha]_D^{25} + 252^\circ$ in EtOH. Weak base.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 1677.

Koniuszy, Wiley, Folkers, *J. Am. Chem. Soc.*, 1949, **71**, 875.

Kenner, Khorana, Prelog, *Helv. Chim. Acta*, 1951, **34**, 1969.

Carmack, McKusick, Prelog, *ibid.*, 1961.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, **73**, 589.

Erythraline

C₁₈H₁₉O₃N MW, 297

Alkaloid with curare-like action isolated from several species of *Erythrina*. Cryst. from EtOH. M.p. 106–7°. $[\alpha]_D^{27} + 211.8^\circ$ in EtOH.

B,HBr: cryst. from MeOH–Et₂O. M.p. 243°. $[\alpha]_D^{27} + 216.6^\circ$ in H₂O.

B,HI: yellow cryst. from EtOH. M.p. 252–3° decomp. $[\alpha]_D^{31} + 177^\circ$ in H₂O.

Methiodide: yellow cryst. from MeOH–C₆H₆. M.p. 185–7°.

Folkers, Koniuszy, *J. Am. Chem. Soc.*, 1940, **62**, 436, 1673; 1942, **64**, 2146.

Prelog *et al.*, *Helv. Chim. Acta*, 1949, **32**, 453.

Kenner, Khorana, Prelog, *Helv. Chim. Acta*, 1951, **34**, 1969.

Carmack, McKusick, Prelog, *ibid.*, 1961.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, **73**, 589.

Erythramine

C₁₈H₂₁O₃N MW, 299

Alkaloid with curare-like action isolated from seeds of *Erythrina sandwicensis*, Deg. and *Erythrina subumbrans* (Hassk.) Merrill. Cryst. from Et₂O–pet. ether. M.p. 103–4°. B.p. 125°/3.9 × 10^{–4} mm. Sol. MeOH, EtOH, AcOEt, C₆H₆. Mod. sol. Et₂O. Prac. insol. pet. ether. Free base unstable.

B,HCl: cryst. from EtOH. M.p. 250° decomp.

B,HBr: needles from EtOH. M.p. 228°. $[\alpha]_D^{28} + 203.2^\circ$ in H₂O.

B,HI: yellowish orange needles from EtOH. M.p. 249° decomp. $[\alpha]_D^{28} + 220^\circ$ in H₂O.

Methiodide: yellowish plates. M.p. 96–8°. $[\alpha]_D^{28} + 176^\circ$ in H₂O.

Folkers, Koniuszy *et al.*, *J. Am. Chem. Soc.*, 1939, **61**, 1232; 1940, **62**, 436, 1673; 1942, **64**, 2146.

Carmack, McKusick, Prelog, *Helv. Chim. Acta*, 1951, **34**, 1601.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, **73**, 589.

Erythratine

C₁₈H₂₁O₄N MW, 315

Alkaloid with curare-like action isolated from *Erythrina glauca*, Willd. Cryst. as hemihydrate from Et₂O–pet. ether. M.p. 170°. $[\alpha]_D^{25} - 145.5^\circ$ in EtOH.

B,HBr: cryst. from EtOH. M.p. 241°. $[\alpha]_D^{25} + 158.7^\circ$ in H₂O.

B,HI: cryst. from EtOH. M.p. 242°. $[\alpha]_D^{25-28} + 109.0^\circ$ in H₂O.

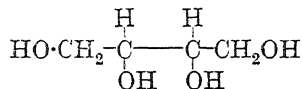
Folkers, Koniuszy *et al.*, *J. Am. Chem. Soc.*, 1940, **62**, 436; 1942, **64**, 2146.

Folkers, Koniuszy, Shavel, *J. Am. Chem. Soc.*, 1951, **73**, 589.

Erythrene.

See 1 : 3-Butadiene.

Erythritol (1 : 2 : 3 : 4-Tetrahydroxybutane)



C₄H₁₀O₄ MW, 122

Occurs in *Protococcus vulgaris* and *Trentepohlia Jolithus*. A metabolic product of *Aspergillus terreus*. Prisms. M.p. 121–5°. B.p. 329–31°, 294–6°/200 mm. Sol. H₂O, hot EtOH. Insol. Et₂O. Heat of comb. C₂ 504.1 Cal. (501.7 Cal.); C_p 504.4 Cal. (502.6 Cal.) Hot conc. HCl → 1 : 4-dichloro-ψ-butylene glycol. Heat with P₂S₅ → thiophene. Me₂CO + HCl → di-isopropylidene-erythritol, m.p. 56°, b.p. 105–6°/29 mm. *Sorbose bacterium* → d-erythrulose.

1 : 4-Di-Et ether: C₈H₁₈O₄. MW, 178. M.p. 13–5°. B.p. 152°/35 mm., 144°/22 mm.

Tetramitrate: nitroerythritol. Plates from EtOH. M.p. 61°.

Tetra-acetyl: m.p. 89°.

1 : 4-Dibenzoyl: m.p. 148°.

Tribenzoyl: m.p. 108–8–5°.

Tetra-benzoyl: m.p. 188–8–5°.

Tetra-p-toluenesulphonyl: m.p. 165–6°.

Di-benzylidene deriv.: m.p. 201–2°.

de Luynes, *Ann. chim. phys.*, 1864, **2**, 399.

Ruff, *Ber.*, 1899, **32**, 3677.

Pariselle, *Ann. chim. phys.*, 1911, **24**, 399.

Prévost, *Compt. rend.*, 1926, **183**, 134.

Grinakowski, *Chem. Zentr.*, 1913, **II**, 2076.

Erythroaphin fb

C₃₀H₂₂O₈ MW, 510

Polycyclic quinonoid end-product of enzymic degradation, after death, of the pigments of *Aphis fabae*. Carmine-red needles from CHCl₃–EtOH. Decomp. above 250°. Sol. CHCl₃, CCl₄. Mod. sol. Py, Me₂CO, C₆H₆, dioxan, Et₂O, AcOH, Ac₂O. Spar. sol. EtOH, AcOEt. Insol. H₂O. Neutral or acid sols. are red with orange-red fluor. Absorption maxima at 267, 421, 446.5, 485, 520.5, 560 and 586 mμ. NaOH →

deep green sol. with red fluor. $\text{H}_2\text{SO}_4 \rightarrow$ red sol. $\text{Ac}_2\text{O} - \text{trace } \text{H}_2\text{SO}_4 \rightarrow$ red \rightarrow green \rightarrow blue sol. with red fluor. $\text{HNO}_3 \rightarrow$ mellitic acid.

Diacetyl deriv.: yellow needles or red prisms from C_6H_6 . M.p. $245-50^\circ$ decomp.

Dibenzoyl deriv.: amorphous brown powder.

Human, Johnson, MacDonald, Todd, *J. Chem. Soc.*, 1950, 477.

Erythroaphin sl

$\text{C}_{30}\text{H}_{24}\text{O}_8$ MW, 512

Final enzymatic decomposition product of the polyquinonoid pigments of *Tuberolachnus salignus* after death. Dark red needles. M.p. $250-2^\circ$ decomp. Very sol. Py, CHCl_3 . Sol. CCl_4 , Me_2CO , C_6H_6 . Spar. sol. AcOEt , EtOH . light petroleum. Sols. in org. solvents are deep red with orange fluor. $\text{H}_2\text{SO}_4 \rightarrow$ red sol., no fluor. $\text{Ac}_2\text{O} - \text{trace } \text{H}_2\text{SO}_4 \rightarrow$ green \rightarrow blue sol. with red fluor.

Diacetyl deriv.: pale orange powder. Very sol. Me_2CO , AcOEt , C_6H_6 , Py. Sol. Et_2O , EtOH , MeOH . Spar. sol. light petroleum. Insol. H_2O .

Duwell, Johnson, MacDonald, Todd, *J. Chem. Soc.*, 1950, 485.

Erythrodiol

$\text{C}_{30}\text{H}_{50}\text{O}_2$ MW, 442

From beans of *Erythroxylon novogranatense*. M.p. 232° . Sol. pet. ether, EtOH .

Acetyl: plates from $\text{CHCl}_3\text{-MeOH}$. M.p. $238.5-239^\circ$. $[\alpha]_D + 71^\circ$ in CHCl_3 .

Diacetyl: prisms. M.p. 186° . $[\alpha]_D + 66.7^\circ$ in CHCl_3 .

Zimmerman, *Helv. Chim. Acta*, 1936, 19, 247.

Prelog et al., *Helv. Chim. Acta*, 1946, 29, 310.

Erythroglaucin.

See under Catenarin.

Erythroidine

$\text{C}_{16}\text{H}_{19}\text{O}_3\text{N}$ MW, 273

Alkaloid with curare-like action isolated from seeds of *Erythrina americana*, Mill. M.p. $94-6^\circ$. Sol. H_2O , MeOH , EtOH , CHCl_3 , C_6H_6 . Mod. sol. Et_2O . *B.HCl*: needles. M.p. $228-9^\circ$ decomp. $[\alpha]_D^{21} + 109.7^\circ$ in H_2O . Now known to be a mixture of two stereoisomers, α - and β -erythroidines.

α -Erythroidine.

B.HCl: m.p. $227-8^\circ$ decomp. $[\alpha]_D + 118^\circ$.

B.HBr: m.p. $220-2^\circ$.

B.HI: m.p. $210-12^\circ$.

B.HClO₄: m.p. $208-208.5^\circ$.

β -Erythroidine.

Cryst. M.p. $98.5-99.5^\circ$. $[\alpha]_D + 88.8^\circ$ in H_2O .

Dict. of Org. Comp.—II.

B.HCl: m.p. 232° decomp. $[\alpha]_D^{25} + 109^\circ$ in H_2O .

B.HClO₄: m.p. $203-203.5^\circ$. $[\alpha]_D^{25} - 96.3^\circ$ in H_2O .

Folkers, Major, *J. Am. Chem. Soc.*, 1937, 59, 1580.

Koniuszy, Folkers, *J. Am. Chem. Soc.*, 1950, 72, 5579; 1951, 73, 333.

Lapière, Robinson, *Chemistry and Industry*, 1951, 650.

Boekelheide, Grundon, Weinstock, *J. Am. Chem. Soc.*, 1952, 74, 1866.

Erythro-2-ketopentose.

See Adonose.

Erythrol (3:4-Dihydroxy-1-butylene)

$\text{CH}_2\text{:CH-CH(OH)-CH}_2\text{OH}$

$\text{C}_4\text{H}_8\text{O}_2$ MW, 88

B.p. 196.5° , $98^\circ/16$ mm., $91-2^\circ/12$ mm. D_{20}^{20} 1.04703. n_D^{20} 1.4628. Ba permanganate \rightarrow dl-erythritol.

Diacetyl: b.p. $202-3^\circ$.

Dibenzoyl: b.p. $199-200^\circ/6$ mm. n_D^{20} 1.5512.

Di-phenylurethane: m.p. $125-6^\circ$.

4-Me ether: b.p. $143-4^\circ$. D_4^{20} 0.943. n_D^{20} 1.4343. *Acetyl*: b.p. $159-62^\circ$. D_4^{20} 0.9826. n_D^{20} 1.4268.

4-Et ether: b.p. $153-7^\circ$. D_4^{15} 0.9214. n_D^{15} 1.433.

Isobutyl ether: b.p. $178-80^\circ$. D_4^{15} 0.8989. n_D^{15} 1.439.

Prévost, *Compt. rend.*, 1926, 183, 1292; 1928, 186, 1209.

Pariselle, *Compt. rend.*, 1910, 150, 1344.

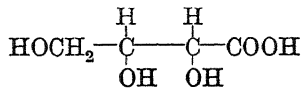
Henninger, *Ann. chim. phys.*, 1886, 7, 213.

Hurd, Filachione, *J. Am. Chem. Soc.*, 1939, 61, 1156.

Petrov, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 131, (*Chem. Abstracts*, 1938, 32, 5369).

Bissinger et al., *J. Am. Chem. Soc.*, 1947, 69, 2955.

Erythronic Acid (Trihydroxybutyric acid)



$\text{C}_4\text{H}_8\text{O}_5$ MW, 136

Free acid readily sol. H_2O . Evaporation of aq. sol. \rightarrow lactone.

dl-.

Brucine salt: cryst. M.p. 210° decomp. $[\alpha]_D^{20} - 33.8^\circ$ in H_2O .

Butyl ester: cryst. from Et_2O . M.p. $62-4^\circ$. $\text{H}(+\text{Pt}) \rightarrow$ erythritol.

Phenylhydrazide: cryst. from EtOH . M.p. $147-5^\circ$.

Triacetyl chloride: $\text{C}_{10}\text{H}_{16}\text{O}_7\text{Cl}$. B.p. $114-16^\circ/2$ mm.

Lactone: dl-erythronolactone. $\text{C}_4\text{H}_6\text{O}_4$. MW, 118. Cryst. from AcOEt . M.p. $91-2^\circ$. *Di-acetyl*: cryst. from H_2O . M.p. $52.5-53^\circ$.

d.-

Brucine salt: cryst. from EtOH.Aq. M.p. 212-14°. $[\alpha]_D^{20} - 25.6^\circ$ in H_2O .

Quinine salt: needles from EtOH. M.p. 166°. $[\alpha]_D^{20} - 106.9^\circ$ in H_2O .

Strychnine salt: needles from H_2O or EtOH.Aq. M.p. 198-9°. $[\alpha]_D^{20} - 16.8^\circ$ in H_2O .

Amide: $C_4H_8O_4N$. MW, 135. Needles. M.p. 91-2°. $[\alpha]_D^{25} + 26.2^\circ$ in H_2O . *Tribenzoyl*: needles from 90% EtOH or 80% Me_2CO . M.p. 201°. $[\alpha]_D^{25} + 9.6^\circ$ in $CHCl_3$.

Lactone: d-erythronolactone. M.p. 104-5°. $[\alpha]_D^{20} - 73.2^\circ$ in H_2O . *Diacetyl*: syrup. $[\alpha]_D^{25} - 50.6^\circ$ in 80% Me_2CO . *Dibenzoyl*: needles from 90% MeOH. M.p. 110-11°. $[\alpha]_D^{25} - 176.9^\circ$ in $CHCl_3$.

l.-

Brucine salt: prisms. Decomp. at 212°. $[\alpha]_D^{20} - 28.4^\circ$ in H_2O .

Amide: needles. M.p. 91-2°. $[\alpha]_D^{25} - 26.2^\circ$ in H_2O . *Tribenzoyl*: needles from 80% Me_2CO . M.p. 201°. $[\alpha]_D^{25} - 9.0^\circ$ in $CHCl_3$.

Lactone: l-erythronolactone. Needles from AcOEt. M.p. 105° corr. $[\alpha]_D + 73.0^\circ$ in H_2O . *Diacetyl*: syrup. $[\alpha]_D^{25} + 50.7^\circ$ in 80% Me_2CO . *Dibenzoyl*: needles from 90% MeOH. M.p. 110-11°. $[\alpha]_D^{25} + 176.3^\circ$ in $CHCl_3$.

Glattfeld, Reitz, *J. Am. Chem. Soc.*, 1940, 62, 974.

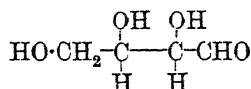
Jelinck, Upson, *J. Am. Chem. Soc.*, 1938, 60, 355.

Glattfeld, Forbrich, *J. Am. Chem. Soc.*, 1934, 56, 1209.

Erythronolactone.

See under Erythronic Acid.

Erythrose (1 : 2 : 3-Trihydroxybutyraldehyde)



$C_4H_8O_4$

MW, 120

l.-

Liq. Very sol. H_2O , EtOH. Exhibits mutarotation. $[\alpha]_D + 21.5^\circ$ (equilibrium value in H_2O). Reduces Fehling's in the cold. Ox. \rightarrow l-erythronic acid \rightarrow mesotartaric acid. NaHg \rightarrow meso-erythritol. Hot HCl \rightarrow lactic acid. Phloroglucinol \rightarrow red. col.

Triacetyl: cryst. from EtOH. M.p. 134°.

Osazone: needles from C_6H_6 . M.p. 163-4°.

Benzylphenylhydrazone: needles. M.p. 105-5°.

Diacetamide: m.p. 210° decomp. Sol. H_2O . Insol. EtOH, Et_2O .

d.-

Liq. $[\alpha]_D - 14.5^\circ$ (equilibrium value in H_2O).

Diacetyl: m.p. 128°. *Phenylhydrazone*, m.p. 144-6°.

Osazone: needles from H_2O . M.p. 164°.

Phenylhydrazone: m.p. 116°.

Benzylphenylhydrazone: needles from C_6H_6 -pet. ether. M.p. 105°.

dl.-

Osazone: m.p. 166-8°. Very sol. EtOH, Me_2CO , AcOH. Sol. Et_2O , hot C_6H_6 . Pract. insol. H_2O .

Ruff, *Ber.*, 1901, 34, 1365; 1899, 32, 3672.

Wohl, *Ber.*, 1899, 32, 3666.

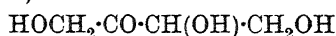
Deulofeu, *J. Chem. Soc.*, 1930, 2603.

Felton, *Chem. Abstracts*, 1936, 30, 2551.

Erythroxyanthraquinone.

See 1-Hydroxyanthraquinone.

Erythrulose (1 : 2-Ketotetrose, 2-keto-1 : 3 : 4-tetrahydroxybutane, hydroxymethyl dihydroxyethyl ketone)



$C_4H_8O_4$

MW, 120

d.-

$[\alpha]_D^{15} - 11^\circ$.

l.-

Produced from erythritol by *Acetobacter*. Light yellow syrup. Sol. EtOH. Insol. Et_2O . $[\alpha]_D^{30} + 11.31$ in H_2O .

o-Nitrophenylhydrazone: cryst. from EtOH. M.p. 152-3°. $[\alpha]_D^{18} + 48^\circ$ in EtOH.

Whistler, Underkoffer, *J. Am. Chem. Soc.*, 1938, 60, 2507.

Müller, Montigel, Reichstein, *Helv. Chim. Acta*, 1937, 20, 1468.

Iwadare, *Bull. Chem. Soc. Japan*, 1939, 14, 131.

Eschscholtzxanthin

$C_{40}H_{54}O_2(\pm 2H)$

MW, 566 (± 2)

A xanthophyll occurring as esters in petals of *Eschscholtzia californica*. Red cryst. from Me_2CO . M.p. 185-6°. $[\alpha]_D^{18} + 225^\circ \pm 12^\circ$ in $CHCl_3$. $CHCl_3$ sol. with conc. $H_2SO_4 \rightarrow$ blue col. and with $SbCl_3$ purplish green. Unstable to heat. Absorbs oxygen from air. Absorption maxima at 4460, 4720 and 5030 Å in EtOH.

Diacetyl: cryst. from CS_2 . M.p. 200-240° decomp. $[\alpha]_D^{20} + 132^\circ$ in $CHCl_3$.

Dibenzoyl: cryst. from Me_2CO -EtOH. M.p. 133°. $[\alpha]_D^{20} - 142^\circ$ in $CHCl_3$.

Di-p-nitrobenzoyl: cryst. from $CHCl_3$ - Me_2CO . M.p. above 260°. $[\alpha]_D^{20} - 234^\circ$ in $CHCl_3$.

Strain, *J. Biol. Chem.*, 1938, 123, 425.

Escigenin (Äscigenin)

$C_{30}H_{48-50}O_5$

MW, 488 or 490

Sapogenin of seeds of *Aesculus hippocastanum*, Linn. Pentacyclic triterpene containing an oxide ring. Needles. M.p. 317-18°. $[\alpha]_D^{20} + 46^\circ$ in EtOH. Absorption max. in EtOH at 275 mμ. Tetranitromethane \rightarrow yellow col. Se \rightarrow 6-hydroxy-1 : 2 : 5-trimethylnaphthal-

ene — 1 : 2 : 5-trimethylnaphthalene — 2 : 7-dimethylnaphthalene — 1 : 2 : 6-trimethylphenanthrene — dimethylpicene — sapotalene.

Tetra-acetyl: needles. M.p. 207–8°. $[\alpha]_D^{25} + 56.7^\circ$ in CHCl_3 .

Ruzicka, Baumgartner, Prelog, *Helv. Chim. Acta*, 1949, **32**, 2057, 2069.

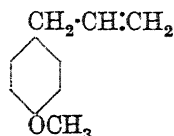
Esculetin.

See Aesculetin.

Esculin.

See Aesculin.

Esdragol (*Estragol*, *chavicol methyl ether*, *methylchavicol*, *p-allylanisole*, *4-methoxy-1-allylbenzene*)



$\text{C}_{10}\text{H}_{12}\text{O}$

MW, 148

Constituent of many essential oils. B.p. 215–16°, 96°/12 mm. D_{25}^{25} 0.9755. n_D^{25} 1.5230. KMnO_4 in $\text{AcOH} \rightarrow$ *p*-methoxyphenylacetic acid. Alc. KOH \rightarrow anethole.

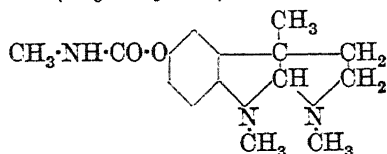
Klages, *Ber.*, 1899, **32**, 1439.

Tiffeneau, *Compt. rend.*, 1904, **139**, 482.

Eykman, *Ber.*, 1889, **22**, 2743.

Verley, D.R.P., 154,654, (*Chem. Zentr.*, 1904, II, 1354).

Eserine (*Physostigmine*)



$\text{C}_{15}\text{H}_{21}\text{O}_2\text{N}_3$

MW, 275

Occurs in calabar bean, *physostigma venenosum*. Two cryst. forms, m.p.s. 86–7° and 105–6°. Sol. EtOH, Et₂O, CHCl_3 . $[\alpha]_D^{25} - 75.8^\circ$. Hot alkali in vacuo \rightarrow eseroline.

N-Benzoyl: prisms. M.p. 115–16°.

B,2HBr: m.p. 224–6°.

B,2HAuCl₄: yellow leaflets. M.p. 163–5°.

B,H₂PtCl₆: orange-yellow needles. M.p. 180°.

Picrate: needles. M.p. 114°.

Methiodide: m.p. 188°.

Polonovski, Polonovski, *Bull. soc. chim.*, 1925, **37**, 744.

Stedman, *J. Chem. Soc.*, 1921, **119**, 891.

Barger, Stedman, *J. Chem. Soc.*, 1923, **123**, 758.

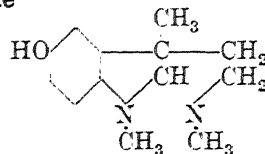
King, Liguori, Robinson, *J. Chem. Soc.*, 1933, 1475.

Julian, Piki, *J. Am. Chem. Soc.*, 1935, **57**, 755.

Eserine oxide.

See Geneserine.

Eseroline



$\text{C}_{13}\text{H}_{18}\text{ON}_2$

MW, 218

l.

Needles from C_6H_6 . M.p. 129°. $[\alpha]_D^{25} - 107^\circ$. Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Spar. sol. pet. ether. Methyl isocyanate \rightarrow eserine. Ox. in air \rightarrow rubreserine.

Benzoyl: leaflets from AcOEt. M.p. 155–6°. *B,HCl,1H₂O*: needles from AcOEt–EtOH. M.p. 212°.

Picrate: m.p. 195°.

Methopicrate: orange yellow. M.p. 194–5° decomp.

Phenylurethane: see Phenenserine.

dl.

M.p. 137–8°.

Salway, *J. Chem. Soc.*, 1912, **101**, 980.

Barger, Stedman, *J. Chem. Soc.*, 1925, **127**, 247.

Petit, Polonovski, *Bull. soc. chim.*, 1893, **9**, 108.

Straus, *Ann.*, 1913, **401**, 350.

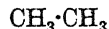
Estragol.

See Esdragol.

Estromon.

See Diethylstilboestrol.

Ethane



C_2H_6

MW, 30

Gas. B.p. –88.63°, –107.9°/385 mm. D_4^{20} 0.5719. Sol. EtOH, liq. oxygen. Spar. sol. H_2O . Vap. press. of liq. 14.1 mm. at –140°, 393.8 mm. at –100°, 1499 mm. at –75°. Heat of comb. C_2 370.4 Cal. Crit. temp. 32.27 ± 0.01°. Crit. press. 48.20 ± 0.02 atm. Crit. vol. 0.148 litre per mole. Decomp. at high temps. Ox. \rightarrow $\text{C}_2\text{H}_5\text{OH} \rightarrow \text{CH}_3 \cdot \text{COOH}$. Cl \rightarrow chloroethane and dichloroethane.

Mermejo, Blas, *Anales Soc. españ. fis. quim.*, 1929, **28**, 228.

Frankland, *J. Chem. Soc.*, 1885, **47**, 236.

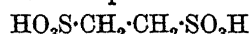
Sabatier, Senderens, *Compt. rend.*, 1897, **124**, 1360.

Smith, Hanson, *Oil and Gas Journal*, 1945, **44** (No. 10), 119.

Ethane-dicarboxylic Acid.

See Methylmalonic Acid and Succinic Acid.

Ethane-1 : 2-disulphonic Acid



$\text{C}_2\text{H}_6\text{O}_6\text{S}_2$

MW, 190

Needles from AcOH–Ac₂O. M.p. 104°. Sol. EtOH. Na salt forms series of hydrates.

Di-Et ester: $\text{C}_6\text{H}_{14}\text{O}_6\text{S}_2$. MW, 246. Prisms

from EtOH or Et₂O. M.p. 77.5°. Very sol. CHCl₃, C₆H₆. Spar. sol. EtOH, Et₂O.

Dichloride: C₂H₄O₄Cl₂S₂. MW, 227. Needles from Et₂O. M.p. 95°. Decomp. by H₂O.

S-Benzyl-isothiuronium salt: m.p. 201–2°. *Aniline salt*: cryst. from H₂O. Decomp. at 270°.

m-Toluidine salt: m.p. 230°.

p-Toluidine salt: chars at 270°.

Kohler, *Am. Chem. J.*, 1897, 19, 732.

Blanksma, *Rec. trav. chim.*, 1946, 65, 311.

Zuffanti, Hendrickson, *J. Am. Chem. Soc.*, 1941, 63, 2999.

Stone, *J. Am. Chem. Soc.*, 1936, 58, 488.

Ethanesulphonic Acid (*Ethylsulphonic acid, sulphoethane*)



C₂H₆O₃S MW, 110

Very stable, forming hydrated salts with common metals.

Me ester: C₃H₅O₃S. MW, 124. B.p. 197–5–200.5°.

Et ester: C₄H₁₀O₃S. MW, 138. B.p. 213–14°, 104°/14 mm. D₄²⁵ 1.1461. n_D²⁰ 1.42684.

Amide: C₂H₅O₂NS. MW, 109. Prisms from Et₂O. M.p. 60°.

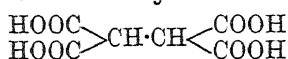
Chloride: C₂H₅O₂ClS. MW, 128.5. B.p. 171°. D₄²⁵ 1.357.

Bromide: b.p. 85–6°/18 mm. n_D²⁵ 1.5010.

Böeseken, van Ockenburg, *Rec. trav. chim.*, 1914, 33, 322.

Autenrieth, *Ann.*, 1890, 259, 363.

Ethane-tetracarboxylic Acid



C₆H₆O₈ MW, 206

Needles or plates from Et₂O. M.p. 167–9° decomp. Sol. H₂O, EtOH, Et₂O. Spar. sol. AcOH, C₆H₆. Heat → succinic acid + CO₂. sym.-*Di-Me ester*: C₈H₁₀O₈. MW, 234. M.p. 158–60°.

Tetra-Me ester: C₁₀H₁₄O₈. MW, 262. Cryst. from Et₂O. M.p. 138°. Spar. sol. Et₂O. Insol. pet. ether.

sym.-*Di-Et ester*: C₁₀H₁₄O₈. MW, 262. Leaflets + ½H₂O. M.p. 132–3° decomp. Sol. EtOH, Et₂O. Spar. sol. CHCl₃, CS₂.

Tetra-Et ester: C₁₄H₂₂O₈. MW, 318. Prisms. M.p. 76°.

Buchner, *Ber.*, 1892, 25, 1157.

Mignonac, Rambeck, *Compt. rend.*, 1929, 188, 1298.

Ethanol.

See Ethyl Alcohol.

Ethanolamine.

See 2-Aminoethyl Alcohol.

Ether.

See Diethyl Ether.

Etheserolene

C₁₄H₁₉O₂N₂ MW, 247

Prisms. M.p. 48°. Easily sol. org. solvents. Spar. sol. H₂O. Volatile in steam. [α]_D²⁰ –98° in EtOH.

Nitroso deriv.: m.p. about 97°.

Picrate: m.p. 98°.

Methiodide: m.p. 179°. [α]_D²⁰ –40° in H₂O.

Polonovski, Polonovski, *Bull. soc. chim.*, 1923, 33, 973.

Stedman, Barger, *J. Chem. Soc.*, 1925, 127, 252.

Ethine.

See Acetylene.

Ethionic Acid (*Sulphuric ester of isethionic acid*)



C₂H₆O₇S₂ MW, 206

Not known in free state. Concentration of aq. sol. → isethionic and sulphuric acids. The salts Na₂C₂H₄O₇S₂·1½H₂O, K₂C₂H₄O₇S₂·½H₂O, cryst. from H₂O. BaC₂H₄O₇S₂·1½H₂O is pptd. from H₂O by a little EtOH.

Anhydride: see Carbyl sulphate.

Magnus, *Ann.*, 1839, 32, 249.

Claeson, *J. prakt. chem.*, 1879, 19, 253.

I.G., B.P., 378,895, (*Chem. Zentr.*, 1932, II, 3960).

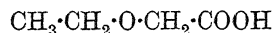
Ethocaine.

See Novocaine.

p-Ethoxyacetanilide.

See under p-Phenetidine.

Ethoxyacetic Acid (*Glycollic acid ethyl ether*)



C₄H₈O₃ MW, 104

Liq. B.p. 156–7°/16 mm. k = 2.50 × 10^{–4} at 25°. D₄²⁰ 1.1021. n_D²⁰ 1.417.

Me ester: C₅H₁₀O₃. MW, 118. B.p. 147–8°/734 mm.

Et ester: C₆H₁₂O₃. MW, 132. B.p. 152°/760 mm.

Phenyl ester: C₁₀H₁₂O₃. MW, 180. B.p. 139°/18 mm.

Benzyl ester: C₁₁H₁₄O₃. MW, 194. B.p. 155°/21 mm.

p-Bromophenacyl ester: C₁₂H₁₃O₄Br. MW, 301. M.p. 104–8°.

Chloride: C₄H₇O₂Cl. MW, 122.5. B.p. 123–4°.

Anhydride: C₈H₁₄O₅. MW, 190. B.p. 142–3°/125 mm.

Amide: C₄H₉O₂N. MW, 103. M.p. 80–2°.

Nitrile: C₄H₇ON. MW, 85. B.p. 136–7°/753 mm.

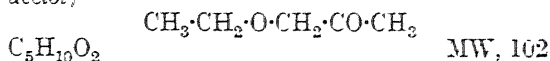
Rothstein, *Bull. soc. chim.*, 1932, 51, 838.

Sommelet, *Compt. rend.*, 1906, 143, 827;

Ann. chim. phys., 1906, 9, 484.

Bruce, Coover, *J. Am. Chem. Soc.*, 1944, 66, 2092.

Ethoxyacetone (*Ethyl acetonyl ether, ethyl-acetol*).



Liq. B.p. $125^\circ/760$ mm. D_4^{20} 0.9204. Misc. with H_2O , EtOH , Et_2O , in all proportions. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ and Fehling's.

Oxime: b.p. 188° . Sol. H_2O .

Semicarbazone: m.p. 96° .

Phenylhydrazone: b.p. $165^\circ/16$ mm.

Fittig, Erlenbach, *Ann.*, 1892, 269, 22.

Sommelet, *Compt. rend.*, 1906, 143, 827;

Ann. chim. phys., 1906, 9, 484.

Ethoxyallylene.

See Ethyl propargyl Ether.

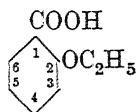
Ethoxyaniline.

See Phenetidine.

Ethoxybenzaldehyde.

See under Hydroxybenzaldehyde and Salicylaldehyde.

***o*-Ethoxybenzoic Acid** (*Salicylic acid ethyl ether*)



M.p. $19.3\text{--}19.5^\circ$. Spar. sol. H_2O . Slightly volatile in steam.

Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. B.p. $245^\circ/760$ mm.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. B.p. $180\text{--}85^\circ/113$ mm.

Menthyl ester: m.p. $52\text{--}3^\circ$.

Kraut, *Ann.*, 1869, 150, 2.

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1742.

***m*-Ethoxybenzoic Acid** (*Ethyl ether of m-hydroxybenzoic acid*).

Needles from H_2O . M.p. 137° . Sol. H_2O , EtOH , Et_2O , C_6H_6 . Sublimes in needles.

Et ester: b.p. $172\text{--}3^\circ/50$ mm.

Menthyl ester: b.p. $230^\circ/18$ mm.

Chloride: $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 184.5. M.p. $27\text{--}8^\circ$. B.p. $135\text{--}40^\circ/16$ mm.

Amide: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. M.p. $139\text{--}139.5^\circ$.

Fritsch, *Ann.*, 1903, 329, 71.

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1742.

***p*-Ethoxybenzoic Acid** (*Ethyl ether of p-hydroxybenzoic acid*).

Needles. M.p. $195\text{--}6^\circ$. Slightly sol. hot H_2O .

Et ester: b.p. $148\text{--}9^\circ/14$ mm.

Menthyl ester: m.p. $76\text{--}7^\circ$. B.p. $230\text{--}5^\circ/16$ mm.

Chloride: b.p. $160^\circ/20$ mm.

Hydrazide: m.p. 124° . *Hydrochloride*: m.p. 216° .

Cohen, Dudley, *J. Chem. Soc.*, 1910, 97, 1742.

2-*p*-Ethoxybenzoylbenzoic Acid.

See under 4'-Hydroxybenzophenone-2-carboxylic Acid.

7-Ethoxy-2 : 5-diaminoacridine.

See Rivanol.

α -Ethoxydi-1-naphthylmethane.

See under 1 : 1'-Dinaphthylcarbinol.

Ethoxydithioformic Acid.

See Xanthogenic Acid.

Ethoxyethylamine.

See 2-Aminodiethyl Ether.

Ethoxyethylbenzene.

See under Ethylphenol.

Ethoxyethylene.

See Ethyl vinyl Ether.

Ethoxyformanilide.

See under Phenetidine.

3-Ethoxy-*n*-heptane.

See under Ethyl-*n*-butylcarbinol.

***p*-Ethoxyphenylurea.**

See Dulcin.

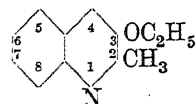
Ethoxypropionic Acid.

See under Hydracrylic Acid and Lactic Acid.

Ethoxypropylene oxide.

See under Glycide.

3-Ethoxyquinaldine



Colourless cryst. M.p. $68\text{--}9^\circ$ corr. B.p. $140\text{--}1^\circ/2\text{--}3$ mm.

Koenigs, Stockhausen, *Ber.*, 1902, 35, 2556.

Cross, Henze, *J. Am. Chem. Soc.*, 1939, 61, 2730.

5-Ethoxyquinaldine (2-Methyl-5-ethoxyquinoline).

Pale yellow viscous oil. B.p. $290\text{--}2^\circ/760$ mm., $174^\circ/11$ mm.

Ethiodide: orange-yellow needles. M.p. 166° .

Picrate: pale yellow needles. M.p. $206\text{--}7^\circ$.

Braunholtz, *J. Chem. Soc.*, 1922, 121, 169.

6-Ethoxyquinaldine (2-Methyl-6-ethoxyquinoline).

Plates from petrol, m.p. 71° . Plates + $1\text{H}_2\text{O}$ from EtOH.Aq. , m.p. $58\text{--}9^\circ$.

B.HCl : colourless needles. M.p. $184\text{--}6^\circ$.

Ethiodide: yellow needles from EtOH . M.p. 182° .

Picrate: pale yellow needles. M.p. 192° .

Braunholtz, *J. Chem. Soc.*, 1922, 121, 169.

7-Ethoxyquinaldine (2-Methyl-7-ethoxy-quinaldine).

Pale yellow viscous oil. B.p. 307–5°/770 mm.

Ethiodide: yellow prisms. M.p. 216–18° decomp.

Picrate: pale yellow needles. M.p. 213°.

Braunholtz, *J. Chem. Soc.*, 1922, 121, 169.

5-Ethoxysalicylic Acid.

See under Gentisic Acid.

β-Ethoxystyrene.

See Ethyl styryl Ether.

Ethyl

C_2H_5 MW, 29

Obtained by thermal decomp. of lead tetraethyl. Reacts with Sb, Zn, Cd, Pb → a complex mixture of metallic alkyls. With Hg → mercury diethyl. With Na → sodium ethyl. With Cl_4 → ethyl iodide. Chief self-reactions are $2C_2H_5 \rightarrow C_4H_{10}$; $2C_2H_5 \rightarrow C_2H_6 + C_2H_4$.

Simons, Dull, *J. Am. Chem. Soc.*, 1933, 55, 2696.

Semerano, Riccoboni, Callegari, *Ber.*, 1941, 74, 1297.

Moore, Taylor, *J. Chem. Physics*, 1940, 8, 396.

N-Ethylacetamide (Acetylenehydramine, acetethylamide)



C_4H_9ON MW, 87

Oily liq. B.p. 205°. D_4^{25} 0.942. Sol. H_2O , EtOH. $HCl \rightarrow C_4H_9ON \cdot HCl$, white needles, m.p. 60°.

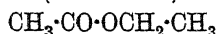
Wallach, *Ann.*, 1873, 184, 108.

Titherley, *J. Chem. Soc.*, 1901, 79, 401.

Ethylacetanilide.

See under Amino-ethylbenzene, and Ethylaniline.

Ethyl acetate (Acetic ester)



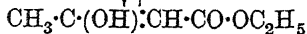
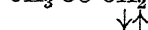
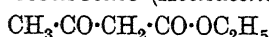
$C_4H_8O_2$ MW, 88

F.p. –83.6°. B.p. 77.1°. D_4^{25} 0.9245, D_4^{20} 0.9003 (0.8990). Sol. 13 parts H_2O at 15°. Misc. with most org. solvents. n_D^{25} 1.37005. Mol. b.p. elevation 27.9°. $NH_3 \rightarrow$ acetamide.

Pabst, *Bull. soc. chim.*, 1880, 33, 350.

Wade, *J. Chem. Soc.*, 1905, 87, 1656.

Ethyl acetoacetate (Acetoacetic ester)



$C_6H_{10}O_3$ MW, 130

B.p. 181°, 100°/80 mm., 88°/29 mm., 74°/14 mm. D_4^{20} 1.0282. n_D^{15} 1.42092 (1.41976). Spar. sol. H_2O . Misc. with most org. solvents. Sol. dil. alkalis, pptd. by CO_2 . Forms Na deriv.

and bisulphite comp. Gives violet col. with $FeCl_3$. $NaHg \rightarrow$ 2-hydroxybutyric ester. Conc. alkali → acetic acid + C_2H_5OH . Dil. acid → acetone + $C_2H_5OH - CO_2$.

Semicarbazone: needles from Et_2O . M.p. 129° decomp. Sol. hot H_2O . Boiling $H_2O \rightarrow$ 3-methyl-5-pyrazolone.

Phenylhydrazones: needles. M.p. 50°. Oxidised by air. Sol. EtOH. Alc. KOH or dil. HCl → 3-methyl-1-phenyl-5-pyrazolone.

2:4-Dinitrophenylhydrazones: m.p. 96°.

2-Nitro-5-chlorophenylhydrazones: m.p. 121°.

2:5-Dichlorophenylhydrazones: m.p. 66–8°.

p-Tolylsemicarbazones: m.p. 117–18°.

β-Naphthylhydrazones: m.p. 107–8°.

Anil: see under 2-Anilinocrotonic Acid.

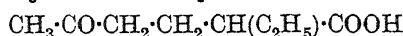
Inglis, Roberts, *Organic Syntheses*, 1926, VI, 36.

Snell, McElvain, *J. Am. Chem. Soc.*, 1931, 53, 2310.

1-Ethylacetoacetic Acid.

See 1-Acetobutyric Acid.

1-Ethyl-3-acetobutyric Acid



$C_8H_{14}O_3$ MW, 158

B.p. 158°/9 mm., 135–7°/2 mm.

Me ester: b.p. 75°/2 mm. Semicarbazone: m.p. 108°.

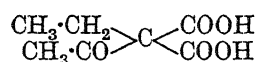
Semicarbazone: cryst. from EtOH– Et_2O . M.p. 127–9°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 769.

1-Ethyl-2-aceto-1:2-di-p-hydroxyphenylethane.

See 3:4-Di-[p-hydroxyphenyl]-hexanone-2.

Ethylacetomalonic Acid



$C_7H_{10}O_5$ MW, 174

Di-Et ester: $C_{11}H_{18}O_5$. MW, 230. B.p. 130–1°/16 mm. $D_4^{19.25}$ 1.0542. Very sol. Et_2O , EtOH.

Et ester-nitrile: $C_9H_{13}O_3N$. MW, 183. Liq. with unpleasant odour. B.p. 130°/35 mm. D_4^{20} 0.976. Sol. EtOH, Et_2O . Insol. H_2O , alkalis.

Auwers, Auffenberg, *Ber.*, 1917, 50, 942.

Ethyl acetonyl Ether.

See Ethoxyacetone.

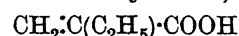
sym.-Ethylacetonylethylene.

See 3-Heptenone-6.

Ethylacetylene.

See 1-Butyne.

1-Ethylacrylic Acid (1-Methylenebutyric acid, 1-butylene-2-carboxylic acid)



$C_5H_8O_2$ MW, 100

Oil with rancid odour. M.p. -16° . B.p. $83^{\circ}/15$ mm., $180^{\circ}/760$ mm.

Et ester: $C_5H_{12}O_2$. MW, 128. B.p. 137° .

Chloride: C_5H_7OCl . MW, 118.5. B.p. $38.5^{\circ}/30$ mm.

Amide: C_5H_9ON . MW, 99. Cryst. from C_6H_6 . M.p. 83.5° .

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 761.

Mannich, Ganz, *Ber.*, 1922, 55, 3493.

2-Ethylacrylic Acid (1-Butylene-1-carboxylic acid, propylideneacetic acid, α -pentenoic acid)



$C_5H_8O_2$ MW, 100

Exists in *cis* and *trans* forms, of which the *trans* is more stable. The nitriles in presence of NaOH or PhONa undergo mutual isomerisation.

Trans:

M.p. 10° . B.p. $108^{\circ}/17$ mm., $99^{\circ}/10$ mm., $71^{\circ}/2$ mm. Mod. sol. H_2O . D_4^{20} 0.992. $k = 1.48 \times 10^{-5}$ at 25° .

Et ester: $C_7H_{12}O_2$. MW, 128. B.p. $157.6^{\circ}/745$ mm., $48^{\circ}/11$ mm. Dibromide, b.p. $117.5^{\circ}/14$ mm.

Chloride: C_5H_7OCl . MW, 118.5. B.p. $37^{\circ}/11$ mm.

Amide: C_5H_9ON . MW, 99. Plates. M.p. 148° .

Nitrile: C_5H_7N . MW, 81. B.p. $143.4^{\circ}/760$ mm., $73.4^{\circ}/72$ mm. n_D^{20} 1.4266. D_4^{20} 0.8266.

Cis:

B.p. $201.2^{\circ}/760$ mm., $101.5-102.5^{\circ}/15$ mm.

Nitrile: b.p. $127.8^{\circ}/760$ mm., $59-59.6^{\circ}/72$ mm. n_D^{20} 1.4211. D_4^{20} 0.8208.

Auwers, *Ann.*, 1923, 432, 63.

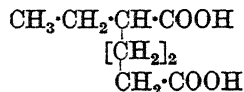
Bruylants, Jmoudsky, *Bulletin de la classe des sciences académie royale de Belgique*, 1931, 17, 1161.

Bourguel, Yvon, *Compt. rend.*, 1926, 182, 224.

2-Ethylacrylic Aldehyde.

See 2-Pentenal.

1-Ethyladipic Acid (Hexane-1:4-dicarboxylic acid)



$C_8H_{14}O_4$ MW, 174

M.p. 53.2° . B.p. $225-6^{\circ}/20$ mm., $166-7^{\circ}/1$ mm. $k = 4.15 \times 10^{-5}$ at 24.2° . $CrO_3 \rightarrow$ succinic acid.

Amide: m.p. 135.4° .

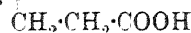
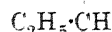
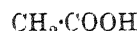
Diamide: m.p. 180° .

Lean, Lees, *J. Chem. Soc.*, 1897, 71, 1067.

Best, Thorpe, *J. Chem. Soc.*, 1909, 95, 713.

Franke et al., *Monatsh.*, 1936, 69, 167.

2-Ethyladipic Acid



$C_8H_{14}O_4$ MW, 174

M.p. $47-9^{\circ}$.

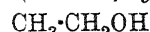
Di-p-phenacyl ester: m.p. $100-1^{\circ}$.

Brown, Rose, Simonsen, *J. Chem. Soc.*, 1944, 101.

Ethylal.

See under Formaldehyde.

Ethyl Alcohol (Ethanol, hydroxyethane)



C_2H_6O MW, 46

F.p. -117.3° (-112.3°). B.p. 78.5° , $54.8^{\circ}/275$ mm., $39.8^{\circ}/130$ mm., $30^{\circ}/79$ mm., $22.1^{\circ}/49.5$ mm., $14.35^{\circ}/31.1$ mm., $8.1^{\circ}/21$ mm., $4^{\circ}/16$ mm. D_4^{20} 0.80645, D_4^{10} 0.7978, D_4^{25} 0.7907, D_4^{30} 0.7893, D_4^{35} 0.78513, D_4^{40} 0.76300, D_4^{45} 0.74620. n_D^{20} 1.36330, n_D^{25} 1.36104, n_D^{30} 1.35954. Heat of comb. C_2 325.7 (328) Cal. Sp. heat 0.612 ($16-40.5^{\circ}$). Crit. temp. 243° . Crit. press. 62.7 atm. Crit. vol. 0.0071. Mol. b.p. elevation 11.7° . Hygroscopic. Misc. with H_2O and most org. solvents. Dissolves $CaCl_2$, I, Br, P and S. Contraction in vol. and evolution of heat on mixing with H_2O . Na \rightarrow sodium ethoxide + H_2 . Cl \rightarrow chloral alcoholate. $H_2SO_4 \rightarrow$ ethyl hydrogen sulphate, diethyl ether, and ethylene. $PCl_5 \rightarrow$ ethyl chloride. I + KOH \rightarrow iodoform. Ox. \rightarrow acetaldehyde \rightarrow acetic acid. Obtained anhydrous by azeotropic distillation with C_6H_6 , or dehydrated with K_2CO_3 , CaO, $CaSO_4$, etc.

Ethyl allocinnamate.

See under Ethyl cinnamate.

Ethylallocinnamic Acid.

See under Ethyleinnamic Acid.

Ethylallylamine



$C_5H_{11}N$ MW, 85

Liq. with strong ammoniacal odour. B.p. 84° . Misc. with H_2O in all proportions.

B, H_2PtCl_6 : yellow needles. M.p. 154° .

Rinne, *Ann.*, 1873, 168, 262.

Liebermann, Paal, *Ber.*, 1883, 16, 531.

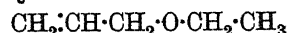
Ethylallylbarbituric Acid.

See Dormin.

Ethylallylcarbinol.

See 1-Hexenol-4.

Ethyl allyl Ether



$C_5H_{10}O$ MW, 86

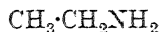
B.p. $66-7^{\circ}/743$ mm. D_4^{20} 0.7651. n_D^{20} 1.3856.

Brühl, *Ann.*, 1880, 200, 178.

Ethyl allyl Ketone.

See 1-Hexenone-4.

Ethylamine

C₂H₇N

MW, 45

B.p. 16.6°. D₄ 0.7057. $k = 5.2 \times 10^{-4}$ at 25°. Inflammable. Misc. with H₂O: salted out by NaOH. NaOCl \rightarrow *N*-chloro deriv. Cl in dil. aq. sol. \rightarrow *N*-dichloro deriv. Dissolves K and Cs with formation of their ethylamides.

*B*₂, 1H₂O: m.p. -71.2°.

*B*₂, 5/2 H₂O: m.p. -7.48°.

B, HCl: m.p. 109-10°.

B, HBr: needles or plates from EtOH. M.p. 159-5°.

B, HI: needles from H₂O. M.p. 188-5°. Spar. sol. EtOH.

B, H₂AuCl₄: m.p. 194-6°.

Picrate: yellow prisms from MeOH. M.p. 165°.

N-Acetyl: see *N*-Ethylacetamide.

N-Benzoyl: see *N*-Ethylbenzamide.

N-Benzenesulphonyl: m.p. 58°.

N-*p*-Toluenesulphonyl: m.p. 63°.

Hofmann, *Ber.*, 1882, 15, 753.

Tafel, *Ber.*, 1886, 19, 1926.

Werner, *J. Chem. Soc.*, 1918, 113, 899.

Ethylamine-sulphonic Acid.

See Taurine.

Ethylaminoacetic Acid.

See Ethylglycine.

Ethyl 1-aminoacetoacetate (1-Aminoacetoacetic ester)

C₈H₁₁O₃N

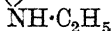
MW, 145

Not known in free state.

B, HCl: white needles from EtOH-Et₂O. M.p. 95° decomp. Hygroscopic. Very sol. H₂O, EtOH. Insol. Et₂O. Reduces Fehling's. Alkalis \rightarrow dimethylpyrazine-dicarboxylic ester.

Picrate: m.p. 129° decomp.

Gabriel, Posner, *Ber.*, 1894, 27, 1141.

p-EthylaminobenzaldehydeC₉H₁₁ON

MW, 149

Needles from C₆H₆-ligroin. M.p. 81-2°. Sol. EtOH, Et₂O, C₆H₆. Mod. sol. hot H₂O.

Oxime: yellowish needles from C₆H₆-pet. ether. M.p. 118°. Sol. EtOH, C₆H₆.

Phenylhydrazone: yellow needles. M.p. 160° to turbid liq., clears at 182°.

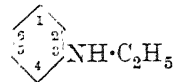
Anil: red needles from C₆H₆. Decomp. at 150°.

Ullmann, Frey, *Ber.*, 1904, 37, 858.

Walter, D.R.P. 118,567, (*Chem. Zentr.*, 1901, I, 652).

N-Ethyl-*o*-aminobenzoic Acid.

See Ethylantranilic Acid.

N-Ethyl-*m*-aminobenzoic AcidC₉H₁₁O₂N

MW, 165

Needles. M.p. 112°. Very sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Griess, *Ber.*, 1872, 5, 1038.

N-Ethyl-*p*-aminobenzoic Acid.

Cryst. from C₆H₆. M.p. 177-8°. Sol. most org. solvents.

Me ester: cryst. from MeOH. M.p. 138-9°.

Nitroso deriv.: m.p. 72-3°.

Et ester: cryst. from EtOH-Aq. M.p. 72-3°.

B, HCl: cryst. from EtOH-Et₂O. M.p. 139-40°. *Nitroso deriv.*: m.p. 55-6°.

N-Acetyl: needles from H₂O. M.p. 180°.

N-Chloroacetyl: plates from H₂O. M.p. 163-4°.

Houben, Freund, *Ber.*, 1909, 42, 4822.

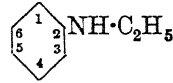
Lockemann, Lobenstein, Neumann, *Ber.*, 1942, 75, 1911.

Surrey, Hamer, *J. Am. Chem. Soc.*, 1944, 66, 2127.

Ethyl *o*-aminobenzyl Ether.

See under *o*-Aminobenzyl Alcohol.

***o*-Ethylaminophenol** (*o*-Hydroxy-ethylaniline, 1-hydroxy-2-ethylaminobenzene)

C₉H₁₁ON

MW, 137

Plates from C₆H₆. M.p. 107.5°. Very sol. EtOH. Sol. hot C₆H₆. Spar. sol. CHCl₃, Et₂O.

B, HCl: needles. M.p. 220°. Sol. H₂O, EtOH.

Me ether: *N*-ethyl-*o*-anisidine. C₉H₁₃ON. MW, 151. Colourless oil. B.p. 228-9°/728 mm., 117°/31 mm. *Hydrochloride*: plates. M.p. 193°.

Et ether: *N*-ethyl-*o*-phenetidine. C₁₀H₁₅ON. MW, 165. B.p. 234-6°/751 mm. D₁₅ 1.021. Misc. in all proportions with Et₂O, C₆H₆, CS₂. Volatile in steam.

Foerster, *J. prakt. Chem.*, 1866, 21, 346.

Diepolder, *Ber.*, 1898, 31, 495.

***m*-Ethylaminophenol** (*m*-Hydroxy-ethyl-aniline, 1-hydroxy-3-ethylaminobenzene).

Feathery cryst. from C₆H₆-pet. ether. M.p. 62°. B.p. 176°/12 mm. Very sol. CHCl₃. Sol. hot H₂O, EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 423.

Badische, D.R.Ps., 76,419, 48,151.

p-Ethylaminophenol (*p*-Hydroxy-ethyl-aniline, 1-hydroxy-4-ethylaminobenzene).

Needles from H_2O . M.p. $110-12^\circ$ ($103-4^\circ$).

Acetate: $C_{10}H_{13}O_2N$. MW, 179. M.p. 187° .

Galatis, *Ber.*, 1927, 60, 1402.

Ethyl aminophenyl Ketone.

See Aminopropiophenone.

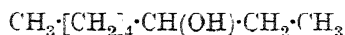
Ethyl *p*-aminophenyl sulphide.

See under *p*-Aminothiophenol.

Ethylamylacetylene.

See 3-Nonyne.

Ethyl-*n*-amylcarbinol (*Octanol-3, 3-hydroxy-octane*)



$C_8H_{18}O$ MW, 130

d-.

Present in Japanese peppermint oil. B.p. $178.5-179.5^\circ$, $76^\circ/16$ mm. D_4^{20} 0.8247. n_D^{20} 1.4252. $[\alpha]_D^{20} +11.13^\circ$ in EtOH.

Acid phthalate: plates from pet. ether. M.p. $66-8^\circ$. $[\alpha]_D^{20} +21.67^\circ$ in EtOH.

l-.

B.p. $82^\circ/24$ mm. $[\alpha]_D^{20} -7.40^\circ$ in EtOH.

1-Naphthylurethane: cryst. from EtOH.Aq. M.p. $79-80^\circ$. $[\alpha]_D^{20} -2.48^\circ$ in EtOH.

dl-.

B.p. $176-177.5^\circ$. D_{15}^{15} 0.8286. n_D^{20} 1.42785.

Acetyl: b.p. $90^\circ/10$ mm. D_{15}^{15} 0.8646. $[\alpha]_D^{20} -5^\circ$.

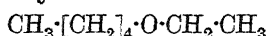
Acid phthalate: plates from pet. ether. M.p. $62-3^\circ$.

Allophanate: m.p. 167° .

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1944.

Levene, Walti, *J. Biol. Chem.*, 1931, 94, 593.

Ethyl *n*-amyl Ether

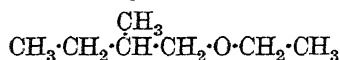


$C_7H_{16}O$ MW, 116

B.p. $119-20^\circ$. Very spar. sol. H_2O . HI \rightarrow *n*-amyl iodide + ethyl iodide.

Blaise, Picard, *Ann. chim. phys.*, 1912, 25, 259.

Ethyl active-amyl Ether

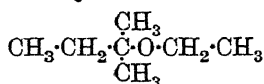


$C_7H_{16}O$ MW, 116

B.p. $107.5-109^\circ/735.7$ mm. D_4^{18} 0.759. n_D^{19} 1.3900. $[\alpha]_D^{18} +0.61^\circ$.

Guye, Chavanne, *Bull. soc. chim.*, 1896, 15, 302.

Ethyl *tert*.-amyl Ether



$C_7H_{16}O$ MW, 116

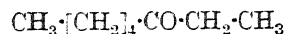
B.p. 192° . D^{18} 0.751.

Kondakoff, *J. Chem. Soc. Abstracts*, 1888, 54, 802.

Ethylamylethylene.

See 3-Nonene.

Ethyl *n*-amyl Ketone (*3-Keto-octane, octanone-3*)



$C_8H_{16}O$ MW, 128

B.p. $165-6^\circ$ (170°). D^{15} 0.8255. n_D^{22} 1.41556.

Di-Me ketal: b.p. $90-2^\circ/26$ mm. D^{25} 0.8552. n_D^{25} 1.4171.

Semicarbazone: cryst. from EtOH.Aq. M.p. 112° (slow heat.), ($117-117.5^\circ$).

Schimmel, *Chem. Zentr.*, 1912, I, 1717.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1944.

Ethyl active-amyl Ketone (*5-Keto-3-methylheptane, 3-methylheptanone-5*)



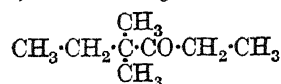
$C_8H_{16}O$ MW, 128

Colourless liq. with odour of mint. B.p. 161° . n_D^{15} 1.4195. Prac. insol. H_2O . Does not form bisulphite comp.

Semicarbazone: m.p. 96° .

Guerbet, *Compt. rend.*, 1910, 150, 184; *Bull. soc. chim.*, 1910, 7, 211.

Ethyl *tert*.-amyl Ketone (*4-Keto-3:3-dimethylhexane, 3:3-dimethylhexanone-4*)



$C_8H_{16}O$ MW, 128

B.p. $150.5-152^\circ$. D^{20} 0.8285. More sol. in cold than in hot H_2O . NaOBr or $CrO_3 \rightarrow$ $CH_3 \cdot CH_2 \cdot C(CH_3)_2 \cdot COOH$.

Semicarbazone: needles from ligroin. M.p. 98° .

Meerwein, *Ann.*, 1913, 396, 252.

Parry, *J. Chem. Soc.*, 1915, 107, 110.

Ethylaniline



$C_8H_{11}N$ MW, 121

B.p. $204.72^\circ/760$ mm., $187.5^\circ/500$ mm., $163.8^\circ/250$ mm., $136.8^\circ/100$ mm., $119.1^\circ/50$ mm., $102.5^\circ/25$ mm., $97.5-98^\circ/18$ mm., $83.8^\circ/10$ mm. Solidifies below -80° . Sol. most org. solvents. D_4^{20} 0.9625, D_4^1 0.9727, D_{15}^{15} 0.9643, D_{25}^{25} 0.9583. n_D^{20} 1.55593. $k = 4.17 \times 10^{-10}$ at 19° . Heat of comb. C_p 1126.88 Cal., C_v 1125.60 Cal. Passed through red hot tube \rightarrow indole. H \rightarrow ethylcyclohexylamine. Br in $CH_3COOH \rightarrow$ 4-bromo-, 2:4-dibromo-, and 2:4:6-tribromo-ethylaniline. $H_2SO_4 \rightarrow$ ethylaniline *m*- and *p*-sulphonic acids. $HNO_2 \rightarrow$ ethylphenyl-nitrosamine. $HNO_3 \rightarrow$ *m*- and *p*-nitroethyl-

aniline. Does not give violet col. with bleaching powder solution.

B.HCl: needles. M.p. 172–5° (176°). Sol. H₂O.

B.HBr: plates from EtOH. M.p. 165–6°. Sol. H₂O.

Oxalate: m.p. 112–14°.

N-Acetyl: *N*-ethylacetanilide. C₁₀H₁₃ON. MW, 163. M.p. 55°.

N-Benzoyl: *N*-ethylbenzanilide. C₁₅H₁₅ON. MW, 225. M.p. 60°.

N-p-Toluenesulphonyl: m.p. 87°.

N-p-Bromobenzenesulphonyl: m.p. 91°.

N-m-Nitrobenzenesulphonyl: m.p. 100°.

C₈H₁₁N, C₆H₅(NO₂)₃: 1:3:5: red needles. M.p. 55–6°.

Picrate: m.p. 132° (137.5–138°).

Ullmann's Enzyklopädie der techn. Chemie, Vol. I, 445.

Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, 46, 741.

Finzi, *Ann. chim. applicata*, 1925, 15, 41.

Guyot, Fournier, *Bull. soc. chim.*, 1930, 47, 203.

I.G., B.P., 334,579, (*Chem. Abstracts*, 1931, 25, 964).

For methods of separation from diethylaniline, etc., see also

Piutti, *Ann.*, 1885, 227, 182.

Blume, Klöffler, *Ber.*, 1905, 38, 3276.

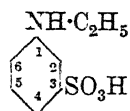
B.D.C., B.P., 270,930, (*Chem. Abstracts*, 1928, 22, 1594).

I.G., B.P., 333,349, (*Chem. Abstracts*, 1931, 25, 522).

Ethylaniline.

See also Amino-ethylbenzene.

Ethylaniline-*m*-sulphonic Acid (*N*-Ethyl-metanilic acid)



C₈H₁₁O₃NS MW, 201

Needles from H₂O. Decomp. at 294°. 100 parts H₂O diss. 2.15 parts at 15°. *k* = 1.58 × 10⁻⁴. Alk. fusion → *m*-ethylaminophenol. Na salt + 2H₂O, leaflets from EtOH.Aq. Ba salt readily sol. H₂O.

Badische, D.R.P., 48,151.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 414.

Shirolkar, Uppal, Venkataraman, *J. Indian Chem. Soc.*, 1940, 17, 443.

Ethylaniline-*p*-sulphonic Acid (*N*-Ethyl-sulphanilic acid).

Plates from H₂O. Decomp. at 258°. 100 parts H₂O diss. 10.4 parts at 13°. *k* = 1.26 × 10⁻⁴. Na salt + 3H₂O, plates or prisms, readily

sol. H₂O. Ag salt + 1H₂O, plates, spar. sol. H₂O. Ba salt + 2H₂O, plates.

Gnehm, Scheutz, *J. prakt. Chem.*, 1901, 63, 416.

Bayer, D.R.P., 295,104, (*Chem. Zentr.*, 1916, II, 1097).

Shirolkar, Uppal, Venkataraman, *J. Indian Chem. Soc.*, 1940, 17, 443.

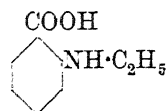
N-Ethylanisidine.

See under Ethylaminophenol.

Ethylanisole.

See under Ethylphenol.

Ethylanthranilic Acid (*N*-Ethyl-*o*-aminobenzoic acid)



C₉H₁₁O₂N MW, 165

Needles from EtOH.Aq. M.p. 153–4°. Blue fluor. in EtOH or Et₂O.

Me ester: C₁₀H₁₃O₂N. MW, 179. Oil with pleasant odour. B.p. 148–50°/45 mm.

Et ester: C₁₁H₁₅O₂N. MW, 193. Oil. B.p. 150–1°/16 mm., 142°/11 mm.

Amide: C₉H₁₂ON₂. MW, 164. Cryst. from hot H₂O. M.p. 128–9°.

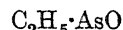
Nitrile: *o*-cyanoethyl-aniline. C₉H₁₀N₂. MW, 146. Needles from ligroin. M.p. 32°.

Houben, Brassert, *Ber.*, 1906, 39, 3237.

Karrer, Nägeli, Weidmann, *Helv. Chim. Acta*, 1919, 2, 248.

Finzi, *Ann. chim. applicata*, 1925, 15, 41.

Ethylarsenious oxide (*Arsenosoethane*)

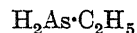


C₂H₅OAs MW, 120

Oil. B.p. 158°/10 mm. Sol. Et₂O, Me₂CO, C₆H₆. Rapidly oxidised by air.

Steinkopf, Miege, *Ber.*, 1920, 53, 1014.

Ethylarsine



C₂H₇As MW, 106

Liq. with disagreeable odour. B.p. 36°. D₂₂ 1.217. Very spar. sol. H₂O. C₂H₅I → tetra-ethylarsonium iodide. CH₃I → ethyltri-methylarsonium iodide. Br → ethyldi-bromoarsine. Poisonous.

Dehn, *Am. Chem. J.*, 1905, 33, 143.

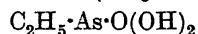
Ethylarsine dibromide.

See Ethyldibromoarsine.

Ethylarsine dichloride.

See Ethyldichloroarsine.

Ethylarsinic Acid (*Ethylarsonic acid*)



C₂H₇O₃As MW, 154

Cryst. from EtOH. M.p. 99-5°. 100 parts H₂O diss. 70 parts at 27°, 112 parts at 40°. 100 parts 95% EtOH diss. 39.4 parts at 25°.

La Coste, *Ann.*, 1881, 208, 34.

Auger, *Compt. rend.*, 1903, 137, 927.

Dehn, *Am. Chem. J.*, 1905, 33, 129.

2-Ethylazulene



C₁₂H₁₂

MW, 156

Blue needles. M.p. 44-5°.

sym.-Trinitrobenzene add. comp.: m.p. 107°.

Picrate: m.p. 110-11°.

Plattner, Fürst, *Helv. Chim. Acta*, 1945, 28, 1636; 1946, 29, 730.

4-Ethylazulene.

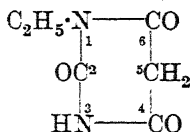
Oil.

Picrate: black needles from EtOH. M.p. 128-5°.

sym.-Trinitrobenzene add. comp.: m.p. 147-5°.

St. Pfau, Plattner, *Helv. Chim. Acta*, 1936, 19, 877.

1-Ethylbarbituric Acid (Malonyl-ethylurea)



C₆H₈O₃N₂

MW, 156

Rectangular leaflets. M.p. 119-20°.

Biltz, Wittek, *Ber.*, 1921, 54, 1038.

5-Ethylbarbituric Acid (Ethylmalonyl-urea).

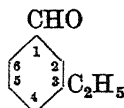
Prisms from H₂O or EtOH. M.p. 194° (190°). Sol. H₂O, EtOH.

Merck, D.R.P., 146,948, (*Chem. Zentr.*, 1904, I, 68); D.R.P., 165,693, (*Chem. Zentr.*, 1906, I, 515).

Fischer, Dilthey, *Ann.*, 1904, 335, 357.

Wenner, *Chem. Abstracts*, 1947, 41, 4107.

m-Ethylbenzaldehyde (3-Aldehydoethylbenzene)



C₉H₁₀O

MW, 134

Oil. B.p. 212°/762 mm.

Mayer, English, *Ann.*, 1918, 417, 88.

p-Ethylbenzaldehyde (4-Aldehydoethylbenzene).

B.p. 221°, 109-10°/10 mm. Odour resembles cuminaldehyde.

Oxime: m.p. 29°.

Semicarbazone: m.p. 199° (207°).

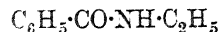
Hydrazone: m.p. 101°.

2:4-Dinitrophenylhydrazone: m.p. 216°.

v. Braun, Engel, *Ann.*, 1924, 436, 304.

Fournier, *Compt. rend.*, 1903, 136, 557.

N-Ethylbenzamide (Benzoyl ethylamine)



C₉H₁₁ON

MW, 149

Needles from H₂O or EtOH. Aq. M.p. 70-71°. B.p. 298-300°, 285°/745 mm. Spar. sol. hot H₂O.

B, HCl: viscous oil. Hyd. by H₂O.

Gattermann, *Ann.*, 1888, 244, 50.

Blacher, *Ber.*, 1895, 28, 2358.

Titherley, *J. Chem. Soc.*, 1901, 79, 393, 403.

Reid, *Am. Chem. J.*, 1911, 45, 43.

Ethylbenzanilide.

See under Aminoethylbenzene and Ethylaniline.

Ethylbenzene (Phenylethane)



C₈H₁₀

MW, 106

F.p. -93.9° (-94.4°). B.p. 136-15° (135.5°/760 mm.), 30°/10 mm. Solubility in H₂O, 0.0013 mols. per litre at 15°. D₄²⁰ 0.88457, D₄¹⁵ 0.8809, D₄²⁰ 0.86690, D₁₅¹⁵ 0.8720, D₂₅²⁵ 0.8650 (0.8646). n_D²⁰ 1.50206, n_D¹⁵ 1.4990, n_D¹⁵ 1.49857, n_D²⁰ 1.49594. Heat of comb. C_v 1089.8 Cal. CrO₃ or dil. HNO₃ → benzoic acid and acetophenone. CrO₂Cl₂ → phenylacetaldehyde, benzaldehyde, and acetophenone. MnO₂ + H₂SO₄ → benzaldehyde and acetophenone. Cl (cold) → α-chloroethylbenzene and α-dichloroethylbenzene. Br (in the dark) → 2- and 4-bromoethylbenzenes. Br (cold) → α-bromoethylbenzene and αα-dibromoethylbenzene. HNO₃ (D 1.475) → 2- and 4-nitroethylbenzenes, 2:4-dinitroethylbenzene, and 2:4:6-trinitroethylbenzene. HNO₃ (D 1.075 at 100°) → α-nitroethylbenzene. H₂SO₄ → ethylbenzene-p-sulphonic acid.

Picrate: light yellow cryst. M.p. 96.6°.

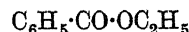
Béhal, Choay, *Bull. soc. chim.*, 1894, 11, 207.

Radziewanowski, *Ber.*, 1894, 27, 3235; 1895, 28, 1139.

Cline, Reid, *J. Amer. Chem. Soc.*, 1927, 49, 3153.

Z. Foldi, B.P., 319,273, (*Chem. Abstracts*, 1930, 24, 2471).

Ethyl benzoate



C₉H₁₀O₂

MW, 150

F.p. -34°. B.p. 212-9° (211.7-211.9°)/760 mm., 142.2°/100 mm., 101.8°/20 mm., 87.2°/10

mm. D_D^{20} 1.0614, D_D^{25} 1.0509, D_D^{30} 1.0496, D_D^{35} 1.0422, D_D^{40} 1.0191. n_D^{20} 1.5068. $\text{NH}_3 \rightarrow$ benzamide. HNO_3 (D 1.52 at 0°) \rightarrow ethyl m-nitrobenzoate. $\text{Na} - \text{EtOH} \rightarrow$ hexahydrobenzoic acid. $\text{H}(\text{Ni}) \rightarrow$ ethyl hexahydrobenzoate.

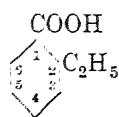
Fischer, Speier, *Ber.*, 1895, 28, 3253.

Sabatier, Mailhe, *Compt. rend.*, 1911, 152, 360.

Hofmann, Josephy, D.R.P., 292,543, (*Chem. Zentr.*, 1916, II, 113).

Finzi, *Ann. chim. applicata*, 1925, 15, 41.

o-Ethylbenzoic Acid



$\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

Needles from hot H_2O . M.p. 68° . B.p. $259^\circ/760$ mm. Sol. EtOH, Et₂O. Less sol. ligroin. Spar. sol. cold H_2O . Cl at $200^\circ \rightarrow$ tetrachloromethylphthalide. $\text{HNO}_3 + \text{H}_2\text{SO}_4 \rightarrow$ 4- and 5-nitro-o-ethylbenzoic acids. Electrolytic red. at Pb \rightarrow o-ethylbenzyl alcohol.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. $231^\circ/763$ mm.

Chloride: $\text{C}_9\text{H}_9\text{OCl}$. MW, 168.5. B.p. $219^\circ/744.5$ mm.

Amide: $\text{C}_9\text{H}_{11}\text{ON}$. MW, 149. Needles from hot H_2O . M.p. $151-3^\circ$.

Nitrile: o-cyanoethylbenzene. $\text{C}_9\text{H}_9\text{N}$. MW, 131. B.p. 212° .

Gabriel, Michael, *Ber.*, 1877, 10, 2206.

Zincke, Frölich, *Ber.*, 1887, 20, 2056, 2895.

Giebe, *Ber.*, 1896, 29, 2534.

m-Ethylbenzoic Acid.

Needles from H_2O or dil. EtOH. M.p. 47° . Prac. insol. cold H_2O . Electrolytic red. at Pb \rightarrow m-ethylbenzyl alcohol.

Nitrile: m-cyanoethylbenzene. B.p. $116-17^\circ/25^\circ$.

Voswinkel, *Ber.*, 1888, 21, 2830.

Mayer, English, *Ann.*, 1918, 417, 87.

p-Ethylbenzoic Acid.

Prisms from EtOH. Laminæ from H_2O . M.p. $110-11^\circ$ ($112-13^\circ$, 113.5°). Spar. sol. cold H_2O . Sol. hot H_2O , EtOH, Et₂O, CHCl_3 , C_6H_6 .

Et ester: b.p. $129-130^\circ/15$ mm.

Amide: laminæ from H_2O . M.p. $115-16^\circ$.

Fittig, König, *Ann.*, 1867, 144, 290.

Aschenbrandt, *Ann.*, 1883, 216, 218.

Kindler, *Ann.*, 1927, 452, 102.

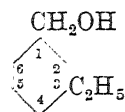
Ethylbenzoylacetic Acid.

See 1-Benzoylbutyric Acid.

Ethylbenzoylcarbinol.

See β -Hydroxybutyropheneone.

m-Ethylbenzyl Alcohol (1-Hydroxymethyl-3-ethylbenzene)



$\text{C}_9\text{H}_{12}\text{O}$

MW, 136

Colourless oil with aromatic odour. B.p. $227^\circ/758$ mm.

Mayer, English, *Ann.*, 1918, 417, 87.

p-Ethylbenzyl Alcohol (1-Hydroxymethyl-4-ethylbenzene).

B.p. $115-17^\circ/9$ mm.

Acetyl: b.p. $130-2^\circ/15$ mm. D_{25}^{25} 1.028. n_D^{25} 1.5042.

v. Braun, Engel, *Ann.*, 1924, 436, 305.

Emerson et al., *J. Am. Chem. Soc.*, 1947, 69, 1905.

Ethylbenzylamine



$\text{C}_9\text{H}_{13}\text{N}$

MW, 135

B.p. 199° (194°). Sol. EtOH, Et₂O. Spar. sol. H_2O . D_{15}^{15} 0.9350. Heat of comb. C_t 1286.8 Cal., C_p 1288.6 Cal. $\text{C}_6\text{H}_5 \cdot \text{NCO} \rightarrow$ phenylethylbenzylurea, m.p. 81° .

B.HCl: m.p. 184° .

Picrate: cryst. from EtOH. M.p. $122-3^\circ$.

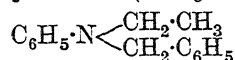
Wallach, *Ann.*, 1905, 343, 73.

Pinner, Franz, *Ber.*, 1905, 38, 1548.

Mailhe, *Bull. soc. chim.*, 1919, 25, 322.

Young, Robinson, *J. Chem. Soc.*, 1933, 275.

Ethylbenzylaniline (Benzylethylaniline)



$\text{C}_{15}\text{H}_{17}\text{N}$

MW, 211

Pale yellow oil. M.p. $34-6^\circ$. B.p. $285-6^\circ/710$ mm. slight decomp., $185.5-186.5^\circ/22$ mm. D_{15}^{15} 1.001, D_{15}^{15} 1.034. Insol. H_2O . Sol. $5\frac{1}{2}$ parts EtOH. Weak base. Nascent Br \rightarrow 2:4:6-tribromoethyl-aniline. $\text{HNO}_2 \rightarrow$ 4-nitrosoethylbenzylaniline, m.p. $61-2^\circ$. $\text{HNO}_3 + \text{H}_2\text{SO}_4 \rightarrow$ ethyl-4-nitrobenzylaniline + ethyl-3-nitrobenzylaniline. HNO_3 (D 1.5) + AcOH \rightarrow 4-nitroethylbenzylaniline. Intermediate for triphenylmethane dyestuffs.

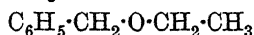
Picrate: short prisms from CHCl_3 -ligroin. M.p. $120-1^\circ$ ($111-12^\circ$).

Friedländer, *Ber.*, 1889, 22, 588.

Stebbins, *J. Am. Chem. Soc.*, 1885, 7, 42.

Laptev, *Chem. Abstracts*, 1935, 29, 461.

Ethyl benzyl Ether



$\text{C}_9\text{H}_{12}\text{O}$

MW, 136

B.p. 189° , $78^\circ/18$ mm. D_4^{10} 0.9577, D_4^{20} 0.9490. n_D^{20} 1.4955. Volatile in steam. AcOH

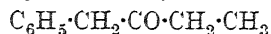
— H_2SO_4 —> benzyl acetate. P_2O_5 in boiling C_6H_6 —> diphenylmethane — ethylene.

Mettler, D.R.P., 116,181, (*Chem. Zentr.*, 1906, I, 615).

v. Braun, *Ber.*, 1916, 43, 1351.

Senderens, *Compt. rend.*, 1924, 178, 1412.

Ethyl benzyl Ketone (2-Keto-1-phenylbutane, 1-phenylbutanone-2)



$\text{C}_{10}\text{H}_{12}\text{O}$ MW, 148

B.p. $225\text{--}6^\circ$ ($230^\circ/755$ mm.), $221\text{--}3^\circ/737$ mm., $111^\circ/16$ mm. D_4^{20} 1.002, D_4^{25} 0.998. CrO_3 —> benzoic and propionic acids.

Semicarbazone: m.p. $135\text{--}5^\circ$ (146° , 153°).

2:4-Dinitrophenylhydrazones: yellow needles. M.p. $140\text{--}1^\circ$.

Ludlam, *J. Chem. Soc.*, 1902, 81, 1189.

Senderens, *Ann. chim.*, 1913, 28, 319.

Mailhe, *Compt. rend.*, 1913, 157, 220.

Ethyl benzyl sulphide.

See under Benzyl Mercaptan.

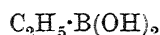
Ethylbiuret.

See under Biuret.

Ethyl borate.

See Triethyl borate.

Ethylboric Acid



$\text{C}_2\text{H}_7\text{O}_2\text{B}$ MW, 74

White cryst. from Et_2O . Sublimes at 40° . Very volatile.

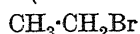
Mono-Et ester: cryst. Decomp. by H_2O .

Di-Et ester: $\text{C}_4\text{H}_{11}\text{O}_2\text{B}$. MW, 102. B.p. 125° decomp. Decomp. by H_2O . Combines with $\text{B}(\text{OEt})_3$ —> $\text{EtB}(\text{OEt})_2\cdot\text{B}(\text{OEt})_3$, b.p. 112° .

Frankland, *Ann. chim.*, 1862, 124, 142.

Khotinsky, Melamed, *Ber.*, 1909, 42, 3095.

Ethyl bromide (Bromoethane)



$\text{C}_2\text{H}_5\text{Br}$ MW, 109

Ethereal liq. F.p. $-125\text{--}5^\circ$ ($-115\text{--}5^\circ$, $-117\text{--}8^\circ$, -119°). B.p. $38\text{--}4^\circ/760$ mm. D_4^{20} 1.50138 (1.4973), D_4^{25} 1.4555 (1.45983, 1.4307). Solubility in 100 parts H_2O : at 0° 1.067, at 10° 0.965, at 20° 0.914, at 30° 0.896. Sol. EtOH , Et_2O , etc. n_D^{20} 1.4320, n_D^{25} 1.42756, n_D^{30} 1.42386. Heat of comb. C_v 329.5 (341.82) Cal., C_p 328.4 Cal. H_2O at 200° —> diethyl ether + ethylene. H_2O at 100° —> ethyl alcohol. Alc. KOH —> ethylene. Cl —> 1-chloro-1-bromoethane + 2-chloro-1-bromoethane.

Weston, *J. Chem. Soc.*, 1915, 107, 1489.

Holt, *J. Chem. Soc.*, 1916, 109, 1.

Kamm, Marvel, *Organic Syntheses*, 1921, I, 6.

Ethyl bromophenyl Ketone.

See Bromopropiophenone.

Ethyl 3-bromopropyl Ether.

See under 3-Bromopropyl Alcohol.

2-Ethylbutane-1:1-dicarboxylic Acid.

See Diethylmethylmalonic Acid.

Ethyl- γ -butenylcarbinol.

See 1-Heptenol-5.

Ethyl γ -butenyl Ketone.

See 1-Heptenone-5.

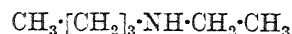
Ethylbutylacetic Acid.

See 1-Ethylcaproic Acid.

Ethylbutylacetylene.

See 3-Octyne.

Ethyl-*n*-butylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. $108\text{--}9^\circ$. D_4^{20} 0.7398. n_D^{20} 1.4011.

B.HCl : m.p. 197° .

$\text{B}_2\text{H}_2\text{PtCl}_6$: cryst. from H_2O . D^{15} 1.826.

Brill, *J. Am. Chem. Soc.*, 1932, 54, 2486.

Le Bel, *Compt. rend.*, 1897, 125, 351.

Campbell, Sommers, Campbell, *J. Am. Chem. Soc.*, 1944, 66, 82.

Ethyl-sec.-*n*-butylamine



$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

dl.

B.p. $97\text{--}8^\circ/741$ mm. D_4^{20} 0.7531, D_4^{25} 0.7358.

B.HCl : m.p. $118\text{--}20^\circ$.

B.HBr : m.p. $115\text{--}18^\circ$.

B.HI : m.p. $73\text{--}5^\circ$.

$\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. $118\text{--}20^\circ$. Sol. H_2O , Et_2O .

B.HAuCl_4 : yellow hygroscopic cryst. M.p. $118\text{--}20^\circ$.

d.

B.p. 98° . $[\alpha]_D^{25} = +18^\circ$. D_4^{25} 0.7396. n_D 1.40428.

Dioxalate: m.p. $155\text{--}6^\circ$.

Bewad, *J. prakt. Chem.*, 1901, 63, 197.

Mamlock, Wolfenstein, *Ber.*, 1901, 34, 2504.

Leithe, *Ber.*, 1930, 63, 804.

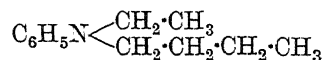
2-Ethyl-*n*-butylamine.

See 1-Amino-2-ethyl-*n*-butane.

Ethyl butylaminoformate.

See Butylurethane.

Ethyl-*n*-butylaniline



$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

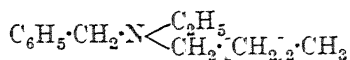
B.p. $237\text{--}42^\circ$ ($235\text{--}40^\circ$, 247°).

Picrate: yellow prisms from EtOH . M.p. $89\text{--}90^\circ$. Sol. hot EtOH , C_6H_6 .

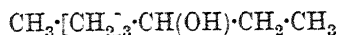
Fröhlich, *Ber.*, 1909, 42, 1562.

Komatsu, *Chem. Zentr.*, 1913, I, 799.

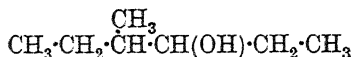
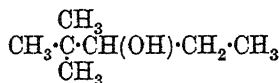
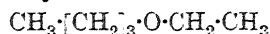
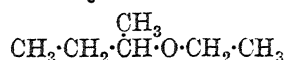
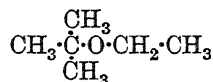
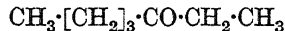
Ethylbutylbenzylamine

C₁₃H₂₁N MW, 191

B.p. 238–40°.

Wedekind, Ney, *Ber.*, 1912, **45**, 1313.Ethyl-*n*-butylcarbinol (*Heptanol-3*, 3-*hydroxy-n-heptane*)C₇H₁₆O MW, 116*dl.*

B.p. 156.5–157°/750 mm.

Et ether: 3-ethoxy-*n*-heptane. C₉H₂₀O. MW, 144. B.p. 151°/750 mm.*d.*B.p. 104–6°/117 mm., 66°/18 mm. D₄²⁰ 0.8227. n_D²⁰ 1.4206. [α]_D²⁰ +6.68°.*Et-H-phthalic ester*: needles from ligroin. M.p. 47–8°.*l.*B.p. 66°/18 mm. [α]_D²⁵ –0.90°.*α-Naphthylurethane*: m.p. 74–5°. [α]_D²⁰ 0°.Blaise, Picard, *Ann. chim.*, 1912, **26**, 287.Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943–4.Levine, Walti, *J. Biol. Chem.*, 1931, **94**, 367.Ethyl-*sec*.-butylcarbinol (3-*Methylhexanol-4*)C₇H₁₆O MW, 116B.p. 149–50°. D₄²⁰ 0.8518.Fourneau, Tiffeneau, *Compt. rend.*, 1907, **145**, 437.Ethyl-*tert*.-butylcarbinol (2:2-*Dimethylpentanol-3*, 3-*hydroxy-2:2-dimethylpentane*)C₇H₁₆O MW, 116Liq. with odour of camphor. B.p. 132–5°, 42–4°/15 mm. D₄²⁰ 0.84078, D₄²⁰ 0.82462.*Acetyl*: b.p. 157–9°/770 mm.*Propionyl*: b.p. 170–1°.*α-Naphthylurethane*: m.p. 107–8°.Faworsky, *J. prakt. Chem.*, 1913, **88**, 675.Whitmore, Forster, *J. Am. Chem. Soc.*, 1942, **64**, 2966.Ethyl *n*-butyl EtherC₆H₁₄O MW, 102B.p. 92.3° (91°, 91.4°), 91.7°/742.7 mm. D₄²⁰ 0.7694 (0.7680), D₄²⁵ 0.7447, D₄²⁵ 0.7522. n_D²⁰ 1.3798.Cherchez, *Bull. soc. chim.*, 1928, **43**, 767.I.G., F.P., 710,846, (*Chem. Abstracts*, 1932, **26**, 1614).Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.Ethyl *sec*.-butyl EtherC₆H₁₄O MW, 102*dl.*B.p. 81.2°. D₄²⁵ 0.7377. n_D²⁵ 1.3753.*l.*B.p. 82–3°. D₄²⁰ 0.745. [α]_D²⁵ –21.31°, [α]_D²⁵ –41.04° in EtOH.Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2097.Kenyon *et al.*, *J. Chem. Soc.*, 1935, 1072.Ethyl *tert*.-butyl EtherC₆H₁₄O MW, 102B.p. 73.1°/760 mm. (68–9°, 69–70°, 73°), 70°/758 mm. D₄²⁰ 0.7681, D₄²⁰ 0.7519, D₄²⁵ 0.7364. n_D²⁰ 1.3794, n_D²⁵ 1.3728.Reboul, *Jahresber. Fortschr. Chem.*, 1881, 409.Nef, *Ann.*, 1900, **309**, 138.Norris, Rigby, *J. Am. Chem. Soc.*, 1932, **54**, 2095.Ethyl *n*-butyl Ketone (3-*Ketoheptane*, *heptanone-3*)C₇H₁₄O MW, 114

B.p. 149–50°, 147–8°/742.9 mm. Does not form bisulphite comp.

Oxime: b.p. 56°/1 mm. n_D²⁵ 1.4522.*Semicarbazone*: m.p. 99–100° (111°).Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, **28**, 272.Pickard, Kenyon, *J. Chem. Soc.*, 1913, **103**, 1943.Ethyl *sec*.-butyl Ketone (3-*Keto-4-methylhexane*, 3-*methylhexanone-4*)C₇H₁₄O MW, 114B.p. 134–5° (136–8°). D₄¹⁹ 0.8248. Does not form bisulphite comp.

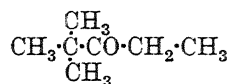
Semicarbazone: m.p. 137°.

Hanriot, Bouveault, *Bull. soc. chim.*, 1889, 1, 550.

Fourneau, Tiffeneau, *Compt. rend.*, 1907, 145, 437.

Hudson, Hauser, *J. Am. Chem. Soc.*, 1941, 63, 3163.

Ethyl *tert*.-butyl Ketone (3-*Keto*-4:4-dimethylpentane, 2:2-dimethylpentanone-3)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Liq. with odour of camphor and mint. B.p. 125-6°. Sol. EtOH, Et₂O, etc. Mod. sol. H₂O. D_4^{20} 0.8303, D_4^{25} 0.8125, D_4^{30} 0.8258, D_4^{35} 0.8106. Does not form bisulphite comp. $\text{CrO}_3 \rightarrow$ acetic and trimethylacetic acids. $\text{Br} \rightarrow \text{CH}_3\text{CHBrCO}\cdot\text{C}(\text{CH}_3)_3$, b.p. 67-9°/11 mm.

Oxime: plates from EtOH. M.p. 79-80°.

Semicarbazone: m.p. 144°.

2:4-Dinitrophenylhydrazone: m.p. 175°.

Wischnegradski, *Ann.*, 1875, 178, 104.

Markownikow, *Ber.*, 1900, 33, 1906.

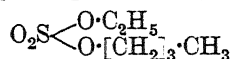
Faworsky, *J. prakt. Chem.*, 1913, 88, 676.

Whitmore, Noll, Meunier, *J. Am. Chem. Soc.*, 1939, 61, 683.

Ethylbutylmalonic Acid.

See Heptane-3:3-dicarboxylic Acid.

Ethyl butyl sulphate (*Butyl sulphovinate*)



$\text{C}_6\text{H}_{14}\text{O}_4\text{S}$ MW, 182

B.p. 117-18°/20 mm. D_4^{18} 1.112. n_D^{18} 1.415.

Bert, *Compt. rend.*, 1924, 178, 1182.

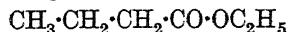
Ethyl *tert*.-butyl sulphide.

See under tert.-Butyl Mercaptan.

1-Ethylbutyraldehyde.

See Diethylacetaldehyde.

Ethyl *n*-butyrate



$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

F.p. -93.3°. B.p. 119.9° (120-120.5°)/760 mm., 114.1°/752 mm., 66.8°/119.6 mm., 48.8°/50.2 mm. D_4^{20} 0.89970, D_4^{25} 0.87880, D_4^{30} 0.85760, D_4^{35} 0.84002. $n_D^{17.5}$ 1.39302, n_D^{20} 1.40002.

Pelouze, Gélis, *Ann.*, 1843, 47, 250.

1-Ethylbutyric Acid.

See Diethylacetic Acid.

2-Ethylbutyric Acid.

See 2-Methylvaleric Acid.

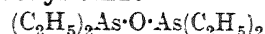
Ethylbutyrylcarbinol.

See 3-Heptanolone-4.

Ethyl cacodyl.

See Arsenic diethyl.

Ethyl cacodyl oxide

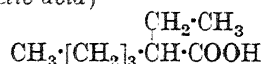


$\text{C}_8\text{H}_{20}\text{OAs}_2$ MW, 282

Liq. with disagreeable odour. B.p. 97-8°/10 mm. $\text{O} \rightarrow$ diethylcacodylic acid (diethylarsinic acid).

Wigren, *Ann.*, 1924, 437, 285.

1-Ethylcaproic Acid (1-Ethylhexoic acid, ethylbutylacetic acid)



$\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

dl.-

B.p. 220-2°/754 mm., 131°/18 mm., 120°/13 mm. D_4^{25} 0.9031. n_D^{25} 1.4255.

Me ester: $\text{C}_9\text{H}_{18}\text{O}_2$. MW, 158. B.p. 82°/24 mm.

Allyl ester: $\text{C}_{11}\text{H}_{20}\text{O}_2$. MW, 184. B.p. 79-79.5°/8 mm.

Benzyl ester: $\text{C}_{15}\text{H}_{22}\text{O}_2$. MW, 234. B.p. 234-6°/28 mm.

p-Phenylphenacyl ester: m.p. 53-4°.

Amide: $\text{C}_8\text{H}_{17}\text{ON}$. MW, 143. M.p. 102-3°.

Ureide: m.p. 157°.

l.-

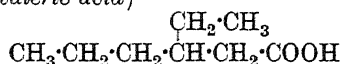
B.p. 120°/13 mm. D_4^{25} 0.9031. n_D^{25} 1.4229.

Et ester: $\text{C}_{10}\text{H}_{20}\text{O}_2$. MW, 172. B.p. 90°/28 mm. n_D^{25} 1.4123. D_4^{25} 0.8586.

Levene, Rothen, Meyer, Kuna, *J. Biol. Chem.*, 1936, 15, 401.

Dolique, *Ann. chim.*, 1931, 15, 425.

2-Ethylcaproic Acid (2-Ethylhexoic acid, 2-propylvaleric acid)



$\text{C}_8\text{H}_{16}\text{O}_2$ MW, 144

d.-

B.p. 106°/5 mm. n_D^{25} 1.4287. D_4^{30} 0.911. $[\alpha]_D^{30} +1.86^\circ$.

Et ester: $\text{C}_{10}\text{H}_{20}\text{O}_2$. MW, 172. B.p. 80°/9 mm. D_4^{30} 0.866. n_D^{25} 1.4183. $[\alpha]_D^{30} +0.59^\circ$.

l.-

B.p. 158-9°/79 mm.

Levene, Marker, *J. Biol. Chem.*, 1931, 91, 687.

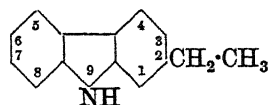
Levene, Rothen, Meyer, Kuna, *J. Biol. Chem.*, 1936, 15, 401.

Ethylcarbamic Acid.

Et Ester, *see* Ethylurethane.

Amide, *see* Ethylurea.

2-Ethylcarbazole



$\text{C}_{14}\text{H}_{13}\text{N}$ MW, 195

Prisms from AcOH. M.p. 225°.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.

3-Ethylcarbazole.

Prisms from toluene. M.p. 144°.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.

9-Ethylcarbazole (N-Ethylcarbazole).

Needles from EtOH. M.p. 67-8°. Sol. hot EtOH, Et₂O.

Picrate: crimson needles. M.p. 104-5° (97°). Sol. EtOH.

Graebe, Behaghel, *Ann.*, 1880, 202, 24.

Atack, U.S.P., 1,494,879, (*Chem. Abstracts*, 1924, 18, 2173).

Burton, Gibson, *J. Chem. Soc.*, 1924, 125, 2504.

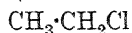
Tikhonov, Ignatyuk-Maistrenko, *Chem. Abstracts*, 1938, 32, 7915.

Ethyl carbonate.

See Diethyl carbonate and Ethyl hydrogen carbonate.

Ethyl carbylamine.

See Ethyl isocyanide.

Ethyl chloride (Chloroethane)

C₂H₅Cl

MW, 64.5

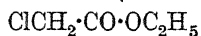
F.p. -142.5° (-141.6°, -138.7°). B.p. 12.5° (13.1°)/760 mm., 12.5-12.6°/725 mm. Spar. sol. H₂O. Sol. EtOH, Et₂O, etc. D₄²⁰ 0.9214, D₄⁰ 0.92295, D₄²⁰ 0.91708. Heat of comb. C_p 334.11 (326.9) Cal., C_v 326.35 Cal. Crit. temp. 187.2°. Crit. press. 51.72 atm. Cl (cold) → mainly ethylidene chloride. Cl (hot, -SbCl₅) → ethylene dichloride. Br (hot, -Fe) → ethylbromide + ethylene dibromide. HI at 130° → ethyl iodide. NH₃ in EtOH → mono-, di-, and tri-ethylamines.

Groves, *Ann.*, 1874, 174, 372.

Krüger, *J. prakt. Chem.*, 1876, 14, 195.

Norris, Taylor, *J. Am. Chem. Soc.*, 1924, 46, 753.

Dandt, U.S.P.s, 1,920,846, 1,920,246, (*Chem. Abstracts*, 1933, 27, 4818).

Ethyl chloroacetate (Chloroacetic ester)

C₄H₇O₂Cl

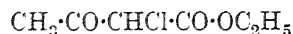
MW, 122.5

F.p. -26°. B.p. 145-6°, 52°/20 mm., D₄²⁰ 1.1749, D₄¹ 1.1749, D₄²⁰ 1.1585 (1.1520), D₄¹⁴⁴ 0.9925. n_D²⁰ 1.42274 (1.42162). Heat of comb. C_v 493.6 Cal. Decomp. on long boiling. NH₃ → chloroacetamide. NH₃ in EtOH → mainly glycine amide. KCN → ethyl cyanoacetate.

Conrad, *Ann.*, 1877, 188, 218.

Imbert, D.R.P.s, 210,502, (*Chem. Zentr.*, 1909, II, 78), 212,592, (*Chem. Zentr.*, 1909, II, 1024).

Petyunin, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 35, (*Chem. Abstracts*, 1940, 34, 4726).

Ethyl 1-chloroacetoacetate (α-Chloroacetoacetic ester)

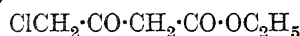
C₆H₉O₃Cl

MW, 164.5

B.p. 193° part decomp., 105-10°/30 mm. Sol. EtOH, Et₂O, etc. Spar. sol. H₂O. D₄²⁰ 1.19. Hot dil. H₂SO₄ → chloroacetone. SO₂Cl₂ → ethyl 1:1-dichloroacetoacetate. NH₃ → 1-chloro-2-iminobutyric ester. KCN → 1-cyanoacetoacetic ester and 1-chloroacetoacetic ester cyanhydrin. Ph·NH·NH₂ → 4-benzeneazo-3-methyl-1-phenylpyrazolone-5. NH₂·CO·NH₂ → ethyl 5-methyliminazol-2-one-4-carboxylate. NH₂·CS·NH₂ → ethyl 2-amino-4-methylthiazole-5-carboxylate. Violet col. with FeCl₃. Forms Na, Cu, Mg and Ni derivs.

Schönbrodt, *Ann.*, 1889, 253, 171.

Dey, *J. Chem. Soc.*, 1915, 107, 1646.

Ethyl 3-chloroacetoacetate (γ-Chloroacetoacetic ester)

C₆H₉O₃Cl

MW, 164.5

B.p. 220° (210°) decomp., 115°/14 mm., 102°/12 mm. Turns yellow on standing. Prac. insol. H₂O. Sol. org. solvents. D₄¹ 1.2292, D₄¹⁷ 1.2176, D₄²⁰ 1.2157. n_D²⁰ 1.4546. Dil. HCl → chloroacetone + EtOH + CO₂. NH₂·CS·NH₂ → ethyl 2-aminothiazole-4-acetate. Red col. with FeCl₃. Forms green Cu deriv., m.p. 168-9° decomp.

Alexandrow, *Ber.*, 1913, 46, 1022.

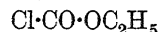
Hamel, *Bull. soc. chim.*, 1921, 29, 396.

Ethyl chloroethyl Ether.

See Chlorodiethyl Ether.

Ethyl 2-chloroethyl sulphide.

See 2-Chlorodiethyl sulphide.

Ethyl chloroformate (Chloroformic ester, ethyl chlorocarbonate)

C₃H₅O₂Cl

MW, 108.5

B.p. 94-5° (93.1°). D₄¹ 1.1596, D₄¹⁵ 1.14419, D₄²⁰ 1.13519 (1.1377). n_D²⁰ 1.39738 (1.39548). NaHg → formic acid. AlCl₃ → ethyl chloride + CO₂. NH₃ → urethane. Dil. acids → HCl + CO₂ + ethylene. Reacts with many org. compounds giving carbethoxy derivs.

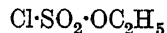
Rose, *Ann.*, 1880, 205, 247.

Hochstetter, D.R.P., 282,134, (*Chem. Zentr.*, 1915, I, 464).

Cappelli, *Gazz. chim. ital.*, 1920, 50, 8.

Ethyl-2-chloropropylcarbinol.

See 5-Chlorohexanol-3.

Ethyl chlorosulphonate (Chlorosulphonic acid ethyl ester)

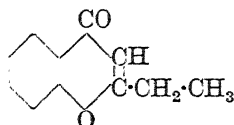
C₂H₅O₃ClS

MW, 144.5

Fuming liq. B.p. 151-4° part. decomp., 93-5°/100 mm., 58°/20 mm., 52°/14 mm. D_4^{25} 1.379, D_4^{20} 1.263. Sol. Et_2O , CHCl_3 , ligroin. Decomp. at boil to H_2SO_4 , HCl , SO_2 and ethylene. Decomp. by H_2O and EtOH .

Behrend, *J. prakt. Chem.*, 1877, 15, 28.
Bushong, *Am. Chem. J.*, 1903, 30, 214.
Willcox, *Am. Chem. J.*, 1904, 32, 450.

2-Ethylchromone



$\text{C}_{11}\text{H}_{10}\text{O}_2$ MW, 174

Needles from Et_2O -pet. ether. M.p. 18°. $\text{NaOH.Aq.} \rightarrow$ salicylic acid.

Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1312.

Mozingo, *Organic Syntheses*, 1941, XXI, 42.

Ethyl cinnamate



$\text{C}_{11}\text{H}_{12}\text{O}_2$ MW, 176

Trans:

Occurs in storax. F.p. 12° (6.5°). B.p. 271°, 158.5-159°/24 mm., 144°/15 mm. D_4^{25} 1.0566, D_4^{20} 1.0519, D_4^{15} 1.0490, D_4^{10} 1.0469 (1.0457), D_4^0 1.0234, D_4^{25} 1.0018. n_D^{25} 1.56351, n_D^{15} 1.561, n_D^{20} 1.55982. $\text{H} \rightarrow$ ethyl 2-phenylpropionate. $\text{Br} \rightarrow$ ethyl 2-phenyl-1:2-dibromopropionate.

Cis: (Ethyl allo-cinnamate).

B.p. 125°/12 mm. D_4^{25} 1.0569, D_4^{20} 1.049. n_D^{25} 1.54833, n_D^{20} 1.545.

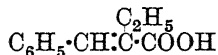
Trans:

Fischer, Speier, *Ber.*, 1895, 28, 3254.

Marvel, King, *Organic Syntheses*, 1929, IX, 38.

Cis:

Auwers, Schmellenkamp, *Ber.*, 1921, 54, 631.

 α -Ethylcinnamic Acid (1-Benzylidenebutyrac acid)

$\text{C}_{11}\text{H}_{12}\text{O}_2$ MW, 176

Trans:

M.p. 104° (106°). Sol. EtOH , hot ligroin. Spar. sol. cold ligroin.

Me ester: $\text{C}_{12}\text{H}_{14}\text{O}_2$. MW, 190. B.p. 250-60°. *Et ester*: $\text{C}_{13}\text{H}_{16}\text{O}_2$. MW, 204. B.p. 142-3°/12 mm.

Chloride: $\text{C}_{11}\text{H}_{11}\text{OCl}$. MW, 194.5. B.p. 142°/14 mm.

Amide: $\text{C}_{11}\text{H}_{13}\text{ON}$. MW, 175. Prisms from EtOH . M.p. 128°.

Dict. of Org. Comp.—II.

Cis: (1-Ethylallocinnamic acid).

Liq.

Aniline salt: m.p. 81°.

Trans:

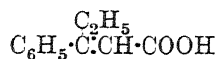
Perkin, *J. Chem. Soc.*, 1877, 31, 393.

Fittig, Slocum, *Ann.*, 1885, 227, 53.

Michael, *Ber.*, 1901, 34, 928.

Cis:

Stoermer, Voht, *Ann.*, 1915, 409, 57.

 β -Ethylcinnamic Acid

$\text{C}_{11}\text{H}_{12}\text{O}_2$

MW, 176

Trans:

M.p. 95.5°.

Me ester: b.p. 130°/8 mm.

Amide: m.p. 104°.

Anilide: m.p. 84°.

Cis: (2-Ethylallocinnamic acid).

M.p. 93-95.5°.

Me ester: b.p. 122-3°/8 mm.

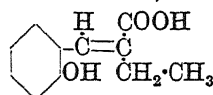
Amide: m.p. 101°.

Anilide: m.p. 122°.

Stoermer, Grimm, Laage, *Ber.*, 1917, 50, 959.

Ethylcitraconic Acid.

See Propylmaleic Acid.

 α -Ethyl-o-coumaric Acid (α -Ethyl-o-hydroxy-trans-cinnamic acid)

$\text{C}_{11}\text{H}_{12}\text{O}_3$

MW, 192

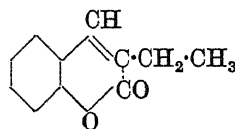
Prisms from EtOH.Aq. Needles from H_2O or C_6H_6 . M.p. 181° decomp. (174°). Sol. EtOH , Et_2O . Spar. sol. H_2O , CHCl_3 . Gives no col. with FeCl_3 .

Me ether: $\text{C}_{12}\text{H}_{14}\text{O}_3$. MW, 206. Needles from EtOH . M.p. 105°. *Me ester*: $\text{C}_{13}\text{H}_{16}\text{O}_3$. MW, 220. B.p. 292°. D_4^{25} 1.1100.

Perkin, *J. Chem. Soc.*, 1877, 31, 416; 1881, 39, 438.

Fries, Volk, *Ann.*, 1911, 379, 99.

3-Ethylcoumarin



$\text{C}_{11}\text{H}_{10}\text{O}_2$

MW, 174

Prisms. M.p. 70-1°. B.p. 299° slight decomp. Sol. hot EtOH , Et_2O . Spar. sol. hot H_2O . $\text{KOH} \rightarrow$ salicylic acid. $\text{P}_2\text{S}_5 \rightarrow$ 3-ethyl-2-thiocoumarin.

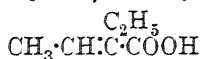
Oxime: needles. M.p. 157°. Sol. EtOH , Et_2O , C_6H_6 . Spar. sol. hot H_2O .

Phenylhydrazone: yellow needles. M.p. 115°. Sol. EtOH, Et₂O, C₆H₆.

Perkin, *J. Chem. Soc.*, 1868, 21, 56.

Fittig, Brown, *Ann.*, 1889, 255, 288.

1-Ethylcrotonic Acid (2-Methyl-1-ethylacrylic acid, β -amylene- γ -carboxylic acid)



C₆H₁₀O₂ MW, 114

(I) Solid form.

M.p. 41–2° (45°). B.p. 209°, 109°/13 mm. D₄²⁰ 0.9484. Spar. sol. H₂O. Sol. EtOH, Et₂O, etc. KMnO₄ \rightarrow 1:2-dihydroxy-1-ethylbutyric acid. Fusion with KOH \rightarrow acetic and butyric acids. Br \rightarrow 2:3-dibromopentane-3-carboxylic acid. HBr \rightarrow 2-bromo-1-ethylbutyric acid.

Et ester: C₈H₁₄O₂. MW, 142. B.p. 165° (167°). Chloride: C₆H₅OCl. MW, 132.5. B.p. 54°/13 mm.

Amide: C₆H₁₁ON. MW, 113. M.p. 114–15°.

(II) Liquid form.

F.p. –35°. B.p. 199.5°/750 mm., 107–8°/10 mm. Insol. H₂O. Sol. EtOH, Et₂O, etc. D₄²⁰ 0.9805, D₄²⁵ 0.976. PCl₃ \rightarrow chloride of solid ethylcrotonic acid. KMnO₄ \rightarrow 1:2-dihydroxy-1-ethylbutyric acid. Br \rightarrow 2:3-dibromopentane-3-carboxylic acid.

Et ester: b.p. 158–9°, 52°/9 mm.

Fittig, *Ann.*, 1904, 334, 102, 115.

Auwers, *Ann.*, 1933, 432, 76.

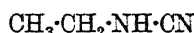
Blaise, Bagard, *Ann. chim. phys.*, 1907, 11, 127.

Sherrill, Matlack, *J. Am. Chem. Soc.*, 1937, 59, 2134.

2-Ethylcrotonic Acid.

See 2-Methyl-2-ethylacrylic Acid.

Ethylcyanamide



C₃H₅N₂ MW, 70

Neutral syrup. Polymerises. H₂S \rightarrow ethylthiourea. H₂Se \rightarrow ethylselenourea.

McKee, *Am. Chem. J.*, 1906, 36, 212.

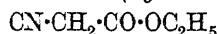
Cahours, Clöez, *Ann.*, 1854, 90, 95.

Schmidt, *Ber.*, 1921, 54, 2068.

Ethyl cyanide.

See under Propionic Acid.

Ethyl cyanoacetate (Cyanoacetic ester)



C₅H₇O₂N MW, 113

B.p. 207°, 122°/42 mm., 107°/27 mm., 97°/16 mm. Insol. H₂O. Sol. NH₃. Aq. D₄²⁰ 1.063, D₄²⁵ 1.0560 (1.0562), D₄³⁰ 1.0306, D₄³⁵ 1.0052. n_D²⁰ 1.41793. Heat of comb. C_v 557.2 Cal., C_p 629.7 Cal. Br \rightarrow bromocyanoacetic ester. NH₃ \rightarrow cyanoacetamide. HNO₂ \rightarrow oximinocyanoacetic ester. NH₂·NH₂ in EtOH \rightarrow

cyanoacetylhydrazide. EtOH (+ conc. H₂SO₄) \rightarrow ethyl malonate. Gives Na deriv. CH₃COCl and C₆H₅COCl \rightarrow acetyl and benzoyl cyanoacetic esters.

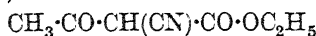
Noyes, *J. Am. Chem. Soc.*, 1904, 26, 1545.

Kohler, Allen, *Organic Syntheses*, 1923, III, 53.

Stephens, *J. Soc. Chem. Ind.*, 1924, 43, 313T, 327T.

Inglis, *Organic Syntheses*, 1928, VIII, 74.

Ethyl 1-cyanoacetoacetate (1-Cyanoacetoacetic ester)



C₇H₉O₃N MW, 155

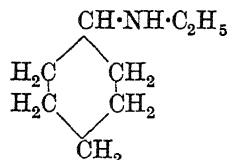
Needles. M.p. 23° (26°). B.p. 195–7°, 130–2°/35 mm., 112–14°/18 mm., 104°/10 mm. Decomp. slowly on standing. Spar. sol. H₂O. Sol. EtOH, Et₂O, CHCl₃, CS₂, C₆H₆. D₄²⁰ 1.1107. n_D²⁰ 1.4710. Heat of comb. C_v 836.8 Cal., C_p 837.0 Cal. Aq. sol. reacts acid. Gives bright red. col. with FeCl₃. KOH in EtOH \rightarrow ammonia, acetic acid, ethyl alcohol, and CO₂. NH₃ \rightarrow ethyl 2-imino-1-cyanobutyrate. Forms Na, K, NH₄, Cu, Ca, Ba, Mg, Ag, and Pb derivs.

Semicarbazone: m.p. 190°.

Haller, Held, *Ann. chim. phys.*, 1889, 17, 204.

Michael, Eckstein, *Ber.*, 1905, 38, 51.

N-Ethylcyclohexylamine (Hexahydroethyl-aniline)



C₈H₁₇N MW, 127

Liq. with fishy odour. B.p. 164°. D₄²⁰ 0.868.

B.HCl: m.p. 184°.

N-Acetyl: b.p. 256°/740 mm.

N-Benzoyl: b.p. 201°.

N-Nitroso: b.p. 130°/12 mm.

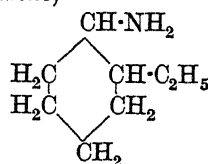
Picrate: yellow cryst. from EtOH. M.p. 133°.

Skita, Rolfes, *Ber.*, 1920, 53, 1251.

Sabatier, Mailhe, *Compt. rend.*, 1911, 153, 1207.

I.G., B.P., 334,579, (*Chem. Abstracts*, 1931, 25, 964).

2-Ethylcyclohexylamine (Hexahydro-o-aminoethylbenzene)



C₈H₁₇N

MW, 127

B.p. 170–1°, 53°/12 mm. D_4^{25} 0.8744. n_D^{25} 1.4682.

N-Benzenesulphonyl : m.p. 121–2°.

Chloroplatinate : m.p. 238–9°.

Picrate : m.p. 189–90°.

Trans-.
B.p. 65°/17 mm.

Picrate : m.p. 198–9° decomp.

N-Benzenesulphonyl : m.p. 131°.

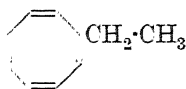
Willstätter, Seitz, v. Braun, *Ber.*, 1925, 58, 385.

King, Barltrop, Walley, *J. Chem. Soc.*, 1945, 277.

Ethyl cyclohexyl Ketone.

See Hexahydropropiofenone.

Ethylcyclo-octatetraene



$C_{10}H_{12}$ MW, 132

Oil. B.p. 81°/37 mm. D_4^{25} 0.8996. n_D^{25} 1.5187.

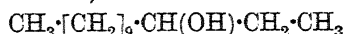
$AgNO_3$ add. comp. : greyish white cryst. from EtOH. M.p. 124–125.5°.

Maleic anhydride add. comp. : cryst. from C_6H_6 -cyclohexane. M.p. 97–98.5°.

Cope, Van Orden, *J. Am. Chem. Soc.*, 1952, 74, 175.

Cope, Campbell, *ibid.*, 179.

Ethyl-*n*-decylcarbinol (*Tridecanol-3, 3-hydroxytridecane*)



$C_{13}H_{28}O$ MW, 200

d-.
Needles from EtOH. M.p. 32°. B.p. 139°/12 mm. D_4^{25} 0.8139. $[\alpha]_D^{25} + 12.44^\circ$. Volatile in steam.

Acid phthalate : m.p. 35–35.5°. $[\alpha]_D^{25} + 17.58^\circ$ in EtOH.

l-.
Needles from EtOH. M.p. 32°. B.p. 140°/15 mm. D_4^{25} 0.8180. $[\alpha]_D^{25} - 6.73^\circ$ in EtOH.

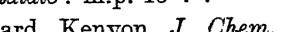
Acid phthalate : m.p. 35–35.5°. $[\alpha]_D^{25} - 17.71^\circ$ in EtOH.

dl-.
Plates. M.p. 14.5°. B.p. 148°/20 mm.

Acid phthalate : m.p. 46–7°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1948.

Ethyl *n*-decyl Ketone (*Tridecanone-3, 3-ketotridecane*)



$C_{13}H_{26}O$ MW, 198

Plates. M.p. 25°. B.p. 140°/17 mm.

Semicarbazone : cryst. from EtOH.Aq. M.p. 90°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1948.

α -Ethylidibenzyl.

See 1 : 2-Diphenyl-*n*-butane.

N-Ethylidibenzylamine

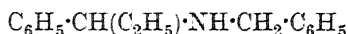
$C_{16}H_{19}N$ MW, 225

B.p. 306°. Sol. EtOH, Et₂O. Insol. H₂O.

Limpricht, *Ann.*, 1867, 144, 315.

Kraft, *Ber.*, 1890, 23, 2782.

α -Ethylidibenzylamine (*N*-Benzyl-1-phenylpropylamine, *N*-benzyl- α -aminopropylbenzene, benzyl- α -ethylbenzylamine)



$C_{16}H_{19}N$ MW, 225

B.p. 135°, <1 mm.

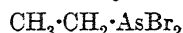
B.HCl : m.p. 168° decomp.

B.HNO₃ : m.p. 146°.

B₂H₂SO₄ : m.p. 188°.

Grammaticakis, *Compt. rend.*, 1938, 207, 1224.

Ethylidibromoarsine (*Dibromoethylarsine, ethylarsenic dibromide, ethylarsine dibromide*)



$C_2H_5Br_2As$ MW, 264

B.p. 192°, 87–8°/16 mm.

Dehn, *Am. Chem. J.*, 1908, 40, 108.

Banks *et al.*, *J. Am. Chem. Soc.*, 1947, 69, 927.

Ethylidichloroamine.

See *N*-Dichloroethylamine.

Ethylidichloroarsine (*Dichloro-ethylarsine, ethylarsine dichloride*)



$C_2H_5Cl_2As$ MW, 175

B.p. 156° (155.3°), 131.2°/400 mm., 109.6°/200 mm., 90°/100 mm., 74°/50 mm. D_4^{25} 1.6595.

Sol. H₂O. Misc. with EtOH, Et₂O, C₆H₆, etc.

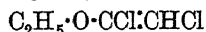
Dil. HNO₃ → ethylarsinic acid.

La Coste, *Ann.*, 1881, 203, 33.

Dehn, *Am. Chem. J.*, 1908, 40, 110.

Gibson, Johnson, *J. Chem. Soc.*, 1931, 2518.

Ethyl 1 : 2-dichlorovinyl Ether (1 : 2-Dichloro-1-ethoxyethylene)



$C_4H_6OCl_2$ MW, 141

B.p. 128.2°. D^{10} 1.08. H₂O → ethyl chloroacetate. H₂O at 180° → HCl + ethyl chloride + glycollic acid.

Geuther, Brockhoff, *J. prakt. Chem.*, 1873, 7, 112.

Imbert, D.R.P., 216,940, (*Chem. Zentr.*, 1910, I, 308).

Ethyl 2 : 2-dichlorovinyl Ether (2 : 2-Dichloro-1-ethoxyethylene)

$C_4H_5OCl_2$ $C_2H_5 \cdot O \cdot CH : CCl_2$ MW, 141

B.p. $144.2^\circ/765.3$ mm. $D_4^{20} 1.2081$. $O \longrightarrow$ ethoxychloroacetyl chloride — phosgene — ethyl formate. H_2SO_4 at $130-40^\circ \longrightarrow$ dichloroacetaldehyde + ethylene.

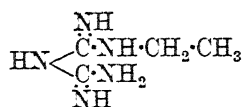
Godefroy, *Jahresber. Fortschr. Chem.*, 1886, 1174.

Neher, Foster, *J. Am. Chem. Soc.*, 1909, 31, 415.

Ethyl diethoxypropionate.

See under Formylacetic Acid.

Ethyldiguanide



$C_4H_{11}N_5$ MW, 129

Deliquescent cryst. Sol. EtOH. Insol. Et₂O. Heat \longrightarrow NH₃ + ethylamine.

B, HCl : sol. H₂O, EtOH. Insol. Et₂O.

$B_2H_2SO_4 \cdot 1\frac{1}{2}H_2O$: m.p. 180° (anhyd.). Sol. H₂O. Insol. Et₂O, EtOH. Loses H₂O at 100° .

Smolka, Friedreich, *Monatsh.*, 1888, 9, 229.

Emich, *Monatsh.*, 1883, 4, 396.

Ethyl-dihydrocupreine.

See Optochine.

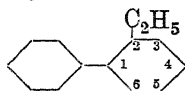
Ethyl 2-dimethylaminoethyl Ether.

See 2-Dimethylaminodiethyl Ether.

3-Ethyl-2 : 4-di(p-hydroxyphenyl)-hexane.

See Octofollin.

2-Ethyldiphenyl



$C_{14}H_{14}$ MW, 182

F.p. -6° . B.p. $128-9^\circ/11$ mm. $n_D^{25} 1.5758$, $n_D^{35} 1.5710$.

Huber *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 1111.

3-Ethyldiphenyl.

B.p. $143^\circ/11$ mm. $n_D^{25} 1.5859$.

Huber *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 1111.

4-Ethyldiphenyl.

Plates from MeOH. M.p. $34.0-34.5^\circ$. B.p. $146-7.5^\circ/11$ mm. $n_D^{25} 1.5891$. $CrO_3 \longrightarrow$ *p*-phenylbenzoic acid.

Huber *et al.*, *J. Am. Chem. Soc.*, 1946, 68, 1111.

N-Ethyldiphenylamine

$(C_6H_5)_2N \cdot C_2H_5$

$C_{14}H_{15}N$ MW, 197

B.p. $295-7^\circ$ ($285-7^\circ$), $207^\circ/72$ mm., $148^\circ/13$ mm.

Girard, *Bull. soc. chim.*, 1875, 23, 3.

Tippmann, Fleissner, *Monatsh.*, 1883, 4, 797.

Skita, Keil, Haveman, *Ber.*, 1933, 66, 1400.

Ethyldiphenylcarbinol.

See 1-Hydroxy-1 : 1-diphenylpropane.

α -Ethyldiphenylmethane.

See 1 : 1-Diphenylpropane.

Ethyldipicrylamine.

See under 2 : 4 : 6 : 2' : 4' : 6'-Hexanitrodi-phenylamine.

Ethyldipropylamine

$(CH_3 \cdot CH_2 \cdot CH_2)_2N \cdot CH_2 \cdot CH_3$

$C_8H_{19}N$ MW, 129

B.p. $137.2^\circ/749.9$ mm. ($132-4^\circ$). Sol. most org. solvents except EtOH. Spar. sol. H₂O. $D_4^{24} 0.807$.

B, HCl : needles. M.p. $113-15^\circ$.

$B_2H_2PtCl_6$: orange-yellow cryst. M.p. 175° . Sol. H₂O. Insol. EtOH.

$B, HAuCl_4$: m.p. 96° . Sol. H₂O.

Comanducci, Arena, *Chem. Zentr.*, 1907, II, 1396.

Passon, *Ber.*, 1891, 24, 1680.

v. Braun, *Ber.*, 1900, 33, 1446.

Ethyldipropylcarbinol (4-Ethylheptanol-4, 3-propylhexanol-3)

$(CH_3 \cdot CH_2 \cdot CH_2)_2C(OH) \cdot CH_2 \cdot CH_3$

$C_9H_{20}O$ MW, 144

B.p. 179.5° . $D_4^{20} 0.83492$, $D_4^{30} 0.82827$. Heat of comb. C_p 1401.8 Cal. $CrO_3 \longrightarrow$ CO₂, acetic, propionic and butyric acids, and butyrene.

Tschebotarew, Saizew, *J. prakt. Chem.*, 1886, 33, 198.

Halse, *J. prakt. Chem.*, 1914, 89, 456.

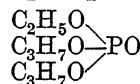
Ethyldipropylmethane.

See 4-Ethylheptane.

Ethyldipropylphenylmethane.

See 4-Ethyl-4-phenylheptane.

Ethyl dipropyl phosphate



$C_8H_{19}O_4P$ MW, 210

B.p. $145^\circ/20$ mm. $D_4^{20} 1.046$, $D_4^{22} 1.025$. Sol. 45 parts H₂O at 25° . H₂O \longrightarrow dipropyl phosphate + ethyl propyl phosphate.

Drushel, *Chem. Zentr.*, 1916, I, 1224.

ω -Ethyldipropyltoluene.

See 4-Ethyl-4-phenylheptane.

Ethyldodecylcarbinol (*Pentadecanol-3, 3-hydroxypentadecane*)



$\text{C}_{15}\text{H}_{32}\text{O}$ MW, 228
l.

Needles from EtOH. M.p. 45° . B.p. $168^\circ/14$ mm. D_4^{20} 0.8115. $[\alpha]_D^{20} - 5.46^\circ$ in EtOH. Non-volatile in steam.

Acid phthalate: cryst. from pet. ether. M.p. $46-7^\circ$. $[\alpha]_D^{20} - 16.95^\circ$ in EtOH.

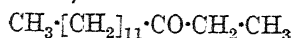
dl.

M.p. 32° . B.p. $163^\circ/12$ mm.

Acid phthalate: cryst. from pet. ether. M.p. $54-5^\circ$.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1951.

Ethyl dodecyl Ketone (*Pentadecanone-3, 3-ketopentadecane*)



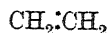
$\text{C}_{15}\text{H}_{30}\text{O}$ MW, 226

Plates. M.p. 38° . B.p. $174^\circ/20$ mm. Spar. volatile in steam.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90.5° .

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1952.

Ethylene



C_2H_4 MW, 28

F.p. -169° . B.p. -105° (-102.3° , -103.9°). Coefficient of absorption in H_2O : 0.226 at 0° , 0.162 at 10° , 0.122 at 20° , 0.098 at 30° . Heat of comb. C_p 333.35 (341.1, 345.8) Cal. Crit. temp. 9.5° . Crit. press. 50.65 atm. Burns with luminous flame. $\text{H} \rightarrow$ ethane. $\text{H}_2\text{SO}_4 \rightarrow$ ethyl hydrogen sulphate. $\text{Cl} \rightarrow$ ethylene dichloride. $\text{Br} \rightarrow$ ethylene dibromide. $\text{I} \rightarrow$ ethylene di-iodide. $\text{HBr} \rightarrow$ ethyl bromide. $\text{HI} \rightarrow$ ethyl iodide. $\text{O}_3 \rightarrow$ ethylene ozonide. $\text{N}_2\text{O}_4 \rightarrow$ ethylene nitrosate. $\text{HOCl} \rightarrow$ ethylene chlorohydrin. $\text{HOBr} \rightarrow$ ethylene bromohydrin. Polymerises at high pressures to give a range of solid polymers known as polythene, of which Alkathene is the well-known brand of I.C.I. Polythene is a saturated straight-chain hydrocarbon of chain length about 1000. M.p. about 115° . It is tough and flexible, with valuable mechanical and electrical properties, highly resistant to water, acids and alkalis, and insol. in cold org. solvents. It dissolves in some hydrocarbon solvents at higher temps.

Erlenmeyer, Bunte, *Ann.*, 1878, 192, 244.

Newth, *J. Chem. Soc.*, 1901, 79, 915.

Senderens, *Bull. soc. chim.*, 1911, 9, 371.

Kesting, *Z. angew. Chem.*, 1925, 38, 362.

Sakmin, *Ber.*, 1934, 67, 392.

Polythene:

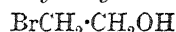
I.C.I., B.P. 471,590; U.S.P.s 2,153,553, 2,188,465, 2,219,684.

Richards, *J. appl. Chem.*, 1951, 370.

Ethyleneacetic Acid.

See Cyclopropane-carboxylic Acid.

Ethylene bromohydrin (*2-Bromoethyl alcohol, 2-bromo-1-hydroxyethane*)



$\text{C}_2\text{H}_5\text{OBr}$ MW, 125

B.p. $149-50^\circ/750$ mm., $63-4^\circ/18$ mm. D_4^{20} 1.7902. D_4^{25} 1.685. Misc. with most org. solvents. Forms azeotropic mixture with H_2O , b.p. $99.1^\circ/762.4$ mm. Hot $\text{H}_2\text{O} \rightarrow$ ethylene glycol.

Et ether: see 2-Bromodiethyl Ether.

Acid 3-nitrophthalate: m.p. $172-5^\circ$.

Acid 4-nitrophthalate: m.p. $99-101^\circ$.

Mokijewski, *Chem. Zentr.*, 1899, I, 591.

McDowall, *J. Chem. Soc.*, 1926, 499.

Thayer, Marvel, Hiers, *Organic Syntheses*, 1926, VI, 12.

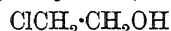
Ethylene bromoiodide.

See 2-Bromo-1-iodoethane.

Ethylene chlorobromide.

See sym.-Chlorobromoethane.

Ethylene chlorohydrin (*2-Chloroethyl alcohol, 2-chloro-1-hydroxyethane*)



$\text{C}_2\text{H}_5\text{OCl}$ MW, 80.5

F.p. -67.5° . B.p. 128.6° (129.5°), $51-2^\circ/22$ mm., $44^\circ/20$ mm. D_4^{20} 1.2195, D_4^{25} 1.1988, D_4^{30} 1.2072, D_4^{35} 1.2019. n_D^{20} 1.44380, n_D^{25} 1.44189. Misc. with H_2O and most org. solvents. Forms azeotropic mixture with H_2O , b.p. $95-8^\circ/735$ mm. $\text{KOH} \rightarrow$ ethylene oxide. $\text{NaHg} + \text{H}_2\text{O} \rightarrow$ ethyl alcohol. $\text{CrO}_3 \rightarrow$ chloroacetic acid. $\text{Na}_2\text{S} \rightarrow$ thioglycol.

Me ether: see Methyl 2-chloroethyl Ether.

Et ether: see 2-Chlorodiethyl Ether.

Acid 4-nitrophthalate: m.p. $97-8^\circ$.

p-Toluenesulphonyl: m.p. 22.5° . B.p. $140/1.5$ mm. n_D^{25} 1.5280.

Gomberg, *J. Am. Chem. Soc.*, 1919, 41, 1414.

Shilov, *Journal of Chemical Industry (Moscow)*, 1928, 5, 1273.

Zapadinskü, *ibid.*, 1426.

Long, Willson, Wheeler, B.P., 265,259, (*Chem. Abstracts*, 1928, 22, 244).

Frahm, *Rec. trav. chim.*, 1931, 50, 261.

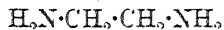
Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij, B.P. Application, 19215/1932.

Ethylene chloroiodide.

See 1-Chloro-2-iodoethane.

Ethylene cyanhydrin.

See under Hydracrylic Acid.

Ethylenediamine (1 : 2-Diaminoethane)

MW, 60

M.p. 8.5° . B.p. 116.5° . Ammoniacal odour. Sol. H_2O with hydration. Insol. C_6H_6 , Et_2O . D_4^{20} 0.902, D_4^{25} 0.898, D_4^{30} 0.8919. n_D^{20} 1.45400 $k = 8.5 \times 10^{-5}$ at 25° . Volatile in steam. Forms compounds with metallic salts.

$\text{B}\cdot\text{H}_2\text{O}$: m.p. 10° . B.p. 118° . D_4^{20} 0.9634. n_D^{20} 1.44997.

B_2HCl : monoclinic prisms. Insol. EtOH . Sublimes without melting.

N-Mono-acetyl: m.p. 51° corr. B.p. 128° 3 mm. Picrate: m.p. 175° corr.

NN-Diacetyl: needles. M.p. 172° . Very sol. H_2O , EtOH . Spar. sol. Et_2O .

N-Mono-propionyl: b.p. 130° 3 mm. Picrate: m.p. 148° corr.

Isovaleryl: hypotonin. M.p. $129-30^\circ$.

NN-Dibenzoyl: m.p. 244° .

NN-Di-benzenesulphonyl: m.p. 168° .

N-Mono-p-toluenesulphonyl: m.p. 123° .

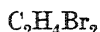
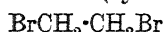
NN-Di-p-toluenesulphonyl: m.p. 360° decomp. Di-picrate: m.p. $233-5^\circ$ decomp.

Bailar, *J. Am. Chem. Soc.*, 1934, 56, 955.

Kraut, *Ann.*, 1882, 212, 251.

Ing, Manske, *J. Chem. Soc.*, 1926, 2348.

Putokhin, *Transactions of the Institute of Pure Chemical Reagents*, U.S.S.R., 1929, No. 300, 119.

Ethylene dibromide (sym.-Dibromoethane)

MW, 188

M.p. 10° . B.p. 131.7° , 52.1° 50.8 mm., 34° 14 mm. D_4^{20} 2.21324, D_4^{25} 2.1785, D_4^{30} 2.1620. n_D^{20} 1.54160, n_D^{25} 1.53789. Hot $\text{H}_2\text{O} \rightarrow$ ethylene glycol. $\text{KOH} \rightarrow$ vinyl bromide. KOH in $\text{EtOH} \rightarrow$ vinyl bromide + acetylene. $\text{NH}_3 \rightarrow$ ethylenediamine and diethylenediamine. K_2S in $\text{EtOH} \rightarrow$ diethylene disulphide.

Erlenmeyer, Bunte, *Ann.*, 1873, 168, 64.

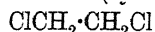
Bauer, U.S.P., 1,414,852, (*Chem. Abstracts*, 1922, 16, 2150).

Kesting, *Z. angew. Chem.*, 1925, 38, 362.

Goshorn, Degering, *Proceedings of the Indiana Academy of Science*, 1935, 45, 139.

Ethylene-dicarboxylic Acid.

See Fumaric Acid, Maleic Acid, and Methylene-malonamic Acid.

Ethylene dichloride (sym.-Dichloroethane)

MW, 99

F.p. -42.0° (-36°). B.p. 83.7° (83.5°). 100 gm. H_2O dissolve 0.922 gm. at 0° , 0.885 gm. at 10° , 0.869 gm. at 20° , 0.865 gm. at 25° , 0.894 gm. at 30° . D_4^{20} 1.28034 (1.28238, 1.28082), D_4^{25} 1.2521 (1.2501, 1.2569), D_4^{30} 1.1576. n_D^{15} 1.44759, n_D^{20} 1.44432 (1.44439). Heat of comb.

C_2 296.36 Cal. KOH in $\text{EtOH} \rightarrow$ vinyl chloride. $\text{NH}_3 \rightarrow$ ethylenediamine and diethylenediamine. $\text{AlCl}_3 \rightarrow$ acetylene. Aniline \rightarrow diphenylpiperazine.

Limpricht, *Ann.*, 1855, 94, 245.

Bahr, Zieler, *Z. angew. Chem.*, 1930, 43, 233.

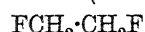
Gersdorff, *U.S. Dept. Agriculture. Miscellaneous Publications*, 1932, 117, 3 (*Bibl.*).

Ethylene dicyanide.

See Succinonitrile.

Ethylenediethyldiamine.

See sym.-Diethylethylenediamine.

Ethylene difluoride (1 : 2-Difluoroethane)

MW, 66

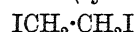
B.p. $10-11^\circ$. Decomposes spontaneously. $\text{Ca}(\text{OH})_2$. Aq. slowly \rightarrow ethylene glycol.

Chabrie, *Compt. rend.*, 1890, 111, 747.

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, 58, 890.

Ethylene Diglycol.

See 2 : 2'-Dihydroxydiethyl Ether.

Ethylene di-iodide (sym.-Di-iodoethane)

MW, 282

Prisms or plates. M.p. $81-2^\circ$. Decomp. in the light. D_4^{10} 2.132. Heat of comb. C_2 324.3 Cal., C_2 324.9 Cal. $\text{Br} \rightarrow$ ethylene dibromide. EtOH at $70^\circ \rightarrow$ 2-iododiethyl ether. $\text{HgCl}_2 \rightarrow$ 2-chloro-1-iodoethane and ethylene dichloride. $\text{AgNO}_3 \rightarrow$ 1 : 2-dinitroethane and 2-nitroethyl nitrite.

Semenoff, *Jahresber. Fortschr. Chem.*, 1864, 483.

Ethylenedimethyldiamine.

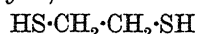
See sym.-Dimethylethylenediamine.

Ethylenedi-naphthyldiamine.

See sym.-Di-naphthylethylenediamine.

Ethylenediphenyldiamine.

See sym.-Diphenylethylenediamine.

Ethylene Dithioglycol (Dimercaptoethane, dithioethylene glycol)

MW, 94

B.p. 146° , $46-7^\circ$ 16 mm. D_4^{24} 1.123. n_D^{25} 1.5558. Sol. EtOH , alkalis. $\text{HNO}_3 \rightarrow$ ethane-disulphonic acid. Br in CHCl_3 or $\text{H}_2\text{SO}_4 \rightarrow$ diethylene tetrasulphide.

Di-Me ether: $\text{C}_4\text{H}_{10}\text{S}_2$. MW, 122. B.p. 183° .

Mono-Et ether: $\text{C}_4\text{H}_{10}\text{S}_2$. MW, 122. B.p. 188° .

Di-Et ether: $\text{C}_6\text{H}_{14}\text{S}_2$. MW, 150. B.p. $210-13^\circ$.

Meyer, *Ber.*, 1886, 19, 3263.

Fasbender, *Ber.*, 1887, 20, 461.

Simpson, *Can. J. Research*, 1947, 25B, 20.

Hall, Reid, *J. Am. Chem. Soc.*, 1943, 65, 1466.

Ethyleneditolyldiamine.

See *sym.*-Ditolyethylenediamine.

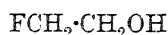
Ethylene fluorobromide.

See *sym.*-Fluorobromoethane.

Ethylene fluorochloride.

See *sym.*-Fluorochloroethane.

Ethylene fluorohydrin (2-Fluoroethyl alcohol, 2-fluoro-1-hydroxyethane)


 $\text{C}_2\text{H}_5\text{OF}$

MW, 64

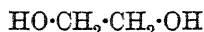
F.p. -26.45° . B.p. $103.35^\circ/757$ mm. D_{20}^{25} 1.11124, D_0^{25} 1.1297. n_D^{25} 1.36470. Sol. H_2O . Dissolves CaCl_2 and $\text{Ca}(\text{NO}_3)_2$.

Acetyl: fluoroethyl acetate. $\text{C}_4\text{H}_7\text{O}_2\text{F}$. MW, 106. B.p. $119.3^\circ/753$ mm., $45.5^\circ/27$ mm. D_{20}^{25} 1.0982. n_D^{25} 1.37792.

α -Naphthylurethane: m.p. $125-7^\circ$.

Swarts, *Rec. trav. chim.*, 1914, **33**, 258, (*Chem. Abstracts*, 1915, **9**, 3227).

Ethylene Glycol (*sym.*-Dihydroxyethane, glycol)


 $\text{C}_2\text{H}_6\text{O}_2$

MW, 62

Odourless, viscous liq. with sweet taste. M.p. -11.5° (-15.6°). B.p. 197° , $140.8^\circ/101$ mm., $136.7^\circ/83$ mm., $122.5^\circ/44$ mm., $109^\circ/25$ mm., $93^\circ/13$ mm. D_4^{25} 1.1088. n_D^{25} 1.43178. Misc. in all proportions with H_2O , EtOH, MeOH, amyl alcohol, Me_2CO , glycerol, AcOH, Pr. Not misc. with CHCl_3 , CCl_4 , Et_2O , C_6H_6 , CS_2 . Heat of comb. C_p 282.2 Cal. Heat of form. C_p -111.1 Cal.

Mono-acetyl: b.p. $187-9^\circ$.

Diacetyl: b.p. $186-7^\circ$. D_0^{25} 1.128.

Mono-p-nitrobenzoyl: m.p. $77-8^\circ$.

Di-p-nitrobenzoyl: cryst. from EtOH-AcOEt. M.p. 145° .

Mono-Me ether: see Methyl 2-hydroxyethyl Ether.

Di-Me ether: 1:2-dimethoxyethane. $\text{C}_4\text{H}_{10}\text{O}_2$. MW, 90. M.p. -58° . B.p. $82-3^\circ$, $78^\circ/750$ mm. D_4^{25} 0.86877, D_4^{25} 0.86285. n_D^{25} 1.37216.

Mono-Et ether: see 2-Hydroxydiethyl Ether.

Di-Et ether: 1:2-diethoxyethane. $\text{C}_6\text{H}_{14}\text{O}_2$. MW, 118. B.p. $123.5^\circ/758.5$ mm. D_0^{25} 0.8628 (0.7993), D_{20}^{25} 0.8484.

Propyl ether: see 2-Hydroxyethyl propyl Ether.

Isopropyl ether: see 2-Hydroxyethyl isopropyl Ether.

Butyl ether: see 2-Hydroxyethyl butyl Ether.

Isobutyl ether: see 2-Hydroxyethyl isobutyl Ether.

Amyl ether: see 2-Hydroxyethyl amyl Ether.

Mono-allyl ether: 2-hydroxyethyl allyl ether. $\text{C}_5\text{H}_{10}\text{O}_2$. MW, 102. B.p. $158.8-159^\circ/755.4$ mm. D_{15}^{25} 0.96095.

Methylene ether: see 1:3-Dioxolan.

Ethylene ether: see 1:4-Dioxan.

Phenyl ether: see 2-Hydroxyethyl phenyl Ether.

Chlorophenyl ether: see 2-Hydroxyethyl chlorophenyl Ether.

Diphenyl ether: *sym.*-diphenoxyethane. $\text{C}_{14}\text{H}_{14}\text{O}_2$. MW, 214. Leaflets from EtOH. M.p. 98° . Sol. Et_2O , CHCl_3 , hot EtOH. Insol. H_2O .

Di-p-aminophenyl ether: *pp'*-diaminodiphenoxyethane. $\text{C}_{14}\text{H}_{16}\text{O}_2\text{N}_2$. MW, 244. Needles from EtOH. M.p. 176° . $\text{FeCl}_3 \rightarrow$ cherry-red col. Sol. $\text{H}_2\text{SO}_4 \rightarrow$ blue col.

Tolyl ether: see 2-Hydroxyethyl tolyl Ether.

Naphthyl ether: see 2-Hydroxyethyl naphthyl Ether.

Brooks, Humphrey, *Ind. Eng. Chem.*, 1917, **9**, 750.

Haworth, Perkin, *J. Chem. Soc.* 1896, **69**, 176.

Niederist, *Ann.*, 1879, **196**, 354.

Ullrich, *Metalbörse*, 1929, **19**, 901, 957, 1013. (*Review of patent literature.*)

Skarblöm, B.P., 369,141, (*Chem. Zentr.*, 1932, **II**, 121).

Soc. Française de Catalyse Généralisée, F.P., 729,952, (*Chem. Zentr.*, 1932, **II**, 2107).

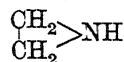
Dreyfus, F.P., 737,612, (*Chem. Zentr.*, 1933, **I**, 2313).

Schrader, *Z. angew. Chem.*, 1929, **42**, 541.

Clarke, *J. Chem. Soc.*, 1912, 101, 1802.

Wurtz, *Ann. chim. phys.*, 1859, **55**, 431.

Ethyleneimine (Aminoethylene, dimethyleneimine, azirane, aziridine)


 $\text{C}_2\text{H}_5\text{N}$

MW, 43

Liq. with strong ammoniacal odour. B.p. $55-6^\circ/756$ mm. Misc. with H_2O . D_{24}^{25} 0.8321. $\text{H}_2\text{S} \rightarrow$ thioethylamine. $\text{SO}_2 \rightarrow$ taurine. Shows strong alkaline reaction. This compound was formerly supposed to be vinylamine, $\text{CH}_2\text{:CH}\cdot\text{NH}_2$, the methods of preparation of which were later shown to give the cyclic imine.

Oxalate: needles. M.p. 115° decomp.

N-Toluenesulphonyl: cryst. from ligroin. M.p. 52° .

Picrate: m.p. 142° .

Howard, Marckwald, *Ber.*, 1899, **32**, 2036.

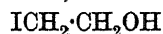
Marckwald, *Ber.*, 1900, **33**, 764.

Gabriel, Stelzner, *Ber.*, 1895, **28**, 2929.

Leighton, Perkins, Renquist, *J. Am. Chem. Soc.*, 1947, **69**, 1540.

Wenker, *J. Am. Chem. Soc.*, 1935, **57**, 2328.

Ethylene iodohydrin (2-Iodoethyl alcohol, 2-iodo-1-hydroxyethane)


 $\text{C}_2\text{H}_5\text{OI}$

MW, 172

B.p. 176-7° part. decomp., 85° 25 mm. Sol. H₂O. D₂₀⁴ 2.905. AgNO₃ → 2-nitroethyl alcohol. Pb(OH)₂ → acetaldehyde.

Acetyl: b.p. 95-6° 43 mm. n_D²⁰ 1.5072.

p-Nitrobenzoyl: m.p. 68-9°.

Allophanyl: m.p. 182°.

Me ether: methyl 2-iodoethyl ether. C₃H₇OI. MW, 186. B.p. 137-8° 750 mm.

Et ether: see 2-Iododiethyl Ether.

Butlerow, Ossokin, *Ann.*, 1867, 144, 42.

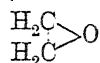
Ethylenelactic Acid.

See Hydracrylic Acid.

Ethylenemalonic Acid.

See Cyclopropane-1:1-dicarboxylic Acid.

Ethylene oxide (Oxirane)



C₂H₄O

MW, 44

B.p. 13.5°/746.5 mm. (12.5°). D₄¹ 0.8909, D₁₅⁴ 0.8824. n_D¹⁵ 1.35965. Sol. H₂O. Heat of comb. C_p 312.55 (308.4) Cal., C_v 307.5 Cal. Reduces AgNO₃. NaHg → C₂H₅OH. HCl → ethylene chlorohydrin. N(CH₃)₃ → choline. Condenses with hydroxy and amino compounds to give hydroxyethyl derivatives and polymers containing the group [-O·CH₂·CH₂·]_n.

Demole, *Ann.*, 1874, 173, 125.

Roithner, *Monatsh.*, 1894, 15, 666.

Badische, D.R.P., 299,682, (*Chem. Zentr.*, 1920, IV, 16).

Kahlbaum, F.P., 728,849, (*Chem. Zentr.*, 1932, II, 2532).

Anglo-Persian Oil Co., B.P., 374,864, (*Chem. Zentr.*, 1932, II, 2723).

Soc. Française de Catalyse Généralisée, F.P., 739,562, (*Chem. Zentr.*, 1933, I, 2607).

Schrader, *Z. angew. Chem.*, 1929, 42, 541.

Ethylene oxide carboxylic Acid.

See Glycidic Acid.

Ethylenesuccinic Acid.

See Cyclobutane-1:2-dicarboxylic Acid.

Ethylene sulphide (Dimethylene sulphide, thirane)



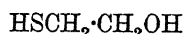
C₂H₄S

MW, 60

Colourless liq. B.p. 55-6°. D₄¹ 1.0368 (1.0342). n_D¹⁵ 1.4914 (1.49001). Rapidly polymerises. CH₃I → cryst. sulphonium iodide.

Delépine, *Compt. rend.*, 1920, 171, 36.

Ethylene Thioglycol (Mercaptoethyl alcohol, thioethylene glycol, hydroxyethyl mercaptan, 1-hydroxy-2-mercaptoethane, thioglycol)



C₂H₆OS

MW, 78

B.p. 157-8° 742 mm. (slight decomp.), 55° 13 mm. Misc. with H₂O. D₄²⁰ 1.1143. n_D²⁰ 1.443.

Hg comp.: silvery plates from H₂O or EtOH. M.p. 123°. Sol. Me₂CO, AcOEt.

Pb comp.: orange plates from EtOH. M.p. 110°.

S-Me: C₃H₈OS. MW, 92. B.p. 80.5-81° 30 mm., 68-70° 20 mm. Misc. with H₂O. D₂₀²⁰ 1.0640. n_D²⁰ 1.4867.

S-Et: C₄H₁₀OS. MW, 106. B.p. 182-4°.

S-n-Butyl: C₆H₁₄OS. MW, 134. B.p. 92-3° 4 mm.

S-Isoamyl: C₇H₁₆OS. MW, 148. B.p. 110-11° 10 mm. D₁₅¹⁵ 0.948. n_D¹⁵ 1.475.

S-Phenyl: C₉H₁₀OS. MW, 154. B.p. 115-16° 2 mm. D₂₀²⁰ 1.1451. n_D²⁰ 1.5917.

S-o-Nitrophenyl: C₈H₉O₃NS. MW, 199. Dark yellow tablets. M.p. 100°.

S-m-Nitrophenyl: yellow needles from pet. ether or H₂O. M.p. 42-5°.

S-p-Nitrophenyl: yellow cryst. from Et₂O or CS₂. M.p. 62°.

S-2:4-Dinitrophenyl: C₈H₈O₅N₂S. MW, 244. Yellow needles from C₆H₆. M.p. 100-5°.

Dibenzoyl: needles from EtOH. M.p. 39°.

S-Phenylurethane: cream cryst. from CCl₄ or C₆H₆. M.p. 59-60°.

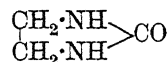
Bennett, Berry, *J. Chem. Soc.*, 1927, 1666.

Fromm, Jörg, *Ber.*, 1925, 58, 306.

Bennett, *J. Chem. Soc.*, 1921, 119, 423.

Tseou, Pan, *J. Chinese Chem. Soc.*, 1939, 7, 29.

Ethyleneurea (2-Ketotetrahydroglyoxaline, tetrahydroiminazalone-2, 2-iminazolidone)



C₃H₆ON₂

MW, 86

Needles. M.p. 131°. Sol. H₂O, hot EtOH. Spar. sol. Et₂O.

Fischer, Koch, *Ann.*, 1886, 232, 227.

N-Ethylethanolamine.

See 2-Hydroxydiethylamine.

Ethyl Ether.

See Diethyl Ether.

Ethyl ethylaminoformate.

See Ethylurethane.

Ethylethylene.

See 1-Butylene.

Ethylethylideneacetone.

See 2-Heptenone-4.

Ethylethynylcarbinol (1-Pentynol-3)



C₅H₈O

MW, 84

B.p. 125°. D₁₅¹⁵ 0.8926. n_D¹⁵ 1.4347.

3:5-Dinitrobenzoyl: needles from 95% EtOH. M.p. 91°.

Hydrogen phthaloyl: prisms. M.p. 72°.

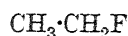
Kreimeier, U.S.P. 2,106,181, (*Chem. Abstracts*, 1938, 32, 2547).

McCallum, U.S.P. 2,125,334, (*Chem. Zentr.*, 1938, II, 3905).

McGrew, Adams, *J. Am. Chem. Soc.*, 1937, 59, 1497.

Lespieau, *Ann. chim.*, 1912, 27, 170.

Ethyl fluoride (*Fluoroethane*)



$\text{C}_2\text{H}_5\text{F}$ MW, 48

Gas. Liquifies at -32° under atmospheric press., at 19° under 8 atm. Sol. EtOH, Et₂O. 100 c.c. H₂O dissolve 198 c.c. at 14° . 100 c.c. EtI dissolve 1480 c.c.

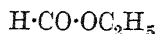
Moissan, *Ann. chim. phys.*, 1890, 19, 272.

Meslans, *Ann. chim. phys.*, 1896, 7, 94.

Grosse, Linn, *J. Org. Chem.*, 1938, 3, 26.

Henne, Midgley, *J. Am. Chem. Soc.*, 1936, 58, 884.

Ethyl formate



$\text{C}_3\text{H}_6\text{O}_2$ MW, 74

B.p. 54.3° . D_4^{20} 0.92286, D_4^{25} 0.91678. n_D^{20} 1.35975. Heat of comb. (vapour) C_p 400.06 (388.0) Cal., (liq.) C_p 391.7 Cal., C_v 391.4 Cal. $\text{R} \cdot \text{C} \cdot \text{CNa} \rightarrow \text{R} \cdot \text{C} \cdot \text{C} \cdot \text{CHO}$.

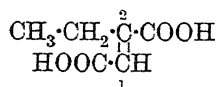
Bishop, *J. Soc. Chem. Ind.*, 1923, 42, 401t.

Young, Thomas, *J. Chem. Soc.*, 1893, 63, 1202.

M.L.B., D.R.P., 315,021, (*Chem. Zentr.*, 1919, IV, 1104).

Gravin, *J. Applied Chem., U.S.S.R.*, 1943, 16, 105, (*Chem. Abstracts*, 1944, 38, 1239).

Ethylfumaric Acid (*1-Butylene-1:2-dicarboxylic acid, methylmesaconic acid*)



$\text{C}_6\text{H}_8\text{O}_4$ MW, 144

Prisms from H₂O. M.p. $194-5^\circ$. Sol. Et₂O. Spar. sol. CHCl₃, ligroin. $k = 9.4 \times 10^{-4}$ at 25° . Dist. with P₂O₅ \rightarrow ethylmaleic acid.

1-Et ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. Needles from Et₂O. M.p. 88° .

2-Et ester: m.p. 53° .

Di-Et ester: $\text{C}_{10}\text{H}_{16}\text{O}_4$. MW, 200. B.p. $122-3^\circ/12$ mm.

Diamide: $\text{C}_6\text{H}_{10}\text{O}_2\text{N}_2$. MW, 142. Leaflets. M.p. $203-4^\circ$.

Anschütz, *Ann.*, 1928, 461, 169.

Fichter, Goldhaber, *Ber.*, 1904, 37, 2384.

Bischoff, *Ber.*, 1891, 24, 2013.

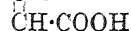
Ethylgalactoside.

See under Galactose.

Ethylglucoside.

See under Glucose.

1-Ethylglutaconic Acid (*1-Amylene-1:3-dicarboxylic acid, 1-pentene-1:3-dicarboxylic acid*)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

Exists in two forms. (i) Prisms from CHCl₃. M.p. 108° . Hot HCl \rightarrow (ii). (ii) Cryst. from H₂O. M.p. $133-4^\circ$.

Di-Me ester: $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. B.p. $95.8^\circ/5$ mm. D_4^{20} 1.0762. n_D^{20} 1.4574.

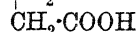
Di-Et ester: $\text{C}_{11}\text{H}_{18}\text{O}_4$. MW, 214. B.p. $171^\circ/62$ mm.

Thole, Thorpe, *J. Chem. Soc.*, 1911, 99, 2199, 2225.

Bland, Thorpe, *J. Chem. Soc.*, 1912, 101, 1557.

Fitzgerald, Kon, *J. Chem. Soc.*, 1937, 725.

1-Ethylglutaric Acid (*Pentane-1:3-dicarboxylic acid*)



$\text{C}_7\text{H}_{12}\text{O}_4$ MW, 160

d.-

Cryst. from C_6H_6 -ligroin. M.p. 60.5° . B.p. $250-60^\circ$, $194.6^\circ/30$ mm., $175^\circ/11$ mm. Sol. H₂O, EtOH, Et₂O, C_6H_6 . $k = 5.8 \times 10^{-5}$ at 25° .

Di-Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_4$. MW, 216. B.p. $120-3^\circ/11$ mm. D_4^{20} 0.9946. n_D^{20} 1.4295.

Anhydride: $\text{C}_7\text{H}_{10}\text{O}_3$. MW, 142. B.p. 275° .

Mono-anilide: needles from EtOH.Aq. M.p. 154.5° .

Mono-p-toluidide: two forms. (1) M.p. $119-20^\circ$. (2) M.p. 145.5° .

Mono-β-naphthylamide: two forms. (1) M.p. 129.5° . (2) M.p. $142-3^\circ$.

d.-

M.p. 42° . D_4^{20} (liq.) 1.173. $[\alpha]_D^{20}$ (liq.) $+16.5^\circ$, $+9.17^\circ$ ($c = 3$) in H₂O.

Di-Me ester: $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. $111^\circ/16$ mm. $[\alpha]_D^{20} +14.6^\circ$.

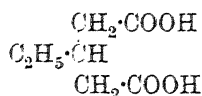
Anhydride: b.p. $147-8^\circ/12$ mm. $[\alpha]_D^{20}$ about $+23^\circ$.

Auwers, Titherley, *Ann.*, 1896, 292, 144, 214.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 769.

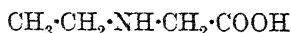
Berner, Leonardsen, *Ann.*, 1939, 538, 39.

v. Braun, Mannes, Reuter, *Ber.*, 1933, 66, 1502.

2-Ethylglutaric Acid (*Isopentane-1:2'-dicarboxylic acid*)C₇H₁₂O₄ MW, 160Prisms from CHCl₃. M.p. 73°. Very sol. H₂O, EtOH, Et₂O.

Dinitrile: b.p. 144°/12 mm.

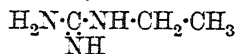
Anhydride: b.p. 158°/13 mm.

Day, Thorpe, *J. Chem. Soc.*, 1920, 117, 1470.Komnenos, *Ann.*, 1883, 218, 167.Blaise, Gault, *Bull. soc. chim.*, 1907, 1, 90.**Ethylglycine** (*Ethylaminoacetic acid, ethylglycocol*)C₄H₉O₂N MW, 103

Plates from EtOH. M.p. 180–2° decomp.

B.HCl: plates. M.p. about 180°.

Et-amide: m.p. 179–179.5°.

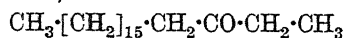
Nitrile: ethylaminoacetonitrile. C₄H₈N₂. MW, 84. B.p. 166–7°, 81–3°/29 mm.Heintz, *Ann.*, 1864, 129, 35; 1864, 132, 1.Cocker, *J. Chem. Soc.*, 1937, 1693.**Ethylglycylhydroxylamine.**See *N*'-Hydroxy-*N*-ethylurea.**Ethylguanidine** (*Guanidinoethane*)C₃H₉N₃ MW, 87

Free base not described.

B₂H₂PtCl₆: decomp. at 188–90°.B₂H₂AuCl₄: m.p. 100–103°. Sinters at 78–80°.

Picrate: m.p. 178–80°.

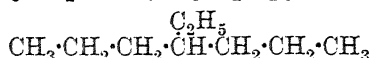
Picrolonate: decomp. at 285°.

Schenck, Kirchhof, *Z. physiol. Chem.*, 1926, 154, 293.**Ethyl heptadecyl Ketone** (*Eicosanone-3, 3-ketoeicosane*)C₂₀H₄₀O MW, 296Leaflets from EtOH. M.p. 60–1° (57°). Sol. Et₂O, Me₂CO, AcOH, C₆H₆. Spar. sol. cold EtOH.Oxime: α-form: needles from EtOH. M.p. 55–5–6–5°. Sol. Et₂O, Me₂CO. Spar. sol. EtOH, pet. ether. Benzoyl: m.p. 37–5°. β-form: m.p. 64–5°. Benzoyl: m.p. 32°.

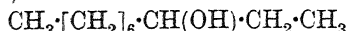
Isonitroso deriv.: needles from pet. ether. M.p. 80–1°.

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1899, 29, I, 474.Ryan, Nolan, *Chem. Zentr.*, 1913, II, 2050.Gilman, Nelson, *Rec. trav. chim.*, 1936, 55, 518.**1-Ethylheptane.**

See Nonane.

4-Ethylheptane (*Ethylidipropylmethane*)C₉H₂₀ MW, 128B.p. 138–9°. D₂₀ 0.7407. n_D²⁰ 1.41564.Oberreit, *Ber.*, 1896, 29, 2003.**4-Ethylheptanol-4.**

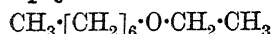
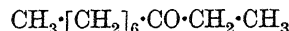
See Ethylidipropylcarbinol.

Ethyl-*n*-heptylcarbinol (*Decanol-3, 3-hydroxydecane*)C₁₀H₂₂O MW, 158

dl-.

B.p. 213°.

l-.

B.p. 108°/15 mm. D₄²⁰ 0.8272. n_D²⁰ 1.4336.[α]_D²⁰ – 7.67° in C₆H₆, – 6.21° in EtOH.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1945.**Ethyl *n*-heptyl Ether**C₉H₂₀O MW, 144B.p. 166–6°, 165°/748.3 mm. D₀ 0.7949, D₁₅ 0.790.Cross, *Ann.*, 1877, 189, 5.Welt, *Ber.*, 1897, 30, 1494.**Ethyl *n*-heptyl Ketone** (*Decanone-3, 3-ketodecane*)C₁₀H₂₀O MW, 156B.p. 211°. H → ethyl-*n*-heptylcarbinol.

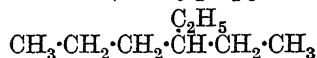
Semicarbazone: m.p. 100–1°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1945.**1-Ethylhexane.**

See Octane.

2-Ethylhexane.

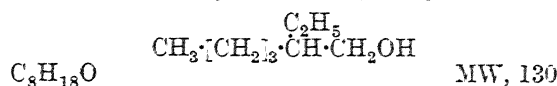
See 3-Methylheptane.

3-Ethylhexane (*Diethylpropylmethane*)C₈H₁₈ MW, 114B.p. 116–19°, 118–8–119°/766 mm. D₁₅¹⁵ 0.7175. n_D²⁵ 1.3993. Heat of comb. C_v 1301 Cal.Clarke, Riegel, *J. Am. Chem. Soc.*, 1912, 34, 678.Pope, Dykstra, Edgar, *J. Am. Chem. Soc.*, 1929, 51, 2204.**2-Ethylhexanol-1.**See 2-Ethyl-*n*-hexyl Alcohol.**3-Ethylhexanol-3.**

See Diethylpropylcarbinol.

Ethylhexoic Acid.

See Ethylcaproic Acid.

2-Ethyl-*n*-hexyl Alcohol (2-Ethylhexanol-1)

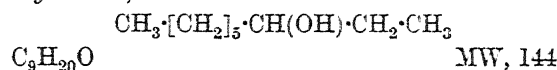
B.p. 181-3°/743 mm., 84-6°/15 mm. D_4^{20} 0.8328. n_D^{20} 1.4328. Al_2O_3 at 400° \rightarrow octene.

Acetyl: b.p. 95°/25 mm. n_D^{20} 1.4204.

Acid phthalate: m.p. 14.6°.

Levene, Taylor, *J. Biol. Chem.*, 1922, 54, 351.

Weizmann, Garrard, *J. Chem. Soc.*, 1920, 117, 329.

Ethyl-*n*-hexylcarbinol (Nonanol-3, 3-hydroxynonane)

dl.

F.p. -23° to -22°. B.p. 194.5-195°/750 mm., 99.5-101.5°/24 mm. D_4^{20} 0.839, D_4^{25} 0.825. n_D^{20} 1.4289. Insol. H_2O . Sol. Et_2O , EtOH .

d.

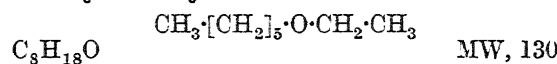
B.p. 97°/17 mm. D_4^{16} 0.8281. n_D^{20} 1.4308. $[\alpha]_D^{20} + 8.05^\circ$.

l.

B.p. 94°/13 mm. D_4^{16} 0.8277. $[\alpha]_D^{16} - 7.96^\circ$.

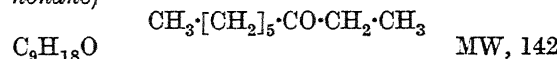
Bagard, *Bull. soc. chim.*, 1907, 1, 359.

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 70; 1913, 103, 1945.

Ethyl *n*-hexyl Ether

B.p. 134-7°, 42°/14 mm.

Lieben, Janecek, *Ann.*, 1877, 187, 139.

Ethyl *n*-hexyl Ketone (Nonanone-3, 3-ketononane)

F.p. -8°. B.p. 190° (185-6°), 86°/20 mm. D_4^{20} 0.825. $\text{CrO}_3 \rightarrow$ acetic, propionic, caproic and heptylic acids.

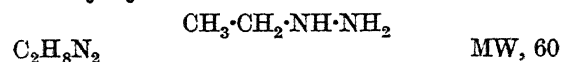
Oxime: b.p. 70°/1 mm. n_D^{25} 1.4552.

Phenylhydrazone: amber oil. B.p. 190-2°/15 mm. n_D^{19} 1.5410.

Semicarbazone: m.p. 111-12°.

Wagner, *J. prakt. Chem.*, 1891, 44, 267.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936.

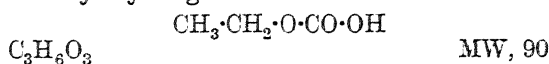
Ethylhydrazine

Ethereal, hygroscopic liq. with ammoniacal odour. B.p. 99.5°/709 mm. Sol. H_2O , EtOH , Et_2O , CHCl_3 , C_6H_6 . Fumes in moist air. Cor-

rosive. Attacks cork and rubber. Reduces Fehling's solution. Gives carbylamine reaction with chloroform and potash. $\text{EtI} \rightarrow$ sym.-diethylhydrazine. $\text{KCNO} \rightarrow$ ethylsemicarbazide.

$\text{B}_2\text{H}_4\text{SO}_4$: plates from hot EtOH . M.p. 110-20°.

Fischer, *Ann.*, 1879, 199, 287.

Ethyl hydrogen carbonate

F.p. -61° to -57°. Unstable at ordinary temps.

K salt: sol. H_2O , EtOH . Insol. Et_2O .

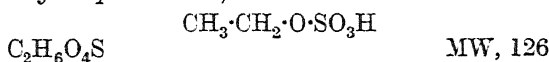
Na salt: sol. H_2O . Spar. sol. EtOH .

Chloride: see Ethyl chloroformate.

Amide: see Urethane.

Hempel, Seidel, *Ber.*, 1898, 31, 3001.

Faurholt, *Z. physik. Chem.*, 1927, 126, 227.

Ethyl hydrogen sulphate (Sulphovinic acid, ethyl sulphuric acid)

Oily liq. Slowly hyd. by H_2O . D_4^{17} 1.316.

Heat \rightarrow ethylene. $\text{EtOH} \rightarrow$ diethyl ether (at 140° \rightarrow diethyl sulphate). Most of the salts are easily sol. H_2O , and are decomp. on boiling in conc. solution.

*NH*₄ salt: prisms from EtOH . M.p. 99°.

Na salt, $1\text{H}_2\text{O}$: sol. H_2O .

K salt: sol. in 0.8 part H_2O at 17°.

Mg salt, $4\text{H}_2\text{O}$: sol. H_2O .

Ca salt, $2\text{H}_2\text{O}$: sol. in 0.8 part H_2O at 17°.

Ba salt, $2\text{H}_2\text{O}$: sol. in 0.92 part H_2O at 17°.

Berthelot, *Bull. soc. chim.*, 1873, 19, 295.

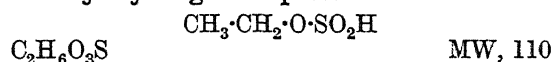
Claesson, *J. prakt. Chem.*, 1879, 19, 246.

Evans, Albertson, *J. Am. Chem. Soc.*, 1917, 39, 456.

Compagnie de Béthune, B.P., 221,512, (*Chem. Abstracts*, 1925, 19, 832).

Popelier, *Bull. soc. chim. Belg.*, 1926, 35, 264.

Hamid, Singh, Dunnicliff, *J. Chem. Soc.*, 1926, 1098.

Ethyl hydrogen sulphite

Unstable in free state. Salts unstable in solid state. Aq. sols. decomp. slowly in cold, rapidly on heating. Dil. acids \rightarrow SO_2 . Decolourises KMnO_4 .

Rosenheim, Liebknecht, *Ber.*, 1898, 31, 408.

Divers, Ogawa, *J. Chem. Soc.*, 1899, 75, 534.

Goldberg, Zimmermann, *Z. angew. Chem.*, 1902, 15, 899.

Ethyl 1-hydroxybutyl Ketone.

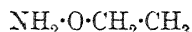
See 4-Heptanolone-3.

Ethyl 3-hydroxybutyl Ketone.

See 2-Heptanolone-5.

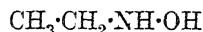
Ethyl 2-hydroxyethyl Ether.

See 2-Hydroxydiethyl Ether.

O-Ethylhydroxylamine (α -Ethylhydroxylamine, ethoxyamine) $\text{C}_2\text{H}_7\text{ON}$

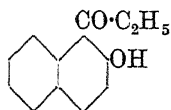
MW, 61

Inflammable liq. with strong odour. B.p. 68° . Misc. with H_2O , EtOH, Et_2O . D_{20}^{25} 0.8827. Alkaline to litmus.

 B, HCl : m.p. 128° . $B_2, \text{H}_2\text{PtCl}_6$: m.p. $174-6^\circ$ decomp.Lossen, Zanni, *Ann.*, 1876, 182, 222.Gürke, *Ann.*, 1880, 205, 274.Jones, Oesper, *J. Am. Chem. Soc.*, 1914, 36, 730.Andrews, King, Walker, *Proc. Roy. Soc.*, 1946, B133, 20.**N-Ethylhydroxylamine** (β -Ethylhydroxylamine) $\text{C}_2\text{H}_7\text{ON}$

MW, 61

Needles from ligroin. M.p. $59-60^\circ$. Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 , cold ligroin. D_4^{25} 0.9079. n_D^{25} 1.41519. Reduces Fehling's. $\text{HI} \rightarrow$ ethylamine. $\text{PhNCO} \rightarrow$ N -hydroxy- N' -ethyl- N' -phenylurea. $\text{Na}_3\text{AsO}_3 \rightarrow$ ethylamine. B, HI : m.p. 75° .

Oxalate: m.p. $95-7^\circ$.Hantzsch, Hilland, *Ber.*, 1898, 31, 2065.Pierron, *Bull. soc. chim.*, 1899, 21, 784.Jones, Oesper, *J. Am. Chem. Soc.*, 1914, 36, 729.Watt, Knowles, *J. Org. Chem.*, 1943, 8, 540.**Ethyl 2-hydroxy-1-naphthyl Ketone** (2-Hydroxy-1-propionaphthone, 1-propionyl-2-naphthol) $\text{C}_{13}\text{H}_{12}\text{O}_2$

MW, 200

Cryst. from petrol. M.p. $70-1^\circ$. Intense red-violet col. with FeCl_3 .

Gulati, Seth, Venkataraman, *J. prakt. Chem.*, 1933, 137, 47.**Ethyl 4-hydroxy-1-naphthyl Ketone** (4-Hydroxy-1-propionaphthone, 4-propionyl-1-naphthol).Cryst. from EtOH. M.p. $188-9^\circ$. Me ether : m.p. 58° . B.p. $205^\circ/15$ mm. Oxime : m.p. $172-4^\circ$. Acetyl : m.p. 92° . Semicarbazone : m.p. 223° . Picrate : orange. M.p. 158° .Desai, Hamid, *Proc. Indian Acad. Sci.*, 1941, 13A, 126.Kindler, Li, *Ber.*, 1941, 74, 321.**Ethyl 1-hydroxy-2-naphthyl Ketone** (1-Hydroxy-2-propionaphthone, 2-propionyl-1-naphthol).

Greenish-yellow plates from EtOH. M.p. 81° (85°). Triboluminescent. Alc. $\text{FeCl}_3 \rightarrow$ red-dish-brown col. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ orange-yellow col.

Me ether : $\text{C}_{14}\text{H}_{14}\text{O}_2$. MW, 214. Needles from ligroin. M.p. $42-3^\circ$. Semicarbazone : needles from EtOH. M.p. 192° . Oxime : needles from EtOH. M.p. $112-13^\circ$.

 Et ether : yellow oil. B.p. $175-80^\circ/15$ mm. Phenylhydrazone : m.p. 136° . Semicarbazone : m.p. 304° . Phenylhydrazone : m.p. 78° . p -Nitrophenylhydrazone: m.p. 232° . Picrate : m.p. 88° .Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, 43, 95.Hantzsch, *Ber.*, 1906, 39, 3096.Heilbron, Hey, Lowe, *J. Chem. Soc.*, 1934, 1314.Desai, Hamid, Shroff, *Proc. Indian Acad. Sci.*, 1941, 13A, 33.Brewster, Walters, *J. Am. Chem. Soc.*, 1942, 64, 2578.**Ethyl 6-hydroxy-2-naphthyl Ketone** (6-Hydroxy-2-propionaphthone, 6-propionyl-2-naphthol).M.p. 158° ($150-1^\circ$). Me ether : m.p. 109° . B.p. $180-5^\circ/0.3$ mm. p -Nitrophenylhydrazone: m.p. $210-11^\circ$. p -Nitrophenylhydrazone: m.p. $225-6^\circ$.Desai, Waravdekar, *Proc. Indian Acad. Sci.*, 1946, 24A, 382.Haworth, Sheldrick, *J. Chem. Soc.*, 1934, 864.**Ethyl hydroxyphenyl sulphide.**

See under Thiohydroquinone and Thioresorcinol.

Ethyl hydroxypropyl Ketone.

See Diethylketol and Hexanolone.

Ethyl hydroxytolyl Ketone.

See Hydroxymethylpropiophenone.

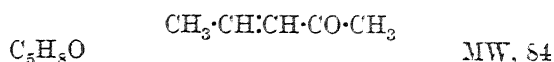
Ethyl hypochlorite $\text{C}_2\text{H}_5\text{OCl}$

MW, 80.5

Yellow liq. B.p. $36^\circ/752$ mm. Misc. with Et_2O , CHCl_3 , C_6H_6 . Explodes on heating, or in cold with Cu powder. Decomp. spontaneously, rapidly in sunlight. $\text{HCl} \rightarrow \text{C}_2\text{H}_5\text{OH} + \text{Cl}_2$.

Sandmeyer, *Ber.*, 1886, 19, 858.

Ethylideneacetone (*Methyl propenyl ketone*, 2-pentenone-4)



Colourless liq. with fruity odour, but becomes pungent on keeping. B.p. 122°. D₄²⁰ 0.861, D₄²⁵ 0.8624. n_D^{20} 1.4350.

Semicarbazone: m.p. 142°. 2 Mols. semicarbazide hydrochloride \rightarrow semicarbazone of methyl β -semicarbazidopropyl ketone, m.p. 126°.

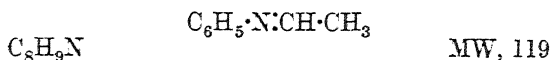
2 : 4-Dinitrophenylhydrazone : m.p. 155°.

Claisen, *Ann.*, 1899, 306, 326.

Wohl, Maag, *Ber.*, 1910, 43, 3284.

Kyriakides, *J. Am. Chem. Soc.*, 1914, 36, 534.

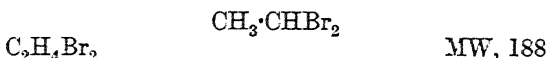
Ethylideneaniline (*Acetaldehyde anil*)



Oil. Polymerises rapidly to 1 : 3-dianilino-1-butylene. Alkalis \rightarrow aniline. Dil. acids \rightarrow acetaldehyde. HCN \rightarrow 1-anilinopropionitrile. H₂SO₃ \rightarrow 1-anilinoethane-1-sulphonic acid.

Miller, Plöchl, Eckstein, *Ber.*, 1892, 25, 2030.

Ethylidene bromide(unsym.-*Dibromoethane*, 1 : 1-dibromoethane)



B.p. 112.5°/755 mm., 109-10°/751 mm. D₁₅¹⁵ 2.10294, D₂₅²⁵ 2.08540, D₄^{17.5} 2.10006, D₄²⁰ 2.05545. n_D^{20} 1.512767. Br (\div Fe) \rightarrow 1 : 1 : 2-tribromoethane. PbO \div H₂O at 130° \rightarrow acetaldehyde. NH₃ at 140° \rightarrow 2-methyl-5-ethylpyridine.

Reboul, *Ann.*, 1870, 155, 30.

Paternó, Pisati, *Ber.*, 1872, 5, 289.

Ethylidene bromiodide.

See 1-Bromo-1-iodoethane.

2-Ethylidenebutane.

See 3-Methyl-2-pentene.

3-Ethylidenebutyric acid (γ -*Amylene- α -carboxylic acid*, 2-pentene-5-carboxylic acid, 3-hexenic acid)



Exists in two modifications.

(I) M.p. 1°. B.p. 206.5°, 106-8°/8 mm., 73°/0.5 mm. D₄^{17.2} 0.9715. $n_D^{17.2}$ 1.4413. $k = 1.91 (1.74) \times 10^{-5}$ at 25°.

(II) B.p. 111-12°/20 mm. D₄^{18.7} 0.9584. $n_D^{18.7}$ 1.4367.

KMnO₄ \rightarrow succinic and acetic acids.

Chloride: C₆H₉OCl. MW, 132.5. B.p. 48-50°/7 mm.

Anilide: m.p. 87°.

p-Toluidide: m.p. 103°.

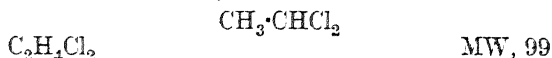
Fichter, *Ber.*, 1896, 29, 2370.

Eccott, Linstead, *J. Chem. Soc.*, 1929, 2163.

Wallach, *Ann.*, 1905, 343, 48.

v. Braun, Kirschbaum, *Ber.*, 1919, 52, 1716.

Ethylidene chloride (unsym.-*Dichloroethane*, 1 : 1-dichloroethane)



F.p. - 96.6° (- 101.5°). B.p. 57.3° (59.2°). 100 gm. H₂O dissolve 0.656 gm. at 0°, 0.595 at 10°, 0.550 at 20°, 0.540 at 30°. D₄ 1.2049, D₂₅²⁵ 1.1835, D₄²⁰ 1.1750 (1.1755), D₉²⁰ 1.1601. n_D^{15} 1.41975, n_D^{20} 1.41655 (1.41678). Heat of comb. C_r 267.4 Cal., C_p 267.1 Cal. NH₃ in EtOH at 160° \rightarrow 2-methyl-5-ethylpyridine.

Beilstein, *Ann.*, 1860, 113, 110.

D'Ans, Kautzsch, *J. prakt. Chem.*, 1909, 80, 310.

Coleman, Dow Chemical Co., U.S.P., 1,900,276, (*Chem. Abstracts*, 1933, 27, 2965).

Ethylidene chlorobromide.

See unsym.-Chlorobromoethane.

Ethylidene chloriodide.

See 1-Chloro-1-iodoethane.

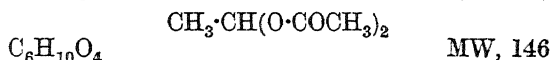
4-Ethylidenecrotonyl Alcohol.

See 2 : 4-Hexadienol-1.

Ethylidenecyclobutylisobutyric Acid.

See γ -Fencholenic Acid.

Ethylidene diacetate (1 : 1-Diacetoxyethane)



Liq. with sharp, fruity odour. B.p. 168°/740 mm., 113-15°/144 mm., 65-7°/10 mm. D₁₂¹² 1.061. KOH \rightarrow acetaldehyde.

Knoevenagel, *Ann.*, 1914, 402, 127.

Chemische Fabrik Greisheim-Elektron, D.R.P. 271,381, (*Chem. Zentr.*, 1914, I, 1316).

Consortium für Elektro-chemische Industrie Gesellschaft, B.P. 288,549, (*Chem. Abstracts*, 1929, 23, 608).

Morrison, Shaw, *Transactions of the Electrochemical Society*, 1933, 63, 23.

Walter, Deutsche Gold und Silber-Scheideanstalt vormals Roessler, D.R.P.s 556,775, 571,318, (*Chem. Abstracts*, 1933, 27, 312, 2696).

Ethylidene-diacetic Acid.

See 2-Methylglutaric Acid.

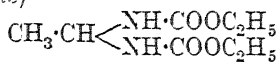
Ethylidene-dianiline.

See Diphenylethylidenediamine.

α -Ethylidenediphenylmethane.

See 1 : 1-Diphenylpropylene.

Ethylidene-diurethane (*Dicarbethoxyethylidenediamine*)

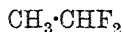


$\text{C}_8\text{H}_{16}\text{O}_4\text{N}_2$ MW, 204

Needles. M.p. 125–6°. B.p. 170–8°/20 mm. Sol. MeOH, Me₂CO, CHCl₃. Spar. sol. Et₂O, ligroin, C₆H₆.

Curtius, *Ber.*, 1912, 45, 1083.

Ethylidene fluoride (1:1-Difluoroethane)



$\text{C}_2\text{H}_4\text{F}_2$ MW, 66

B.p. –24.7°. Quite stable and practically inert chemically and physiologically.

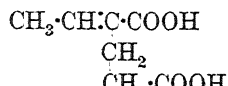
I.G., D.R.P. 641,878, (*Chem. Zentr.*, 1937, I, 3714).

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, 58, 890.

Ethylidene fluorochloride.

See unsym.-Fluorochloroethane.

1-Ethylideneglutaric Acid (γ -Amylene- α -dicarboxylic acid, 2-pentene-3:5-dicarboxylic acid)



$\text{C}_7\text{H}_{10}\text{O}_4$ MW, 158

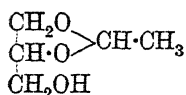
Needles from H₂O. M.p. 152°. Sol. hot H₂O, Et₂O. Spar. sol. CHCl₃, C₆H₆, CS₂, pet. ether. $k = 3.2 \times 10^{-5}$ at 25°.

Anhydride: C₇H₈O₃. MW, 140. Needles from Et₂O–pet. ether. M.p. 87°.

Fichter, *Ber.*, 1896, 29, 2369.

Fichter, Eggert, *Ber.*, 1898, 31, 1998.

1:2-Ethylideneglycerol



$\text{C}_5\text{H}_{10}\text{O}_3$ MW, 118

B.p. 68–70°/1 mm. D₄¹⁷ 1.1243. n_D¹⁷ 1.4413.

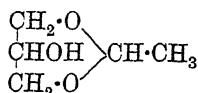
Me ether: C₆H₁₂O₃. MW, 132. B.p. 56–8°/23 mm. D₄¹⁷ 1.0224. n_D¹⁷ 1.4177.

Benzoyl: b.p. 144–5°/2 mm. D₄¹⁷ 1.1618. n_D¹⁷ 1.5145.

Hill, Hill, Hibbert, *J. Am. Chem. Soc.*, 1928, 50, 2248.

Maglio, Burger, *J. Chem. Education*, 1946, 23, 174.

1:3-Ethylideneglycerol



$\text{C}_5\text{H}_{10}\text{O}_3$ MW, 118

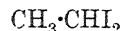
B.p. 52°/1 mm. D₄¹⁷ 1.1477. n_D¹⁷ 1.4532.

Me ether: b.p. 80°/23 mm. D₄¹⁷ 1.0705. n_D¹⁷ 1.4375.

Benzoyl: m.p. 86°.

Hill, Hill, Hibbert, *J. Am. Chem. Soc.*, 1928, 50, 2248.

Ethylidene iodide (unsym.-Di-iodoethane)



$\text{C}_2\text{H}_4\text{I}_2$ MW, 282

B.p. 177–9°. D₀ 2.84.

Gustavson, *Ber.*, 1874, 7, 731.

Spindler, *Ann.*, 1885, 231, 266.

Emschwiller, *Compt. rend.*, 1933, 196, 1028.

3-Ethylidenepentane.

See 3-Ethylpentene-2.

2-Ethylidenepropane.

See 2-Methylbutylene-2.

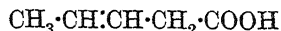
2-Ethylidenepropionaldehyde.

See 3-Pentenal.

1-Ethylidenepropionic Acid.

See Angelic Acid and Tiglic Acid.

2-Ethylidenepropionic Acid (2-Pentenic acid, 2-butylene-1-carboxylic acid, 3-methylvinyl-acetic acid, propenylacetic acid)



$\text{C}_5\text{H}_8\text{O}_2$ MW, 100

B.p. 191–2°, 93.5–95°/16 mm. D₄¹⁸ 0.9885. n_D¹⁸ 1.43569. $k = 3.35 \times 10^{-5}$ at 25°.

Me ester: C₆H₁₀O₂. MW, 114. B.p. 72–5°/87 mm., 42–3°/18 mm.

Et ester: C₇H₁₂O₂. MW, 128. B.p. 51–2°/15.5 mm.

Chloride: C₅H₇OCl. MW, 118.5. B.p. 53–4°/55 mm. D₄¹⁸ 1.0666. n_D¹⁸ 1.44990.

Amide: C₅H₉ON. MW, 99. Leaflets from C₆H₆. M.p. 69–70°.

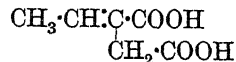
Nitrile: C₅H₇N. MW, 81. B.p. 75°/74 mm. D₄¹⁸ 0.8423. n_D¹⁸ 1.42358.

p-Bromophenacyl ester: leaflets from C₆H₆–pet. ether. M.p. 87–8°.

Auwers, Meissner, Seydel, Wissebach, *Ann.*, 1923, 432, 67.

Linstead, Noble, Boorman, *J. Chem. Soc.*, 1933, 557.

Ethylidene-succinic Acid (1-Methylitaconic acid, 2-butylene-1:2-dicarboxylic acid)



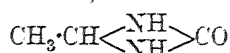
$\text{C}_6\text{H}_8\text{O}_4$ MW, 144

Prisms. M.p. 166–7°. Spar. sol. Et₂O, cold H₂O. Insol. CHCl₃. $k = 9.5 \times 10^{-5}$ at 25°. Non-volatile in steam. Na.Hg → ethylsuccinic acid.

Fittig, Fränkel, *Ann.*, 1889, 255, 36, 40.

Fichter, Pfister, *Ber.*, 1904, 37, 1998.

Ethylidene-urea (*Methylmethylenurea*, *carbonylethylidenediamine*),



$\text{C}_3\text{H}_6\text{ON}_2$ MW, 86

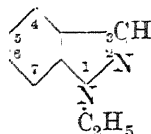
Needles. M.p. 154° . Spar. sol. H_2O , EtOH , Et_2O .

Schiff, *Ann.*, 1869, 151, 204.

4-Ethylidene-n-valeric Acid.

See 4-Heptenic Acid.

1-Ethylindazole



$\text{C}_9\text{H}_{10}\text{N}_2$ MW, 146

Oil. B.p. $233-4^\circ/727\text{ mm.}$, $126-7^\circ/21\text{ mm.}$

Picrate: yellow needles. M.p. $148-50^\circ$.

Auwers, Duesberg, *Ber.*, 1920, 53, 1200.

2-Ethylindazole.

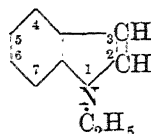
Leaflets from pet. ether. M.p. $37-9^\circ$. B.p. 268° , $140^\circ/14\text{ mm.}$ Sol. H_2O , EtOH . Spar. sol. pet. ether. Volatile in steam.

Auwers, Pfuhl, *Ber.*, 1925, 58, 1365.

Fischer, Tafel, *Ann.*, 1885, 227, 314.

Auwers, Duesberg, *Ber.*, 1920, 53, 1200.

1-Ethylindole



$\text{C}_{10}\text{H}_{11}\text{N}$ MW, 145

Oil. B.p. $252-3^\circ$. D^{15}_D 1.2563.

Picrate: red needles from ligroin. M.p. 105° .

Michaelis, Robisch, *Ber.*, 1897, 30, 2811.

2-Ethylindole.

Plates from ligroin. M.p. 43° (35°). B.p. $160-70^\circ/25\text{ mm.}$, $142-3^\circ/5\text{ mm.}$

Verley, Beduwé, *Bull. soc. chim.*, 1925, 37, 190.

I.C.I., B.P., 330,332, (*Chem. Zentr.*, 1930, II, 2055).

3-Ethylindole.

M.p. 37° (43°). B.p. $282-4^\circ/730\text{ mm.}$, $150-6^\circ/20\text{ mm.}$ Sol. EtOH , Et_2O , CHCl_3 , C_6H_6 , ligroin. Spar. sol. H_2O . Insol. dil. acids. Volatile in steam.

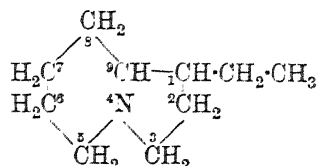
Picrate: m.p. 143° (121°).

Pictet, Duparc, *Ber.*, 1887, 20, 3417.

Korczynski, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, 56, 905.

Cornforth, Robinson, *J. Chem. Soc.*, 1942, 680.

1-Ethylindolizidine (*1-Ethyl-octahydropyrrocoline*)



$\text{C}_{10}\text{H}_{19}\text{N}$ MW, 153

B.p. $64^\circ/11\text{ mm.}$

Picrate: yellow needles from EtOH . M.p. 134° .

Picrolonate: rosettes of yellow needles. M.p. 176° .

Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1521.

2-Ethylindolizidine.

B.p. $41^\circ/1\text{ mm.}$

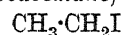
Picrate: yellow needles from EtOH . M.p. 149° .

Picrolonate: pale yellow needles. M.p. 161° slight decomp.

Methiodide: needles from Me_2CO . M.p. 232° decomp.

Clemo, Metcalfe, *J. Chem. Soc.*, 1937, 1521.

Ethyl iodide (*Iodoethane*)



$\text{C}_2\text{H}_5\text{I}$ MW, 156

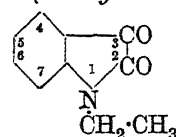
B.p. 72.3° . D^{15}_D 1.94707, D^{20}_D 1.91326. n^{15}_D 1.51682. Heat of comb. C_p 356.0 Cal., C_v 355.4 Cal. Mg in $\text{Et}_2\text{O} \rightarrow \text{C}_2\text{H}_5\text{MgI}$. Dry $\text{AgNO}_2 \rightarrow$ nitroethane + ethyl nitrite.

Adams, Voorhees, *J. Am. Chem. Soc.*, 1919, 41, 797.

Hunt, *J. Chem. Soc.*, 1920, 117, 1592.

Hirao, *J. Chem. Soc. Japan*, 1931, 52, 269.

N-Ethylisatin (*1-Ethylisatin*, *1-ethyl-ψ-isatin*)



$\text{C}_{10}\text{H}_9\text{O}_2\text{N}$ MW, 175

Red cryst. from Et_2O . M.p. 95° . Sol. EtOH , hot H_2O . Mod. sol. Et_2O . Sol. alkalis with yellow col. of Na salt of N-ethylisatinic acid. Blue col. with H_2SO_4 and crude C_6H_6 .

3-Oxime: m.p. $160-2^\circ$ with previous softening.

Stollé, Bergdoll, Luther, Auerhahn, Wacker, *J. prakt. Chem.*, 1930, 128, 21.

Geigy, D.R.P., 320,647, (*Chem. Zentr.*, 1920, IV, 223).

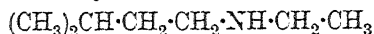
Martinet, *Ann. chim.*, 1919, 11, 101.

Michaelis, Robisch, *Ber.*, 1897, 30, 2813.

5-Ethylisatin.

Red needles. M.p. 137° .

Paucksch, *Ber.*, 1884, 17, 2806.

Ethylisoamylamine

$\text{C}_7\text{H}_{17}\text{N}$ MW, 115

B.p. 127°. Spar. sol. H_2O .

$\text{B}_2, \text{H}_2\text{PtCl}_6$: yellow needles.

Nitrosamine: b.p. 144°, 85 mm.

Mailhe, *Bull. soc. chim.*, 1919, 25, 324.

Sabatier, Mailhe, *Compt. rend.*, 1909, 148, 900.

Durand, *Bull. soc. chim.*, 1897, 17, 405.

Ethyl isoamylaminoformate.

See Isoamylurethane.

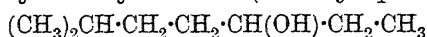
Ethylisoamylaniline

$\text{C}_{13}\text{H}_{21}\text{N}$ MW, 191

Oil. B.p. 262°.

Picrate: yellow prisms. M.p. 103–4°.

Hofmann, *Ann.*, 1850, 74, 156.

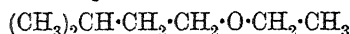
Ethylisoamylcarbinol (2-Methylheptanol-5)

$\text{C}_8\text{H}_{18}\text{O}$ MW, 130

Oil. B.p. 165–6°. n_D 1.42011.

Acetyl: b.p. 184–5°. D_{20}^{20} 0.8554. n_D 1.41602.

Buelens, *Rec. trav. chim.*, 1909, 28, 114.

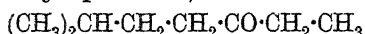
Ethyl isoamyl Ether

$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 112°. D_{15}^{15} 0.764. D_{15}^{25} 0.7695. P_2O_5

→ 90% trimethylethylene + 10% isopropylethylene.

Peter, *Ber.*, 1899, 32, 1419.

Ethyl isoamyl Ketone (3-Keto-6-methylheptane, 2-methylheptanone-5)

$\text{C}_8\text{H}_{16}\text{O}$ MW, 128

Liq. with pleasant odour resembling camphor.

B.p. 163–163.5°/734.2 mm. D_{20}^{20} 0.8304. n_D 1.42087.

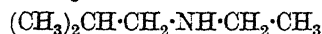
Semicarbazone: cryst. from hot ligroin. M.p. 132–3°.

Ponzio, de Gaspari, *Gazz. chim. ital.*, 1898, 28, 275.

Bouveault, Locquin, *Bull. soc. chim.*, 1904, 31, 1158.

2-Ethylisobutane.

See 2:2-Dimethylbutane.

Ethylisobutylamine

$\text{C}_6\text{H}_{15}\text{N}$ MW, 101

B.p. 98°.

B, HCl : m.p. 209° decomp. Sol. H_2O , EtOH , CHCl_3 . Insol. Et_2O .

$\text{B}_2, \text{H}_2\text{PtCl}_6$: reddish-yellow cryst. M.p. 201° decomp. Sol. H_2O . Insol. Et_2O . D_{15}^{15} 1.804.

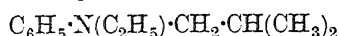
Nitrosamine: b.p. 193°.

Marckwald, v. Droste-Huelshoff, *Ber.*, 1899, 32, 562.

Le Bel, *Compt. rend.*, 1897, 125, 351.

Ethyl isobutylaminoformate.

See Isobutylurethane.

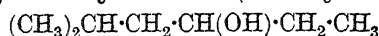
Ethylisobutylaniline

$\text{C}_{12}\text{H}_{19}\text{N}$ MW, 177

Oil. B.p. 228–31°/770 mm.

Picrate: m.p. 91–2°.

Fröhlich, *Ber.*, 1909, 42, 1562.

Ethylisobutylcarbinol (2-Methylhexanol-4)

$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

B.p. 147–8°/756.5 mm.

Wagner, *Bull. soc. chim.*, 1884, 42, 330.

Ethyl isobutyl Ether

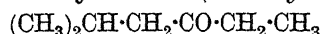
$\text{C}_6\text{H}_{14}\text{O}$ MW, 102

B.p. 81.1°. D_4^{25} 0.7323. n_D^{25} 1.3739.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, 54, 2097.

Lippert, *Ann.*, 1893, 276, 160.

Marks, Lipkin, Bettman, *J. Am. Chem. Soc.*, 1937, 59, 946.

Ethyl isobutyl Ketone (2-Methylhexanone-4)

$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Liq. with peppermint-like odour. B.p. 134.5–135°/735 mm. D_4^{20} 0.829, D_4^{17} 0.815.

Oxime: m.p. 129°.

Semicarbazone: m.p. 152° (150°).

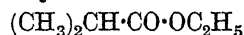
2:4-Dinitrophenylhydrazones: m.p. 75°.

Mailhe, *Compt. rend.*, 1913, 157, 221.

Fournier, *Bull. soc. chim.*, 1910, 7, 839.

Wagner, *J. prakt. Chem.*, 1891, 44, 274.

Douris, *Compt. rend.*, 1913, 157, 55.

Ethyl isobutyrate

$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

B.p. 110°. D_4^{20} 0.89060, D_4^{20} 0.86930, D_4^{20} 0.84760.

Pribram, Handl, *Monatsh.*, 1881, 2, 684.

Sabatier, Mailhe, *Compt. rend.*, 1911, 152, 1046.

Ethyl isocyanate

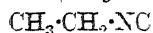
$\text{C}_3\text{H}_5\text{ON}$

MW, 71

Pungent smelling liq. B.p. 60°. Heat of comb. C_p 424.4 Cal., C_v 424.2 Cal. At 100° polymerises \rightarrow cryst., m.p. 95°, probably triethylisocyanuric acid. $H - Ni$ at 180-90° \rightarrow mainly methylethylamine.

Wurtz, *Ann. chim. phys.*, 1854, 42, 43.
Gattermann, *Ann.*, 1888, 244, 36.

Ethyl isocyanide (Ethylcarbylamine)



C_3H_5N MW, 55

B.p. 79° (75-8°). D_4^{20} 0.7591, D_4^{25} 0.74421. Heat of comb. C_p 480 Cal. Spar. sol. H_2O . Polymerises on heating to 100-60°. $H + Ni$ at 160-70° \rightarrow mainly methylethylamine.

Hofmann, *Ann.*, 1868, 146, 109.

Gautier, *Ann. chim. phys.*, 1869, 17, 203, 233.

Guillemand, *Ann. chim. phys.*, 1908, 14, 363.

Ethyl isonitrosoacetoacetate.

See under Diketobutyric Acid.

Ethylisopropylamine



$C_5H_{13}N$ MW, 87

B.p. 76°. Misc. with H_2O , EtOH.

B_2, H_2PtCl_6 : reddish-yellow cryst. from H_2O .

M.p. 180°. D_4^{15} 1.885.

Nitrosamine: b.p. 70°, 11 mm.

Brill, *J. Am. Chem. Soc.*, 1932, 54, 2486.

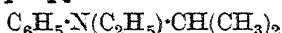
Schuftan, *Ber.*, 1894, 27, 1010.

Mulder, *Rec. trav. chim.*, 1906, 25, 105.

Ethyl isopropylaminoformate.

See Isopropylurethane.

Ethylisopropylaniline



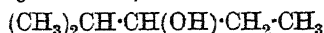
$C_{11}H_{17}N$ MW, 163

Oil. B.p. 214-15° (220° approx.).

B_2, H_2PtCl_6 : m.p. 199°.

v. Braun, *Ber.*, 1900, 33, 2732.

Ethylisopropylcarbinol (2-Methylpentanol-3, 3-hydroxyisohexane)



$C_6H_{14}O$ MW, 102

B.p. 129-30°. D_4^{20} 0.8243. n_D^{20} 1.4175.

Phenylurethane: b.p. 175°/12 mm.

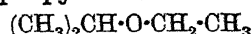
3-Nitrophthalate: m.p. 150-1°.

Hopff, *Ber.*, 1931, 64, 2745.

Sabatier, Senderens, *Compt. rend.*, 1903, 137, 302.

Pukirev, *Chem. Abstracts*, 1943, 37, 4686.

Ethyl isopropyl Ether



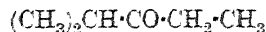
$C_5H_{12}O$ MW, 88

B.p. 53-4°. D_4^{20} 0.720.

Norris, Rigby, *J. Am. Chem. Soc.*, 1932, 54, 2097.

Lippert, *Ann.*, 1893, 276, 158.

Ethyl isopropyl Ketone (2-Methylpentanone-3)



$C_6H_{12}O$ MW, 100

B.p. 115-16° (114.5-115°). D_4^{20} 0.830, D_4^{25} 0.814. Does not form bisulphite comp.

Oxime: b.p. 73-5°/11 mm.

Semicarbazone: m.p. 95° (80°).

2:4-Dinitrophenylhydrazones: yellow or red cryst. M.p. 111-13° (168-9°).

Hopff, *Ber.*, 1931, 64, 2744.

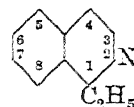
Fournier, *Bull. soc. chim.*, 1910, 7, 840.

Wagner, *J. prakt. Chem.*, 1891, 44, 257.

Ethylisopropylphenanthrene.

See Homoretene.

1-Ethylisoquinoline



$C_{11}H_{11}N$ MW, 157

Light yellow oil. B.p. 250°. Sol. EtOH, Et_2O . Insol. H_2O .

Picrate: m.p. 207-10°.

$B, H, AuCl_4$: m.p. 168-72°.

Chloroplatinate: m.p. 199-200°.

Bergstrom, McAllister, *J. Am. Chem. Soc.*, 1930, 52, 2848.

Späth, Berger, Kuntara, *Ber.*, 1930, 63, 137.

3-Ethylisoquinoline.

B.p. 255-6°/752 mm.

Picrate: yellow plates from EtOH. M.p. 171-2°.

$B, H, AuCl_4$: yellow needles. M.p. 115-17°.

B_2, H_2PtCl_6 : needles. M.p. 180° decomp.

Damerow, *Ber.*, 1894, 27, 2237.

4-Ethylisoquinoline.

M.p. 63.5-65°. B.p. 274-5°.

Gabriel, *Ber.*, 1887, 20, 1207.

Ethyl isothiocyanate



C_3H_5NS MW, 87

Pungent smelling liq. M.p. -5.9°. B.p. 131-2°. D_4^{20} 1.0192, D_4^{25} 1.0030. n_D^{20} 1.5142. Insol. H_2O . Heat of comb. C_p 604.1 Cal., C_v 602.8 Cal.

Berthelot, *Compt. rend.*, 1900, 130, 445.

Kaluza, *Monatsh.*, 1912, 33, 366.

Anschütz, *Ann.*, 1909, 371, 217.

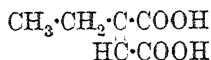
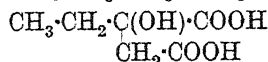
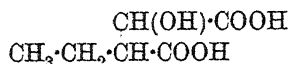
Hofmann, *Ber.*, 1869, 2, 452.

Ethylitaconic Acid.

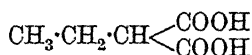
See Propylidenesuccinic Acid.

Ethyl-lutidine.

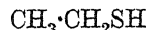
See Dimethylethylpyridine.

Ethylmaleic Acid (1-Butylene-1 : 2-dicarboxylic acid, methylcitraconic acid) $\text{C}_6\text{H}_8\text{O}_4$ MW, 144Prisms from H_2O or CHCl_3 . M.p. 100–1°. Sol. H_2O , Et_2O , warm CHCl_3 . Spar. sol. C_6H_6 . Insol. ligroin. Volatile in steam. $k = 2.38 \times 10^{-3}$ at 25°.Anhydride: $\text{C}_6\text{H}_6\text{O}_3$. MW, 126. B.p. 142°/66 mm.Fittig, Fränkel, *Ann.*, 1889, 255, 33.Bischoff, *Ber.*, 1890, 23, 1936.**1-Ethylmalic Acid** (2-Hydroxybutane-1 : 2-dicarboxylic acid, 1-hydroxy-1-ethylsuccinic acid) $\text{C}_6\text{H}_{10}\text{O}_5$ MW, 162Prisms from Et_2O . M.p. 131–3°.Semenow, *Chem. Zentr.*, 1899, I, 1205.**2-Ethylmalic Acid** (1-Hydroxybutane-1 : 2-dicarboxylic acid, 2-hydroxy-1-ethylsuccinic acid) $\text{C}_6\text{H}_{10}\text{O}_5$ MW, 162

Exists in three forms.

(I) Cryst. from Et_2O – C_6H_6 . M.p. 108°. Sol. H_2O , EtOH , Et_2O , Me_2CO , AcOEt .Monoamide: $\text{C}_6\text{H}_{11}\text{O}_4\text{N}$. MW, 161. M.p. 158–9°.(II) Prisms from Et_2O –pet. ether. M.p. 133–4°. Dist. → ethylmaleic, ethylfumaric, and ethylenesuccinic acids.Et ester: $\text{C}_8\text{H}_{14}\text{O}_5$. MW, 190. B.p. 133–5°.(III) M.p. 86–7°. Sol. H_2O , EtOH , Et_2O , CHCl_3 , C_6H_6 , pet. ether. Dist. → ethylmaleic acid.Lutz, *Ber.*, 1902, 35, 4372.Fichter, Goldhaber, *Ber.*, 1904, 37, 2382.Doebner, Segelitz, *Ber.*, 1905, 38, 2735.**Ethylmalonic Acid** (Propane-1 : 1-dicarboxylic acid) $\text{C}_5\text{H}_8\text{O}_4$ MW, 132Prisms + H_2O from H_2O . M.p. anhyd. 111.5°. Sol. EtOH , Et_2O . k (first) = 1.27×10^{-3} at 25°; (second) = 0.54×10^{-6} . At 160° → butyric acid.Di-Me ester: $\text{C}_7\text{H}_{12}\text{O}_4$. MW, 160. B.p. 178–9°. D_4^{15} 1.104.Di-Et ester: $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 207–9°/755 mm., 92°/10 mm., 77°/5 mm. D_{15}^{15} 1.008.Dichloride: $\text{C}_5\text{H}_6\text{O}_2\text{Cl}_2$. MW, 169. B.p. 76–82°/35 mm.

Mononitrile: see 1-Cyanobutyric Acid.

Dinitrile: 1 : 1-dicyanopropane. $\text{C}_5\text{H}_6\text{N}_2$. MW, 94. B.p. 206°/756 mm., 90–1°/20 mm. D_{11}^{11} 0.9515. Sol. EtOH , Et_2O , CHCl_3 . Spar. sol. H_2O .Diamide: $\text{C}_5\text{H}_{10}\text{O}_2\text{N}_2$. MW, 130. Cryst. from H_2O or EtOH . M.p. 216° (212°). Spar. sol. H_2O , MeOH , EtOH . Insol. Et_2O , CHCl_3 .Dihydrazide: needles from EtOH . M.p. 168°.Michael, *J. prakt. Chem.*, 1905, 72, 539, 550.Markownikoff, *Ann.*, 1876, 182, 329.Wislicenus, Urech, *Ann.*, 1873, 165, 93.Conrad, *Ann.*, 1880, 204, 134.Galimberti, Ponzini, *Gazz. chim. ital.*, 1942, 72, 125.Wallingford, Homeyer, Jones, *J. Am. Chem. Soc.*, 1941, 63, 2056.**Ethyl Mercaptan** (Mercaptoethane, thioethyl alcohol) $\text{C}_2\text{H}_6\text{S}$ MW, 62Liq. with leek-like odour. M.p. –144.4°. B.p. 37°. D_4^{25} 0.86174, D_4^{25} 0.83147. n_D^{25} 1.4351. Very spar. sol. H_2O . Sol. alkalis. Dil. HNO_3 → diethyl disulphoxide. Conc. HNO_3 → ethane-sulphonic acid.Sabatier, Mailhe, *Compt. rend.*, 1910, 150, 1219.Klason, *Ber.*, 1887, 20, 3411.**Ethylmesaconic Acid.**

See Propylfumaric Acid.

Ethyl-γ-methylallylcarbinol.

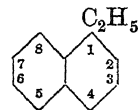
See 3-Methyl-1-hexenol-4.

Ethyl methylaminoformate.

See Methylurethane.

5-Ethyl-5(1-methyl-α-butenyl)-barbituric Acid.

See Delvinal.

1-Ethynaphthalene (α-Ethynaphthalene, 1-naphthylethane) $\text{C}_{12}\text{H}_{12}$ MW, 156M.p. 15°. B.p. 251–2° (256.5°/756 mm.), 112–16°/8 mm., 100°/2–3 mm. D_4^{15} 1.0221, D_4^{15} 1.0111. n_D^{15} 1.6089.

Picrate: m.p. 98–5°.

Fröschl, Harlass, *Monatsh.*, 1932, 59, 280.Lévy, *Compt. rend.*, 1931, 193, 174.Clemmensen, *Ber.*, 1913, 46, 1840.Darzens, Rost, *Compt. rend.*, 1908, 146, 933.

2-Ethyl-naphthalene (*β*-Ethyl-naphthalene, 2-naphthylethane).

M.p. -7.5° . B.p. 252° , $117-18^{\circ}$ /10 mm. D. 1.0069, D₄²⁰ 0.9955. n_D^{20} 1.6028.

Picrate: m.p. $76-7^{\circ}$ ($72-3^{\circ}$).

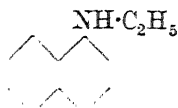
Lévy, *Compt. rend.*, 1931, **192**, 1397.

Barbot, *Bull. soc. chim.*, 1930, **47**, 1314.

Marchetti, *Gazz. chim. ital.*, 1881, **11**, 439.

Darzens, Rost, *Compt. rend.*, 1908, **146**, 934.

N-Ethyl-1-naphthylamine (*Ethyl-α-naphthylamine*)



$C_{12}H_{13}N$

MW, 171

B.p. 303° , 722.5 mm., 191° /16 mm.

B.HCl: m.p. 193° .

Knoevenagel, Dieterich, *J. prakt. Chem.*, 1914, **89**, 34.

Morgan, Micklethwait, *J. Chem. Soc.*, 1907, **91**, 1516.

N-Ethyl-2-naphthylamine (*Ethyl-β-naphthylamine*)



$C_{12}H_{13}N$

MW, 171

B.p. $316-17^{\circ}$, 191° /25 mm., 167° /10-12 mm.

B.HCl: plates. M.p. 238° (235°).

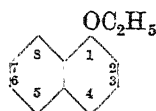
Meisenheimer, *Ann.*, 1911, **385**, 128.

Reychler, *Bull. soc. chim.*, 1902, **27**, 882.

Bischoff, Hausdörfer, *Ber.*, 1892, **25**, 2312.

Fischer, *Ber.*, 1893, **26**, 193.

Ethyl 1-naphthyl Ether (*α-Naphthol ethyl ether*)



$C_{12}H_{12}O$

MW, 172

M.p. 5.5° . B.p. 276.4° (280°), $186-7^{\circ}$ /66 mm. $152-4^{\circ}$ /18 mm., $106-106.5^{\circ}$ /2 mm. D⁴ 1.0711. n_D^{20} 1.59509.

$C_{12}H_{12}O, C_6H_3(NO_2)_3-1:3:5$: yellow needles. M.p. 125.5° .

Picrate: m.p. $118.5-119^{\circ}$.

Kamm, McClugage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1245.

Witt, Schneider, *Ber.*, 1901, **34**, 3172.

Schaeffer, *Ann.*, 1869, **152**, 286.

Ethyl 2-naphthyl Ether (*Nerolin II, Bromelia*).

Plates. M.p. 37.5° . B.p. 282° ($274-5^{\circ}$). D₄²⁰ 1.0640. Sol. EtOH, Et₂O, pet. ether, CS₂, toluene. Insol. H₂O. Used in perfumery.

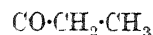
$C_{12}H_{12}O, C_6H_3(NO_2)_3-1:3:5$: yellow needles. M.p. 95° .

Picrate: m.p. $101-1.5^{\circ}$.

Davis, *J. Chem. Soc.*, 1900, **77**, 35.

Schaeffer, *Ann.*, 1869, **152**, 287.

Ethyl 1-naphthyl Ketone (*α-Propionaphthone, 1-propionyl-naphthalene, ethyl α-naphthyl ketone*)



$C_{13}H_{12}O$

MW, 184

B.p. $305-7^{\circ}$, $166-8^{\circ}$ /8 mm., $144-6^{\circ}$ /1 mm. D 1.1082, D₄²⁰ 1.0971. n_D^{20} 1.6108, n_D^{25} 1.606. Sol. EtOH, Et₂O, CS₂. Spar. sol. pet. ether. HNO₃ → 1-naphthoic acid.

Oxime: cryst. from ligroin. M.p. $57-8^{\circ}$.

Picrate: needles from EtOH. M.p. $77-8^{\circ}$.

Caille, *Compt. rend.*, 1911, **153**, 393.

Rousset, *Bull. soc. chim.*, 1896, **15**, 62.

Kloetzel, Wildman, *J. Org. Chem.*, 1946, **11**, 390.

Nunn, Henze, *J. Org. Chem.*, 1947, **12**, 540.

Ethyl 2-naphthyl Ketone (*β-Propionaphthone, 2-propionyl-naphthalene, ethyl β-naphthyl ketone*).

M.p. 60° . B.p. $312-14^{\circ}$, $181-3^{\circ}$ /18 mm. Sol. EtOH, CHCl₃. Spar. sol. H₂O, pet. ether. HNO₃ → 2-naphthoic acid.

Oxime: needles from EtOH.Aq. M.p. 133° .

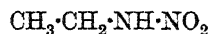
Semicarbazone: silky needles. M.p. 202° .

Barbot, *Bull. soc. chim.*, 1930, **47**, 1319.

Rousset, *Bull. soc. chim.*, 1896, **15**, 62; 1897, **17**, 313.

Buu-Hoi, Cagniant, *Bull. soc. chim.*, 1945, **12**, 307.

Ethyl-nitramine (*N-Nitroethylamine*)



$C_2H_5O_2N_2$

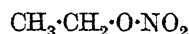
MW, 90

F.p. 6° . D₄¹⁵ 1.1675. Heat of comb. C₂ 372.82 Cal. Acid reaction. Forms salts. 40% H₂SO₄ → ethylene + N₂O.

Franchimont, Klobbie, *Rec. trav. chim.*, 1888, **7**, 356.

Umbgrove, Franchimont, *Rec. trav. chim.*, 1897, **16**, 388.

Ethyl nitrate



$C_2H_5O_3N$

MW, 91

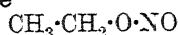
M.p. -112° . B.p. $87.5-87.7^{\circ}$. D₄¹ 1.1305, D₄²⁰ 1.106, D₄²⁵ 1.1004. Heat of comb. C₂ 324.04 Cal. Sol. H₂O. Sn + HCl → hydr.

oxylamine + a base $C_4H_{11}ON$. $H_2S + NH_3 \rightarrow C_2H_5 \cdot SH$.

Millon, *Ann.*, 1843, 47, 373.

Biron, *Chem. Zentr.*, 1901, I, 366.

Ethyl nitrite



$C_2H_5O_2N$ MW, 75

B.p. 17° . D_{15}^{25} 0.900. Heat of comb. C_p 334.21 Cal.

Thiele, Eichwede, *Ann.*, 1900, 311, 366.

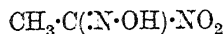
Wallach, Otto, *Ann.*, 1889, 253, 251.

Feldhaus, *Ann.*, 1863, 126, 73.

Chrétien, Longi, *Compt. rend.*, 1943, 217, 504.

Adickes, *J. prakt. Chem.*, 1943, 161, 271.

Ethyl nitrolic Acid (*Acetonitrolic acid, nitro-isonitroso-ethane*)



$C_2H_4O_3N_2$ MW, 104

Cryst. from H_2O or Et_2O . M.p. $87-8^\circ$. Sol. most org. solvents. Reacts acid to litmus. $Sn + HCl \rightarrow$ hydroxylamine + $CH_3 \cdot COOH$. Forms three series of salts: red, yellow and colourless.

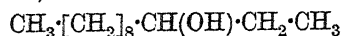
Steinkopf, Jürgens, *J. prakt. Chem.*, 1911, 84, 711.

Behrend, Tryller, *Ann.*, 1894, 283, 239.

Meyer, Constam, *Ann.*, 1882, 214, 329.

Wieland, *Ann.*, 1907, 353, 82.

Ethyl nonylcarbinol (*Dodecanol-3, 3-hydroxydodecane*)



$C_{12}H_{26}O$ MW, 186

l.

M.p. 25° . B.p. $130^\circ/15$ mm. D_{15}^{25} 0.8223. $[\alpha]_D^{25} -6.10^\circ$ in EtOH. Volatile in steam.

Acid phthalate: needles. M.p. 25° . $[\alpha]_D^{20} -15.60^\circ$ in EtOH.

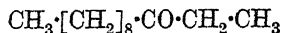
dl.

M.p. 12° . B.p. $133^\circ/14$ mm.

Acid phthalate: m.p. $31-2^\circ$.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1947.

Ethyl nonyl Ketone (*Dodecanone-3, 3-ketodecane*)



$C_{12}H_{24}O$ MW, 184

M.p. 19° . B.p. $134^\circ/18$ mm.

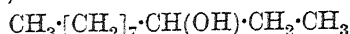
Semicarbazone: cryst. from EtOH.Aq. M.p. 89° .

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936.

Ethyl octahydropyrrocoline.

See Ethylindolizidine.

Ethyl octylcarbinol (*Undecanol-3, 3-hydroxyundecane*)



$C_{11}H_{24}O$ MW, 172

l.

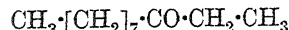
Needles. M.p. 17° . B.p. 117° . D_{15}^{25} 0.8295. n_D^{20} 1.4367. $[\alpha]_D^{20} -6.22^\circ$ in EtOH. Volatile in steam.

dl.

B.p. 229° .

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1946.

Ethyl octyl Ketone (*Undecanone-3, 3-ketoundecane*)



$C_{11}H_{22}O$ MW, 170

B.p. 227° , $104-6^\circ/11$ mm.

Semicarbazone: cryst. from EtOH.Aq. M.p. 90° .

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1946.

Ethyl oxamic Acid



$C_4H_7O_3N$ MW, 117

M.p. 120° . Sol. H_2O , EtOH, Et_2O . Sublimes.

Et ester: $C_6H_{11}O_3N$. MW, 145. B.p. $244-6^\circ$. Misc. with H_2O , EtOH, Et_2O , $CHCl_3$.

Amide: $C_4H_8O_2N_2$. MW, 116. Needles from H_2O . M.p. about $202-3^\circ$. Sol. Et_2O , hot H_2O , hot EtOH.

Baum, D.R.P., 77,597.

Heintz, *Ann.*, 1863, 127, 48.

Wurtz, *Ann. chim.*, 1850, 30, 490.

Ethyl pentadecylcarbinol (*Octadecanol-3, 3-hydroxyoctadecane*)



$C_{18}H_{38}O$ MW, 270

l.

Prisms from EtOH. M.p. 56° . B.p. $172^\circ/2$ mm. D_{15}^{25} 0.8011. $[\alpha]_D^{20} -4.78^\circ$ in EtOH.

Acid phthalate: m.p. $32-3^\circ$. $[\alpha]_D^{20} -15.62^\circ$ in EtOH.

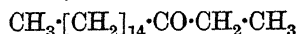
dl.

M.p. 43° . B.p. $202^\circ/13$ mm.

Acid phthalate: m.p. $39-41^\circ$.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1953.

Ethyl pentadecyl Ketone (*Octadecanone-3, 3-keto-octadecane*)



$C_{18}H_{36}O$ MW, 268

Prisms from EtOH- Et_2O . M.p. 53° (50°). B.p. $198^\circ/14$ mm. ($197.5^\circ/11$ mm.).

Oxime: two forms, m.p.s 44° and 58-9°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 76°.

Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1936, 1953.

Bertrand, *Bull. soc. chim.*, 1896, 15, 765.

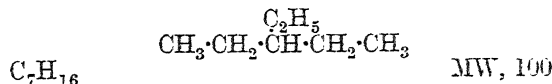
1 - Ethyl - 4 - pentadecyltetramethylene Glycol.

See Heneicosandiol-3: 6.

1-Ethylpentamethylene Glycol.

See Heptandiol-1: 5.

3-Ethylpentane (Triethylmethane)



B.p. 93-3°. D_4^{20} 0.6984. n_D^{20} 1.39366.

Böeseke, Wildschut, *Rec. trav. chim.*, 1932, 51, 168.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, 51, 1483.

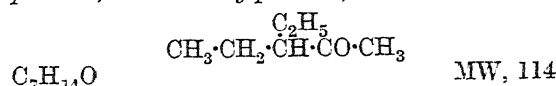
3-Ethylpentanol-2.

See 1:1-Diethylisopropyl Alcohol.

3-Ethylpentanol-3.

See Triethylcarbinol.

3-Ethylpentanone-2 (Diethylacetone, 3-acetopentane, 2-keto-3-ethylpentane)



B.p. 138-40°, 38-42°/19 mm.

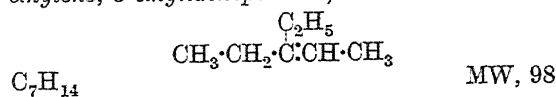
Oxime: b.p. 186-188.5°/712 mm.

Semicarbazone: m.p. 99°.

Bardan, *Bull. soc. chim.*, 1931, 49, 1876.

Frankland, Duppa, *Ann.*, 1866, 138, 212.

3-Ethylpentene-2 (1-Methyl-2:2-diethyl-ethylene, 3-ethylidenepentane)



B.p. 96°/764 mm. $D_4^{24.5}$ 0.7191. n_D^{20} 1.4139.

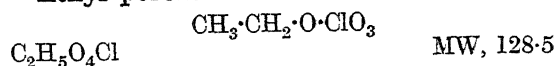
Nitrosylchloride: m.p. 86° (74°).

Böeseke, Wildschut, *Rec. trav. chim.*, 1932, 51, 169.

Edgar, Calingaert, Marker, *J. Am. Chem. Soc.*, 1929, 51, 1486.

Saizew, *J. prakt. Chem.*, 1898, 57, 38.

Ethyl perchlorate



Oil. Decomp. readily with explosion in dry state. Distilled under layer of H_2O , b.p. 74° (89°).

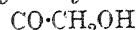
Roscoe, *Ann.*, 1862, 124, 124.

Meyer, Spormann, *Z. anorg. allgem. Chem.*, 1936, 228, 341.

Ethyl peroxide.

See Diethyl peroxide.

4-Ethylphenacyl Alcohol (4-Ethylbenzoyl-carbinol, ω -hydroxy-4-ethylacetophenone;



$\text{C}_{10}\text{H}_{12}\text{O}_2$ MW, 164

Yellow plates from pet. ether. M.p. 67-8°.

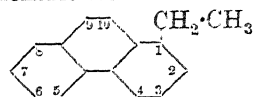
Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. pet. ether.

Acetyl: prisms from ligroin or MeOH. M.p. 61-2°.

Semicarbazone: plates from MeOH. M.p. 161°.

Auwers, *Ber.*, 1906, 39, 3759.

1-Ethylphenanthrene



$\text{C}_{16}\text{H}_{14}$ MW, 206

Prisms from EtOH. M.p. 62-5°.

Picrate: orange prisms from EtOH. M.p. 108-9°.

Styphnate: yellow needles from EtOH. M.p. 144°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 460.

2-Ethylphenanthrene.

Leaflets from MeOH. M.p. 67-8° (64-5°).

Picrate: yellow needles from EtOH. M.p. 95.5-96° (92-3°).

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, 55, 3447.

Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

3-Ethylphenanthrene.

Liq.

Picrate: orange-red needles from EtOH. M.p. 121.5-122°.

Styphnate: orange prisms from MeOH. M.p. 114-16°.

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, 55, 3447.

Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

9-Ethylphenanthrene.

Needles from C_6H_6 -pet. ether. M.p. 62.5-63° (66°). B.p. 198-200°/11 mm.

Picrate: orange-red prisms from EtOH. M.p. 123-4°.

Mosettig, van de Kamp, *J. Am. Chem. Soc.*, 1933, 55, 3447.

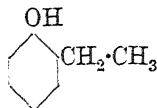
Bradsher, Amore, *J. Am. Chem. Soc.*, 1941, 63, 493.

N-Ethylphenetidine.

See under Ethylaminophenol.

Ethylphenetole.

See under Ethylphenol.

o-Ethylphenol (2-Hydroxy-1-ethylbenzene, phlorol) $C_8H_{10}O$

MW, 122

B.p. 206.5–207.5°. Sol. EtOH, AcOH, C_6H_6 . Very spar. sol. H_2O . $FeCl_3 \rightarrow$ blue col.*Me ether*: o-ethylanisole, 2-methoxy-1-ethylbenzene. $C_9H_{12}O$. MW, 136. B.p. 186–8°/755 mm., 70–71°/11 mm. D_4^{20} 0.9636. n_D^{20} 1.512.*Et ether*: o-ethylphenetole, 2-ethoxy-1-ethylbenzene. $C_{10}H_{14}O$. MW, 150. B.p. 189–92°.Beilstein, Kuhlberg, *Ann.*, 1870, 156, 211.Sempotowski, *Ber.*, 1889, 22, 2672.Marschalk, *Ber.*, 1910, 43, 1699.Klages, Eppelsheim, *Ber.*, 1903, 36, 3591.**m-Ethylphenol** (3-Hydroxy-1-ethylbenzene).M.p. –4°. B.p. 214°/752 mm. D^0 1.0250. $FeCl_3 \rightarrow$ violet col.*Me ether*: m-ethylanisole, 3-methoxy-1-ethylbenzene. B.p. 196–7°/758 mm., 77–8°/12 mm. D_4^{20} 0.95746. n_D^{20} 1.5102.*Acetyl*: b.p. 222–3°. D^0 1.0403.*p-Nitrobenzoyl*: m.p. 68°.Sempotowski, *Ber.*, 1889, 22, 2674.Béhal, Choay, *Bull. soc. chim.*, 1894, 11, 211.Klages, Eppelsheim, *Ber.*, 1903, 36, 3592.Kenner, Statham, Jones, *J. Chem. Soc.*, 1935, 299.**p-Ethylphenol** (4-Hydroxy-1-ethylbenzene).Needles. M.p. 47–8° (45–6°). B.p. 218.5–219.5°. Sol. EtOH, Et_2O , C_6H_6 , CS_2 . $FeCl_3 \rightarrow$ deep blue col. *Acetyl* deriv. by Fries rearrangement \rightarrow 2-hydroxy-5-ethylacetophenone.*Me ether*: p-ethylanisole, 4-methoxy-1-ethylbenzene. B.p. 195–6°, 83–4°/16 mm., 75°/10 mm. D_4^{15} 0.9624. n_D^{15} 1.5094.*Et ether*: p-ethylphenetole, 4-ethoxy-1-ethylbenzene. B.p. 211°, 92–3°/12 mm. D_4^{17} 0.9385.*Acetyl*: b.p. 226–7°/750 mm.Zincke, *Ann.*, 1902, 322, 187 (Footnote).Clemmensen, *Ber.*, 1914, 47, 53.Johnson, Hodge, *J. Am. Chem. Soc.*, 1913, 35, 1018.Baranger, *Bull. soc. chim.*, 1931, 49, 1216.Klages, Eppelsheim, *Ber.*, 1903, 36, 3593.Schering, B.P., 274,439, (*Chem. Zentr.*, 1929, II, 96).**1-Ethyl-2-phenylacetylene.**

See 1-Phenyl-1-butyne.

Ethylphenylbarbituric Acid.

See Luminal.

Ethylphenylcarbinol (α -Hydroxypropylbenzene, ω -ethylbenzyl alcohol, 1-phenylpropyl alcohol)
 $C_6H_5 \cdot CH(OH) \cdot CH_2 \cdot CH_3$ $C_9H_{12}O$

MW, 136

dl-.

B.p. 217–21°, 106–8°/18 mm., 105–8°/10 mm. D_4^{20} 1.016, D_4^{20} 0.994. n_D^{20} 1.5208. *p*-Nitrobenzoyl chloride \rightarrow mainly 1-chloro-1-phenylpropane.*Acetyl*: b.p. 227–8°.*p-Nitrobenzoyl*: m.p. 59–60°.

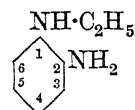
d-.

 $[\alpha]_D^{25} \div 55.54^\circ$.

l-.

B.p. 94–5°/10 mm. $[\alpha]_D^{25} -22.2^\circ$.Davies, Kipping, *J. Chem. Soc.*, 1911, 99, 298.Tschelinzeff, *Ber.*, 1904, 37, 4539.Klages, *Ber.*, 1902, 35, 2251.Whelan, Welcher, *Proc. Indian Acad. Sci.*, 1943, 53, 134. **α -Ethyl- β -phenylcinnamic Acid.**

See 1:1-Diphenyl-1-butylene-2-carboxylic Acid.

Ethyl-o-phenylenediamine (o-Amino-ethyl aniline, 1-ethylamino-2-aminobenzene) $C_8H_{12}N_2$

MW, 136

Oil. (M.p. 157–8° decomp.). B.p. 248–9°, 121–3°/10 mm.

Hempel, *J. prakt. Chem.*, 1890, 41, 164; 1889, 39, 199.Weidenhagen *et al.*, *Ber.*, 1942, 75, 1936.**Ethyl-m-phenylenediamine** (m-Amino-ethyl aniline, 1-ethylamino-3-aminobenzene).

B.p. 276°.

Nölting, Stricker, *Ber.*, 1886, 19, 547.

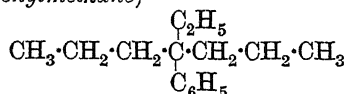
Badische, D.R.P., 76,419.

Ethyl-p-phenylenediamine (p-Amino-ethyl aniline, 1-ethylamino-4-aminobenzene).B.p. 270°, 261–2°/746 mm. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O .Fischer, Hepp, *Ber.*, 1886, 19, 2994.Schweitzer, *Ber.*, 1886, 19, 149.

Oehler, D.R.P., 12,932.

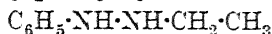
Ethyl phenyl Ether.

See Phenetole.

4-Ethyl-4-phenylheptane (3-Propyl-3-phenylhexane, ω -ethylidipropyltoluene, ethyldipropylphenylmethane) $C_{15}H_{24}$

MW, 204

B.p. 127–8°/15 mm. D_4^{20} 0.8698. n_D^{15} 1.49211.Halse, *J. prakt. Chem.*, 1914, 89, 457.

sym.-Ethylphenylhydrazine

$\text{C}_8\text{H}_{12}\text{N}_2$ MW, 136

B.p. $235-6^\circ/741$ mm., $110^\circ/14$ mm., $100-104^\circ/10$ mm. D_4^{20} 1.004. n_D^{20} 1.55. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Reduces Fehling's.

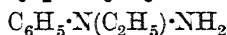
B.HCl: leaflets from EtOH-Et₂O. M.p. 164° .

B.(COOH)₂: needles from EtOH. M.p. $167-8^\circ$ decomp.

N-Benzoyl: prisms from EtOH.Aq. M.p. 100° .

Fischer, Ehrhard, *Ann.*, 1879, 199, 330.

Knorr, Weidel, *Ber.*, 1909, 42, 3528.

unsym.-Ethylphenylhydrazine

$\text{C}_8\text{H}_{12}\text{N}_2$ MW, 136

Oil. B.p. 237° , $115-19^\circ/19-21$ mm. D^{15} 1.018. Reduces warm Fehling's.

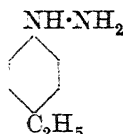
B.HCl: leaflets from CHCl₃. M.p. 137° , ($146-7^\circ$).

Fischer, *Ber.*, 1875, 8, 1642.

Michaelis, Philips, *Ann.*, 1889, 252, 270.

Michaelis, Robisch, *Ber.*, 1897, 30, 2810.

Audrieth, Weisiger, Carter, *J. Org. Chem.*, 1941, 6, 417.

p-Ethylphenylhydrazine (4-Hydrazino-1-ethylbenzene)

$\text{C}_8\text{H}_{12}\text{N}_2$ MW, 136

Leaflets. Unstable even in form of salts. Sol. H₂O, EtOH, Et₂O, CHCl₃, Me₂CO, C₆H₆.

B.HCl: leaflets. M.p. 200° .

B.H₂SO₄: reddish leaflets from H₂O. M.p. 180° .

Picrate: yellow needles. M.p. 122° .

Willgerodt, Harter, *J. prakt. Chem.*, 1905, 71, 410.

Ethyl phenyl Ketone.

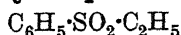
See Propiophenone.

Ethyl-α-phenylpropylcarbinol.

See 3-Phenylhexanol-4.

Ethyl phenyl sulphide.

See Thiophenetole.

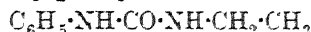
Ethyl phenyl sulphone

$\text{C}_8\text{H}_{10}\text{O}_2\text{S}$ MW, 170

Leaflets from EtOH.Aq. M.p. 42° . B.p. $160^\circ/12$ mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. cold H₂O.

Otto, *Ber.*, 1880, 13, 1274; 1885, 18, 161.

Ferns, Lapworth, *J. Chem. Soc.*, 1912, 101, 284.

sym.-Ethylphenylurea

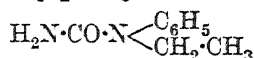
$\text{C}_9\text{H}_{12}\text{ON}_2$ MW, 164

Needles from EtOH.Aq. M.p. 104° (99°).

Sonn, *Ber.*, 1914, 47, 2442.

Mauguin, *Ann. chim.*, 1911, 22, 318.

Oliveri-Mandalà, Noto, *Gazz. chim. ital.*, 1913, 43, I, 311.

unsym.-Ethylphenylurea

$\text{C}_9\text{H}_{12}\text{ON}_2$ MW, 164

Plates from pet. ether. M.p. $62.3-62.5^\circ$. Very sol. H₂O and org. solvents except ligroin.

Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1800.

Gebhardt, *Ber.*, 1884, 17, 2095.

Ethyl phosphate.

See under Phosphoric Acid.

Ethylphosphine

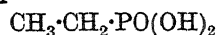
$\text{C}_2\text{H}_7\text{P}$ MW, 62

Liq. with unpleasant odour. B.p. 25° . De-comp. by H₂O.

Hofmann, Mahla, *Ber.*, 1892, 25, 2437.

Berthaud, *Compt. rend.*, 1906, 143, 1166.

Albers, Schuler, *Ber.*, 1943, 76, 23.

Ethylphosphinic Acid

$\text{C}_2\text{H}_7\text{O}_3\text{P}$ MW, 110

Hygroscopic cryst. M.p. 44° .

Di-Et ester: $\text{C}_6\text{H}_{15}\text{O}_3\text{P}$. MW, 166. B.p. 198° ($203^\circ/750$ mm.), $90-95^\circ/20$ mm. D_4^{20} 1.0259. n_D^{20} 1.4163.

Dichloride: $\text{C}_2\text{H}_5\text{OCl}_2\text{P}$. MW, 147. B.p. 175° , $75-8^\circ/50$ mm. D^{20} 1.1883.

Hofmann, *Ber.*, 1872, 5, 110.

Michaelis, *Ber.*, 1880, 13, 2175.

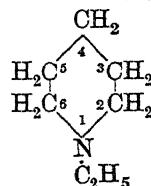
Guichard, *Ber.*, 1899, 32, 1578.

Michaelis, Becker, *Ber.*, 1897, 30, 1006.

Plets, *J. Gen. Chem. U.S.S.R.*, 1936, 6, 1198, (*Chem. Abstracts*, 1937, 31, 3155).

1-Ethylpimelic Acid.

See Heptane-1 : 5-dicarboxylic Acid.

N-Ethylpiperidine (Ethylpiperidylamine)

$\text{C}_7\text{H}_{15}\text{N}$ MW, 113

B.p. 128° . D_4^{20} 0.82373. n_D^{20} 1.44158.

B₂H₂PtCl₆: orange prisms. M.p. 202° .

$B,HAuCl_4$: yellow cryst. M.p. 106–7°.
Picrate: yellow needles from EtOH. M.p. 167–5°.

Winans, Adkins, *J. Am. Chem. Soc.*, 1932, **54**, 310.

Evans, *J. Chem. Soc.*, 1897, **71**, 523.

Dennstedt, *Ber.*, 1890, **23**, 2571.

Clarke, *J. Chem. Soc.*, 1912, **101**, 1807.

Adkins *et al.*, *J. Am. Chem. Soc.*, 1934, **56**, 2425.

Yur'ev, Pervova, Sazonova, *J. Gen. Chem. U.S.S.R.*, 1939, **9**, 590.

2-Ethylpiperidine (α -Ethylpiperidine).

B.p. 142–3°/719 mm. D_4^{20} 0.8651. Spar. sol. H_2O .

B,HCl : m.p. 181–2°.

B_2,H_2PtCl_6 : prisms. M.p. 208–10° decomp.

$B,HAuCl_4$: m.p. 129–30°.

Picrate: prisms. M.p. 133°.

N-Benzenesulphonyl: leaflets or plates from EtOH.Aq. M.p. 64–5°.

Lipp, *Ber.*, 1900, **33**, 3513.

Ladenburg, *Ber.*, 1898, **31**, 290.

3-Ethylpiperidine (β -Ethylpiperidine).

Oil. B.p. 152.6°. D_4^{20} 0.871. Spar. sol. H_2O . Fumes in air.

B,HCl : needles from C_6H_6 . M.p. 141–2°.

B,HI : m.p. 123°.

B_2,H_2PtCl_6 : m.p. 183–4°.

$B,HAuCl_4$: m.p. 112°.

Picrate: m.p. 63°.

Stoehr, *J. prakt. Chem.*, 1892, **45**, 44.

Ladenburg, *Ann.*, 1898, **301**, 149.

Günther, *Ber.*, 1898, **31**, 2140.

4-Ethylpiperidine (γ -Ethylpiperidine).

B.p. 156–8°. D_4^{20} 0.8759. Spar. sol. H_2O .

B_2,H_2PtCl_6 : orange leaflets. M.p. 173–4°.

$B,HAuCl_4$: m.p. 105°.

Ladenburg, *Ann.*, 1888, **247**, 72.

3-Ethyl-4-piperidylacetic Acid.

See Cincholoipon.

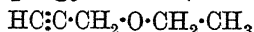
Ethylpiperidylamine.

See N-Ethylpiperidine.

Ethyl α -piperidyl Ketone.

See Conhydrinone.

Ethyl propargyl Ether (Ethoxyallylene)



C_5H_8O MW, 84

Liq. with penetrating odour. B.p. 80°. D_4^{20} 0.8326. n_D^{20} 1.40390. Completely miscible with EtOH.

Baeyer, *Ann.*, 1866, **138**, 196.

Liebermann, Kretschmer, *Ann.*, 1871, **158**, 230.

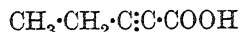
Ethylpropenylcarbinol.

See 2-Hexenol-4.

Ethyl propenyl Ketone.

See 2-Hexenone-4.

Ethylpropionic Acid (1-Butyne-1-carboxylic acid, 3-methyltetrollic acid)



$C_5H_8O_2$ MW, 98

Feathery cryst. from petrol. M.p. 50°. B.p. 122°/10 mm., 81–2°/3 mm. D^{20}_D 0.978. n_D^{20} 1.4619. Sol. H_2O .

Me ester: $C_6H_8O_2$. MW, 112. B.p. 72°/10 mm. D^{20}_D 0.937. n_D^{20} 1.4455.

Et ester: $C_7H_{10}O_2$. MW, 126. B.p. 67–8°/18 mm. D^{20}_D 0.962.

Dupont, *Compt. rend.*, 1909, **148**, 1523.

Zoss, Hennion, *J. Am. Chem. Soc.*, 1941, **63**, 1151.

Favorskii, Mokhnach, *J. Gen. Chem. U.S.S.R.*, 1935, **5**, 1668.

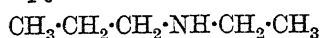
Ethylpropylacetic Acid.

See 1-Ethyl-n-valeric Acid.

Ethylpropylacetylene.

See 3-Heptyne.

Ethylpropylamine



$C_5H_{13}N$ MW, 87

B.p. 79.8°/747 mm. Sol. EtOH. Spar. sol. H_2O . D^{24}_D 0.773. n_D^{20} 1.3966.

B,HCl : m.p. 225–6° (217–18°).

N-Nitroso: b.p. 195°.

B_2,H_2PtCl_6 : orange yellow cryst. M.p. 198–9° (184–5°). D^{15}_D 1.89.

$B,HAuCl_4$: m.p. 86–7°.

Comanducci, Arena, *Chem. Zentr.*, 1907, **II**, 1396.

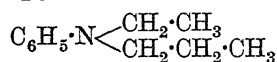
Bewad, *J. prakt. Chem.*, 1901, **63**, 211.

Campbell, Sommers, Campbell, *J. Am. Chem. Soc.*, 1944, **66**, 82.

Ethyl propylaminoformate.

See Propylurethane.

Ethylpropylaniline



$C_{11}H_{17}N$ MW, 163

Yellowish oil. B.p. 216°.

B,HCl : m.p. 131°.

Claus, Hirzel, *Ber.*, 1886, **19**, 2787.

Ethylpropylcarbinol (Hexanol-3, 3-hydroxy-hexane)



$C_6H_{14}O$ MW, 102

dl-.

B.p. 134.5–135.5°. D^{20}_D 0.81825. n_D^{20} 1.4167.

Allophanate: m.p. 185.5°.

Acid phthalate: m.p. 76–7°.

3:5-Dinitrobenzoyl: m.p. 77°.

Phenylurethane: m.p. 65°.

p-Xenylurethane: m.p. 135°.

d.
B.p. 131–3°. $[\alpha]_{D_{20}}^{20} +6.81^\circ$, $[\alpha]_{D_{25}}^{25} +7.79^\circ$,
 $[\alpha]_{D_{30}}^{30} +12.41^\circ$ in CHCl_3 .
Acid phthalate: m.p. 48–9°. $[\alpha]_{D_{20}}^{20} +9.31^\circ$,
 $[\alpha]_{D_{25}}^{25} +10.19^\circ$, $[\alpha]_{D_{30}}^{30} +11.26^\circ$ in CHCl_3 .

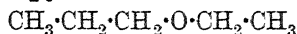
l.

B.p. 133–4°. n_D^{20} 1.4140. $[\alpha]_{D_{20}}^{20} -7.13^\circ$.
Pickard, Kenyon, *J. Chem. Soc.*, 1913,
103, 1942.
Lieben, Völker, *Ber.*, 1875, 8, 1019.
Airs, Balfe, Kenyon, *J. Chem. Soc.*, 1942,
18.
Jones, McCombie, *ibid.*, 733.
Kenyon, Poplett, *J. Chem. Soc.*, 1945, 273.

Ethyl propyl Diketone.

See Heptandione-3 : 4.

Ethyl propyl Ether



$\text{C}_5\text{H}_{12}\text{O}$ MW, 88

B.p. 63.6°. D_4^{20} 0.7386. n_D^{20} 1.36948.
Cerchez, *Bull. soc. chim.*, 1928, 43, 767.
Michael, Wilson, *Ber.*, 1906, 39, 2574.
Brühl, *Ann.*, 1880, 200, 177.

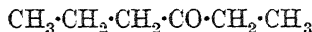
sym.-Ethylpropylethylene.

See 3-Heptene.

Ethylpropylethylene Glycol.

See Heptandiol-3 : 4.

Ethyl propyl Ketone (Hexanone-3, 3-keto-hexane)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 123–123.5°. D_4^{20} 0.81491. n_D^{20} 1.39899.
Osime: b.p. 86°/17 mm.
Semicarbazone: m.p. 112°.
2 : 4-Dinitrophenylhydrazones: m.p. 130° (149–51°).

Sabatier, Mailhe, *Compt. rend.*, 1913, 156,
1733.

Lieben, Völker, *Ber.*, 1875, 8, 1019.

Michael, *Ber.*, 1906, 39, 2144.

Ethylpropylmalonic Acid (Hexane-3 : 3-dicarboxylic acid)



$\text{C}_8\text{H}_{14}\text{O}_4$ MW, 174

Needles. M.p. 117–18°. Sol. H_2O , EtOH ,
 Et_2O . Insol. ligroin. $k = 1.16 \times 10^{-2}$ at 25°.

Di-Me ester: $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 202. B.p.
215–17°, 107°/17 mm. D_4^{20} 1.0154. n_D^{20} 1.43005.

Di-Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_4$. MW, 230. B.p.
234–6°.

Rasetti, *Bull. soc. chim.*, 1905, 33, 684.

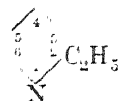
Ethylpropylphenylcarbinol.

See 3-Phenylhexanol-3.

1-Ethyl-2-propylsuccinic Acid.

See Heptane-3 : 4-dicarboxylic Acid.

2-Ethylpyridine (*2*-Ethylpyridine)



$\text{C}_7\text{H}_9\text{N}$ MW, 107

B.p. 148.6° (148–50°). D_4^{20} 0.9502. D^{17}
0.9371.

$B, \text{HCl}, 2\text{HgCl}_2$: needles from H_2O . M.p.
103–6°.

$B_2, \text{H}_2\text{PtCl}_6$: orange plates. M.p. 165–7°
decomp.

$B, \text{H}_2\text{AuCl}_4$: yellow plates from H_2O . M.p.
121°.

Picrate: m.p. 187–9°.

Bergstrom, McAllister, *J. Am. Chem.*
Soc., 1930, 52, 2848.

Löffler, Grosse, *Ber.*, 1907, 40, 1327.

Königs, Happe, *Ber.*, 1902, 35, 1345.

Ladenburg, *Ber.*, 1899, 32, 44.

3-Ethylpyridine (*3*-Ethylpyridine).

B.p. 162–5°/762 mm. D_4^{20} 0.9539.

$B, \text{HCl}, 2\text{HgCl}_2$: m.p. 132.5°.

$B_2, \text{H}_2\text{PtCl}_6$: m.p. 208–9° (196°).

Picrate: m.p. 128–30°.

Ladenburg, *Ann.*, 1898, 301, 151.

Königs, *Ann.*, 1906, 347, 216.

Strong, McElvain, *J. Am. Chem. Soc.*,
1933, 55, 816.

4-Ethylpyridine (*4*-Ethylpyridine).

B.p. 169.6–70°/750 mm. corr. D_4^{20} 0.9404. n_D^{15}
1.5029.

$B, \text{HCl}, 2\text{HgCl}_2$: plates. M.p. 150–2°.

$B_2, \text{H}_2\text{PtCl}_6$: plates. M.p. 213°.

$B, \text{H}_2\text{AuCl}_4$: prisms from HCl . M.p. 147–8°
(145°).

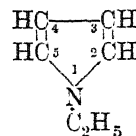
Picrate: m.p. 168°.

Ladenburg, *Ber.*, 1899, 32, 45.

Gabriel, Colman, *Ber.*, 1902, 35, 1365.

Wibaut, Arens, *Rec. trav. chim.*, 1941, 60,
119.

N-Ethylpyrrole (Ethylpyrrolamine)



$\text{C}_6\text{H}_9\text{N}$ MW, 95

B.p. 131°. D^{10} 0.9042, D^{16} 0.8881. n_D^{20}
1.4841. Sol. EtOH , Et_2O . Insol. H_2O .

Ciamician, Zanetti, *Ber.*, 1889, 22, 660.

Bell, Lapper, *Ber.*, 1877, 10, 1962.

Lubavin, *Ber.*, 1869, 2, 100.

Yur'ev, *J. Gen. Chem. U.S.S.R.*, 1934, 4,
1258; 1938, 8, 1934, (*Chem. Abstracts*,
1939, 33, 1603).

2-Ethylpyrrole (α -Ethylpyrrole).

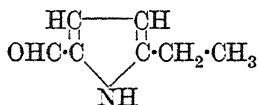
B.p. 163–5°, 59–60°/15 mm.

de Jong, *Rec. trav. chim.*, 1929, **48**, 1029.Hess, Wissing, *Ber.*, 1914, **47**, 1424.Dennstedt, *Ber.*, 1890, **23**, 2563.**3-Ethylpyrrole.**

B.p. 65°/14 mm.

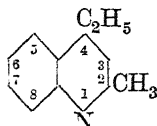
Fischer, Rose, *Ann.*, 1935, **519**, 1.

Note.—According to de Jong (*Rec. trav. chim.*, 1929, **48**, 1029) the 3-ethylpyrrole described earlier in the literature (*refs.* below), is actually 2-ethylpyrrole.

Oddo, Mameli, *Gazz. chim. ital.*, 1914, **44**, II, 169.Dennstedt, Zimmerman, *Ber.*, 1886, **19**, 2190.**2-Ethylpyrrole-5-aldehyde** C_7H_9ON

MW, 123

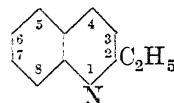
Needles from ligroin. M.p. 52°.

Fischer, Beyer, Zaucker, *Ann.*, 1931, **486**, 68.**5-Ethyl-2-pyrrolidone.**See under 3-Amino-*n*-caproic Acid.**4-Ethylquinaldine** (2-Methyl-4-ethylquinoline). $C_{12}H_{13}N$

MW, 171

B.p. 150–3°/14 mm. $K_2Cr_2O_7 + H_2SO_4 \rightarrow$ quinaldine-4-carboxylic acid.*Methiodide*: m.p. 246°.*Tartrate*: needles from EtOH. M.p. 149°.Knoll, D.R.P.s 363,582–3, (*Chem. Abstracts*, 1924, **18**, 991).Knövenagel, Bähr, *Ber.*, 1922, **55**, 1926.**6-Ethylquinaldine** (2-Methyl-6-ethylquinoline).

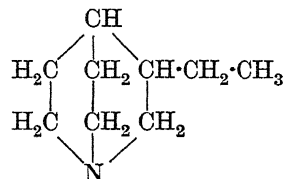
B.p. 276–9°.

Methiodide: yellow needles from EtOH. M.p. 214°.*Dichromate*: m.p. 134°.*HgCl*₂ double salt: m.p. 155°.*ZnCl*₂ double salt: m.p. 167°.Mills, Harris, Lambourne, *J. Chem. Soc.*, 1921, **119**, 1300.**2-Ethylquinoline** (α -Ethylquinoline) $C_{11}H_{11}N$

MW, 157

B.p. 245–6°, 128–31°/13 mm. D_{17}^{20} 1.050. n_D^{20} 1.5979. Sol. EtOH, Et₂O, CHCl₃, CS₂. Spar. sol. H₂O.*Methiodide*: greenish-yellow needles from EtOH. M.p. 180°. B_2, H_2PtCl_6 : m.p. 188°. $B, HCl, HgCl_2$: needles. M.p. 118°. $B, HCl, 2AuCl_3$: yellow needles. M.p. 142°.*Picrate*: m.p. 148°.Delaby, Hiron, *Bull. soc. chim.*, 1930, **47**, 1395.Döbner, *Ann.*, 1887, **242**, 272.Reher, *Ber.*, 1887, **20**, 2734; 1886, **19**, 2996.**3-Ethylquinoline** (β -Ethylquinoline).B.p. 266°, 135–8°/12 mm. D_4^{20} 1.0508. n_D^{20} 1.6160. B, HCl : m.p. 173°.*Methiodide*: m.p. 191°.*Ethiodide*: m.p. 215°.*Picrate*: m.p. 197°.v. Braun, Petzold, Seeman, *Ber.*, 1922, **55**, 3785.Utermohlen, *J. Org. Chem.*, 1943, **8**, 544.**4-Ethylquinoline** (γ -Ethylquinoline).B.p. 271–4°, 143–5°/8–9 mm. $CrO_3 + H_2SO_4 \rightarrow$ cinchoninic acid. B, HNO_3 : m.p. 120° (115–5°). $B, HCl, HgCl_2$: needles. M.p. 154°. B_2, H_2PtCl_6 : m.p. 204°.*Methiodide*: yellow cryst. M.p. 149°.*Picrate*: yellow needles from H₂O. M.p. 200° (178–80°) decomp.Reher, *Ber.*, 1886, **19**, 2999; 1887, **20**, 2734.Rabe, Pasternack, *Ber.*, 1913, **46**, 1032.**N-Ethyl- α -quinolone.**

See under Carbstyryl.

3-Ethylquinuclidine $C_9H_{17}N$

MW, 139

d. $[\alpha]_D + 110^\circ$ in EtOH. B, HCl : $[\alpha]_D + 70.1^\circ$ in EtOH. α -Bromo-*d*-camphor- π -sulphonate: m.p. 188–9°. $[\alpha]_D + 87.1^\circ$ in H₂O.

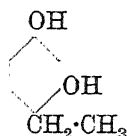
dl.
Oil with odour resembling collidine. B.p. 190-2°/720 mm., 78-9°/12 mm.
B.HCl: m.p. 208-11°.
B.HBr: m.p. 230-1°.
B.HI: m.p. 233°.
B.HAuCl₄: golden leaflets from EtOH.Aq.
M.p. 176-8°.
B₂H₂PtCl₆: m.p. 221° decomp.
Picrate: yellow needles from H₂O. M.p. 153-154.5°.

Koenigs, Bernhart, *Ber.*, 1905, **38**, 3054.

Koenigs, *Ber.*, 1904, **37**, 3244.

Prelog, Sostaric, Gustak, *Ann.*, 1940, **545**, 247.

4-Ethylresorcinol (2 : 4-Dihydroxyethylbenzene)



C₈H₁₀O₂

MW, 138

Cryst. from H₂O. M.p. 97-8°.

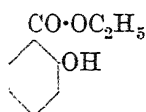
Diacetyl: b.p. 162°/14 mm.

Diallyl ether: b.p. 146°/10 mm.

Johnson, Lane, *J. Am. Chem. Soc.*, 1921, **43**, 356.

Baker, Lothian, *J. Chem. Soc.*, 1936, **274**.

Ethyl salicylate



C₉H₁₀O₃

MW, 166

M.p. 1-3°. B.p. 231.5°, 132.8°/37 mm., 107.5-108.5°/12 mm., 101.8°/8.8 mm. *D*₄²⁰ 1.147, *D*₄²⁵ 1.131. *n*_D²⁰ 1.5226. Heat of comb. *C_p* 1051.748 Cal.

Me ether: see under *o*-Methoxybenzoic Acid.

Et ether: see under *o*-Ethoxybenzoic Acid.

Acetyl: see under Acetylsalicylic Acid.

Benzoyl: leaflets from EtOH. M.p. 79-80°.

p-Nitrobenzoyl: yellowish leaflets from C₆H₆. M.p. 107-8°.

Phenylcarbamate: m.p. 98-100°.

Göttig, *Ber.*, 1876, **9**, 1473.

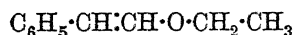
Baly, *Ann.*, 1849, **70**, 270.

Auwers, *Ann.*, 1915, **408**, 253.

α-Ethylstilbene.

See 1 : 2-Diphenyl-1-butylene.

Ethyl styryl Ether (β-Ethoxystyrene)



C₁₀H₁₂O

MW, 148

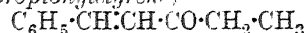
B.p. 223-6°, 106°/14 mm., 98-9°/10 mm. *D*₄²⁰ 0.979. *n*_D²⁰ 1.5496.

Wislicenus, Billhuber, *Ber.*, 1918, **51**, 1370.

Duffraisse, Chaux, *Bull. soc. chim.*, 1926, **39**, 905.

Emerson, Agnew, *J. Am. Chem. Soc.*, 1945, **67**, 518.

Ethyl styryl Ketone (Benzylidenemethyl ethyl ketone, β-propionylstyrene)



C₁₁H₁₂O

MW, 160

Leaflets from ligroin. M.p. 38-9°. B.p. 142°/12 mm. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. *n*_D²⁰ 1.5726.

Oxime: m.p. 85-6°.

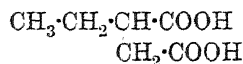
Semicarbazone: m.p. 173°.

Phenylhydrazone: m.p. 104-5° (101°).

Dibromide: m.p. 109-10°.

Harries, Müller, *Ber.*, 1902, **35**, 968.

Ethylsuccinic Acid (Butane-1 : 2-dicarboxylic acid)



C₆H₁₀O₄

MW, 146

dl.

M.p. 96°. *D*₄²⁰ 1.0017. [*α*]_D²⁰ +15.4° in Me₂CO.

Anhydride: C₆H₈O₃. MW, 128. M.p. 32.5°. [*α*]_D²⁰ +0.3°.

l.

M.p. 96°. *D*₄²⁰ 1.0018. [*α*]_D²⁰ -15.4° in Me₂CO.

Di-Me ester: C₈H₁₄O₄. MW, 174. B.p. 91-4°/13 mm. *D*₄²⁰ 1.053. [*α*]_D²⁰ -14.89°.

Anhydride: m.p. 32.5°. [*α*]_D²⁰ -0.1°.

dl.

Needles. M.p. 100°. Sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃. Insol. pet. ether. Heat of comb. *C_p* 671.9 Cal. *k* (first) = 8.5 × 10⁻⁵ at 25°: (second) = 1.3 × 10⁻⁶ at 100°. Dist. → anhydride.

Di-Me ester: b.p. 202-5°. *D*₄²⁰ 1.051.

Di-Et ester: C₁₀H₁₈O₄. MW, 202. B.p. 223-6° (230-1°). *D*₄²⁰ 1.030.

Anhydride: liq. *D*₄²⁰ 1.165.

Diamide: C₆H₁₂O₂N₂. MW, 144. M.p. 214°.

Fittig, Fränkel, *Ann.*, 1889, **255**, 41.

Polko, *Ann.*, 1887, **242**, 121.

Huggenberg, *Ann.*, 1878, **192**, 149.

Berner, Leonardsen, *Ann.*, 1939, **538**, 1.

Ethyl sulphate.

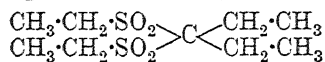
See Diethyl sulphate and Ethyl hydrogen sulphate.

Ethyl sulphide.

See Diethyl sulphide.

Ethyl sulphite.

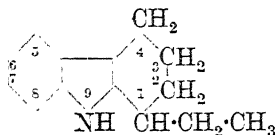
See Diethyl sulphite and Ethyl hydrogen sulphite.

Ethylsulphonal (Tetronal)C₈H₂₀O₄S₂ MW, 256M.p. 85°. Sol. 450 parts cold H₂O. More sol. EtOH, Et₂O. Hypnotic.Baumann, Kast, *Z. physiol. Chem.*, 1890, 14, 64.**Ethylsulphonic Acid.**

See Ethanesulphonic Acid.

Ethylsulphuric Acid.

See Ethyl hydrogen sulphate

1-Ethyl-1 : 2 : 3 : 4-tetrahydrocarbazoleC₁₄H₁₇N MW, 199

B.p. 200-5°/16 mm.

Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1938, 71, 192.**6-Ethyl-1 : 2 : 3 : 4-tetrahydrocarbazole.**

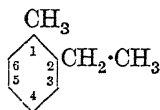
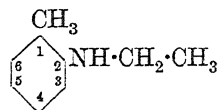
Plates from ligroin. M.p. 78°. S → 3-ethylcarbazole.

Plant, Williams, *J. Chem. Soc.*, 1934, 1143.**N-Ethyl-1 : 2 : 3 : 4-tetrahydroquinoline.**

See Kairolin A.

Ethyltetramethylene Glycol.

See Hexandiol-1 : 4.

Ethyl thiocyanateC₃H₅NS MW, 87B.p. 146°. D₄¹⁶ 1.020, D₄²⁰ 1.00715. n_D¹⁵ 1.4684. Misc. with EtOH, Et₂O. Insol. H₂O. Heat of comb. C_v 612.5 Cal., C_p 613.8 Cal. Polymerises on heating to 190° with trace of acid. Zn + HCl → C₂H₅SH + HCN.Biilmann, Bjerrum, *Ber.*, 1917, 50, 509.Walden, *Ber.*, 1907, 40, 3215.Palazzo, Scelsi, *Gazz. chim. ital.*, 1908, 38, I, 669.***o*-Ethyltoluene (1-Methyl-2-ethylbenzene)**C₉H₁₂ MW, 120B.p. 164.8-165°, 62-3°/20-1 mm. D₄^{15.7} 0.8841, D₄²⁰ 0.881. n_D²⁰ 1.5042. Dil. HNO₃ → *o*-toluic acid.Auwers, *Ann.*, 1919, 419, 109.Blaise, Montagne, *Compt. rend.*, 1925, 181, 122.***m*-Ethyltoluene (1-Methyl-3-ethylbenzene).**B.p. 157-9°. D₁₇¹⁷ 0.8692, D₄²⁰ 0.867. n_D²⁰ 1.4975. CrO₃ → isophthalic acid.Auwers, *Ann.*, 1919, 419, 110.Bartow, Sellards, *J. Am. Chem. Soc.*, 1905, 27, 370.Tsukervanik, Vikhrova, *J. Gen. Chem. U.S.S.R.*, 1937, 7, 632, (*Chem. Abstracts*, 1939, 33, 9294).***p*-Ethyltoluene (1-Methyl-4-ethylbenzene).**M.p. -56°. B.p. 160-2°, 49.5-50°/11 mm. D₄²⁰ 0.8606. n_D²⁰ 1.4959. Dil. HNO₃ → *p*-toluic acid. CrO₃ → terephthalic acid.Wallach, *Ann.*, 1917, 414, 210.Auwers, *Ann.*, 1919, 419, 110.Defren, *Ber.*, 1895, 28, 2649.Rinkes, *Chem. Abstracts*, 1946, 40, 4033.**N-Ethyl-*o*-toluidine**C₉H₁₃N MW, 135

B.p. 214-14.5°, 95.5°/10 mm.

N-Acetyl: N-ethylacet-*o*-toluidide. B.p. 254-6°.Finzi, *Chem. Abstracts*, 1925, 19, 2648.Thomas, *J. Chem. Soc.*, 1917, 111, 563.Fierz-David, Rufener, *Helv. Chim. Acta*, 1934, 17, 1452.**N-Ethyl-*m*-toluidine.**

B.p. 221-2° (215°).

B, HCl: m.p. 159°.

B, HBr: m.p. 161°.

B, HI: m.p. 138°.

Chloroplatinate: m.p. 182° decomp.

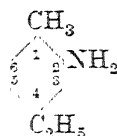
B, HgCl₂: m.p. 88°.B, ZnCl₂: m.p. 128°.N-Acetyl: N-ethylacet-*m*-toluidide. B.p. 254°.

N-Benzoyl: m.p. 72°.

N-Oxalyl: m.p. 111°.

Yamaguchi, Matsumoto, *Chem. Abstracts*, 1924, 18, 3192.Buck, Ferry, *Organic Syntheses*, 1938, XVIII, 40.Finzi, *Chem. Abstracts*, 1925, 19, 2648.**N-Ethyl-*p*-toluidine.**B.p. 217°. D_{15.5}^{15.5} 0.9391, D₄²⁵ 0.942.Guyot, Fournier, *Bull. soc. chim.*, 1930, 47, 209.Finzi, *Chem. Abstracts*, 1925, 19, 2648.Lazier, Adkins, *J. Am. Chem. Soc.*, 1924, 46, 741.Thomas, *J. Chem. Soc.*, 1917, 111, 570.King, Tonkin, *J. Chem. Soc.*, 1946, 1063.

4-Ethyl-o-toluidine (2-Methyl-5-ethylaniline, 6-amino-1-methyl-4-ethylbenzene);



$C_9H_{13}N$

MW, 135

Colourless liq. B.p. $105-10^{\circ}$ 10 mm.

N-Acetyl: needles from C_6H_6 . M.p. 138° .

Rinkes, *Chem. Abstracts*, 1946, 40, 4034.

5-Ethyl-o-toluidine (2-Methyl-4-ethylaniline, 6-amino-1-methyl-3-ethylbenzene).

Colourless liq., darkening on exposure to air or light. B.p. $228-9^{\circ}$.

B.HCl: m.p. 152° .

N-Formyl: m.p. 151° .

N-Acetyl: m.p. 105° .

N-Benzoyl: m.p. 152° .

Mailhe, *Bull. soc. chim.*, 1921, 29, 715.

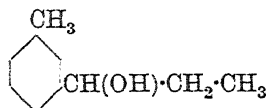
4-Ethyl-m-toluidine (3-Methyl-6-ethylaniline, 5-amino-1-methyl-4-ethylbenzene).

Colourless liq. B.p. $115-20^{\circ}$ 10 mm.

N-Acetyl: needles from C_6H_6 and ligroin. M.p. 142° .

Rinkes, *Chem. Abstracts*, 1946, 40, 4034.

Ethyl-m-tolylcarbinol (α -Hydroxy-m-propyltoluene, m-[α -hydroxypropyl]-toluene)



$C_{10}H_{14}O$

MW, 150

B.p. $113-14^{\circ}$ 12 mm. $D_4^{15} 0.9833$. $n_D^{15} 1.521$.

Auwers, *Ann.*, 1919, 419, 111.

Ethyl-p-tolylcarbinol (α -Hydroxy-p-propyltoluene, p-[α -hydroxypropyl]-toluene).

Cryst. M.p. 15° . B.p. $118-20^{\circ}$ 23 mm. $D_4^{15} 0.966$.

Acetyl: b.p. 130° 25 mm. $D_4^{14} 0.989$.

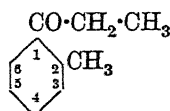
Phenylurethane: cryst. from pet. ether. M.p. $86-8^{\circ}$.

Klages, *Ber.*, 1902, 35, 2252.

Ethyl tolyl Ether.

See under Cresol.

Ethyl o-tolyl Ketone (2-Methylpropionophenone, 2-propionyltoluene)



$C_{10}H_{12}O$

MW, 148

B.p. $219-20^{\circ}$. $D_4 1.0119$.

Semicarbazone: m.p. 173° (169°).

Mauthner, *J. prakt. Chem.*, 1922, 103, 393.

Senderens, *Ann. chim.*, 1913, 28, 332.

Blaise, *Compt. rend.*, 1901, 133, 1218.

Ethyl m-tolyl Ketone (3-Methylpropionophenone, 3-propionyltoluene).

B.p. 234° 745 mm., $130-5^{\circ}$ 30-33 mm. $D_4 1.0059$.

Oxime: m.p. $68-9^{\circ}$.

Semicarbazone: m.p. $175-6^{\circ}$ (166°).

Wallach, Rentschler, *Ann.*, 1908, 360, 61.

Senderens, *Ann. chim.*, 1913, 28, 332.

Hartung, Munch, Crossley, *J. Am. Chem. Soc.*, 1935, 57, 1091.

Ethyl p-tolyl Ketone (4-Methylpropionophenone, 4-propionyltoluene).

B.p. $238-9^{\circ}$, $119-20^{\circ}$ 18 mm., 106° 8 mm. $D_4 1.0053$, $D_4^{20} 0.990$. $n_D^{20} 1.5278$.

Oxime: m.p. $89-90^{\circ}$.

Semicarbazone: m.p. $186.5-187^{\circ}$ (180°).

Mauthner, *J. prakt. Chem.*, 1922, 103, 394.

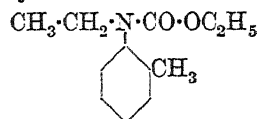
Noller, Adams, *J. Am. Chem. Soc.*, 1924, 46, 1893.

Senderens, *Ann. chim.*, 1913, 28, 332.

Auwers, *Ber.*, 1916, 49, 2400.

Klages, *Ber.*, 1902, 35, 2252.

Ethyl-o-tolylurethane



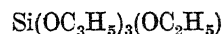
$C_{12}H_{17}O_2N$

MW, 207

B.p. 257° 755 mm. $D_4^{25} 1.0225$.

Baker, *J. Chem. Soc.*, 1913, 103, 1657.

Ethyl triallyl orthosilicate



$C_{11}H_{20}O_4Si$

MW, 244

B.p. $121-121.5^{\circ}$ 34 mm. $n_D^{20} 1.4230$.

Peppard, Brown, Johnson, *J. Am. Chem. Soc.*, 1946, 68, 70.

Ethyltridecylcarbinol (Hexadecanol-3, 3-hydroxyhexadecane)



$C_{16}H_{34}O$

MW, 242

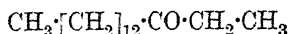
l.

Needles from EtOH. M.p. 50° . B.p. 152° 4 mm. $D_4^{27} 0.8000$. $[\alpha]_D^{20} -5.27^{\circ}$ in EtOH. Spar. volatile in steam.

Acid phthalate: needles from pet. ether. M.p. 51° . $[\alpha]_D^{20} -16.47^{\circ}$ in EtOH.

dl.

M.p. 37-8°. B.p. 176°/16 mm.

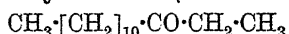
Acid phthalate: needles from pet. ether. M.p. 51-2°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1952.**Ethyl tridecyl Ketone (Hexadecanone-3)** $\text{C}_{16}\text{H}_{32}\text{O}$ MW, 240

Leaflets from pet. ether. M.p. 42°. B.p. 184°/17 mm., 140°/2 mm.

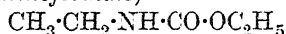
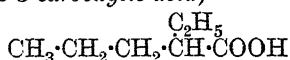
Semicarbazone: cryst. from EtOH.Aq. M.p. 86°.*p*-Nitrophenylhydrazone: m.p. 82°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1952.Asinger, Eckoldt, *Ber.*, 1943, 76, 579.**Ethylundecylcarbinol (Tetradecanol-3)** $\text{C}_{14}\text{H}_{30}\text{O}$ MW, 214l. Prisms from EtOH. M.p. 38°. B.p. 160°/15 mm., 146°/10 mm. D_4^{20} 0.8098. $[\alpha]_D^{20}$ - 6.25° in EtOH. Slowly volatilises in steam.*Acid phthalate*: needles from pet. ether. M.p. 33°. $[\alpha]_D^{20}$ - 17.43° in EtOH.

dl.

Needles. M.p. 25°. B.p. 173°/25 mm.

Acid phthalate: cryst. from pet. ether. M.p. 58-60°.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1950.**Ethyl undecyl Ketone (Tetradecanone-3)** $\text{C}_{14}\text{H}_{28}\text{O}$ MW, 212

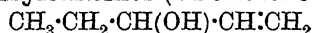
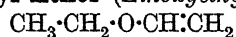
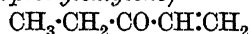
Cryst. from MeOH. M.p. 34°. B.p. 152°/16 mm., 148°/10 mm.

Oxime: cryst. from MeOH. M.p. 40°.*Semicarbazone*: cryst. from EtOH. M.p. 89°.Blaise, Guérin, *Bull. soc. chim.*, 1903, 29, 1208.Pickard, Kenyon, *J. Chem. Soc.*, 1913, 103, 1950.**Ethylurea** $\text{C}_3\text{H}_8\text{ON}_2$ MW, 88Needles from EtOH-Et₂O. M.p. 92°. Very sol. H₂O, EtOH, CHCl₃, C₆H₆. Insol. Et₂O, CS₂. Hot alc. KOH → K cyanate + ethylamine.*Nitrate*: prisms. M.p. 55-60°.*Oxalate*: plates. M.p. 55-60°.Davis, Blanchard, *J. Am. Chem. Soc.*, 1929, 51, 1797.Kjellin, Kuylenstjerna, *Ann.*, 1897, 298, 119.**Ethylurethane (Ethyl N-ethyl carbamate, ethyl ethylaminoformate)** $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$ MW, 117B.p. 170° (174-6°), 74-5°/14 mm. D_4^{20} 0.9813. n_D^{20} 1.42192. Hot alkali → C₂H₅OH, CO₂, and C₂H₅NH₂.Mauguin, *Ann. chim. phys.*, 1911, 22, 323.Curtius, Hille, *J. prakt. Chem.*, 1901, 64, 409.Schreiner, *J. prakt. Chem.*, 1880, 21, 125.**1-Ethyl-n-valeric Acid (Ethylpropylacetic acid, hexane-3-carboxylic acid)** $\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130B.p. 209.2°. Sol. EtOH, Et₂O. Prac. insol. H₂O. Heat of comb. C₇ 994.7 Cal.*Me ester*: C₈H₁₆O₂. MW, 144. B.p. 155-156.5°.*Et ester*: C₉H₁₈O₂. MW, 158. B.p. 169-71°.*Chloride*: C₇H₁₃OCl. MW, 148.5. B.p. 158-60°.*Amide*: C₇H₁₅ON. MW, 129. Cryst. from CS₂. M.p. 102.5-103.5°.Rasetti, *Bull. soc. chim.*, 1905, 33, 685.Kiliani, *Ber.*, 1886, 19, 227.**Ethylvinylacetone.**

See 1-Heptenone-4.

Ethylvinylacetylene.

See 1-Hexen-3-yne.

Ethylvinylcarbinol (1-Pentenol-3) $\text{C}_5\text{H}_{10}\text{O}$ MW, 86B.p. 114-16°, 37°/20 mm. D_4^{20} 0.856, D_4^{25} 0.839. n_D^{20} 1.4182.*p*-Nitrobenzoyl: m.p. 53°.*Allophanate*: m.p. 155°.Delaby, *Compt. rend.*, 1922, 175, 967.Kohler, *Am. Chem. J.*, 1907, 38, 525.Hunsdiecker, Wirth, *Ber.*, 1942, 75, 460.**Ethyl vinyl Ether (Ethoxyethylene)** $\text{C}_4\text{H}_8\text{O}$ MW, 72B.p. 35.5°. D_4^{20} 0.7589. n_D^{20} 1.3767. Spar. sol. H₂O. Polymerises violently on addn. of iodine. Used in anaesthesia.*Dibromide*: b.p. 63°/8 mm.I.G., D.R.Ps., 550,403, 550,495, (*Chem. Abstracts*, 1932, 26, 4825).Leuchs, Lemcke, *Ber.*, 1914, 47, 2577.Gulyaeva, Dauguleva, *Chem. Abstracts*, 1938, 32, 3756.Hurd, Botteron, *J. Am. Chem. Soc.*, 1946, 68, 1200.**Ethyl vinyl Ketone (1-Pentenone-3, 3-ketopentene-1, propionylethylene)** $\text{C}_5\text{H}_8\text{O}$ MW, 84

Liq. with penetrating odour. B.p. 65–70°/200 mm., 38°/60 mm. D_4^{20} 0.8524. n_D^{20} 1.4275. Sol. most org. solvents. Insol. H_2O . Polymerises easily, especially by heat or alkali. Forms add. comps. with aliphatic and aromatic amines.

Diethylacetal: $C_9H_{18}O_2$. MW, 158. B.p. 76–8°/15 mm.

Blaise, Maire, *Bull. soc. chim.*, 1908, 3, 270.

Courtot, Pierron, *Compt. rend.*, 1929, 188, 1501.

Ethylxanthogenic Acid.

See Xanthogenic Acid.

Ethyne.

See Acetylene.

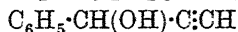
Ethynylbenzene.

See Phenylacetylene.

Ethynyl-2-butyne.

See 1:4-Hexadi-yne.

Ethynylphenylcarbinol (*Acetylenylphenyl carbinol*, α -hydroxybenzylacetylene, 3-hydroxy-3-phenylallylene, 1-phenylpropynol-1)



C_9H_8O MW, 132

Prisms. M.p. 22°. B.p. 114°/12 mm. D_4^{20} 1.0655. n_D^{20} 1.5508.

Hg comp.: needles from EtOH. M.p. 167–8°.

Acetyl: b.p. 124°/18 mm. n_D^{20} 1.5155.

Hydrogen phthaloyl: needles from petrol. M.p. 98–9°.

Phenylurethane: needles from pet. ether. M.p. 81–2°.

p-Nitrophenylurethane: pale yellow needles from xylene. M.p. 132°.

β -*Naphthylurethane*: needles from petrol. M.p. 120°.

Campbell, Campbell, Eby, *J. Am. Chem. Soc.*, 1938, 60, 2882.

Lespieau, *Bull. soc. chim.*, 1920, 39, 991.

McCallum, U.S.P. 2,125,384, (*Chem. Zentr.*, 1938, II, 3005).

Jones, McCombie, *J. Chem. Soc.*, 1942, 734.

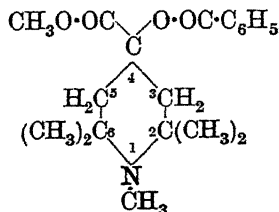
17-Ethynyltestosterone.

See Pregnenynolone.

Etio-.

See Aetio-.

α -**Eucaine** (1:2:2:6:6-Pentamethyl-4-benzoylhydroxypiperidine-4-carboxylic acid methyl ester)



$C_{19}H_{27}O_4N$

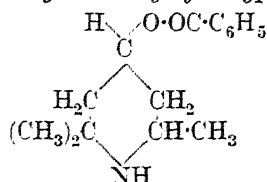
MW, 333

M.p. 104–5° (103°). Sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 , pet. ether. Local anæsthetic.

Hydrochloride: m.p. about 200° decomp.

Parsons, *J. Am. Chem. Soc.*, 1901, 23, 885.
Schering, D.R.P., 90,245.

β -**Eucaine** (o-Benzoylvinylldiacetonalkamine, 2:6:6-trimethyl-4-benzoylhydroxypiperidine)



$C_{15}H_{21}O_2N$

MW, 247

l.

Prisms from pet. ether. M.p. 57–8°.

B.HCl: plates. M.p. 244–5°. $[\alpha]_D - 11.3^\circ$ in H_2O .

Picrate: prisms from EtOH. M.p. 198–9°.

d.

Columns from pet. ether. M.p. 57–8°. Equally anæsthetic to the *l*-form but only half as toxic.

B.HCl: plates. M.p. 244–5°. $[\alpha]_D + 11.5^\circ$ in H_2O .

r.

Plates from pet. ether. M.p. 70–1° (91°, about 78°). Sol. Et_2O , $CHCl_3$, C_6H_6 , pet. ether. Substitute for cocaine as local anæsthetic.

B.HCl: m.p. 277–9° (268° decomp.).

Picrate: plates from EtOH. M.p. 230–5–231–5°.

King, *J. Chem. Soc.*, 1924, 125, 41.

Parsons, *J. Am. Chem. Soc.*, 1901, 23, 885.
Schering, D.R.P., 97,672.

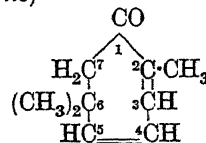
Eucalyptol.

See Cineole.

Eucarvol.

See Eucarvone.

Eucarvone (*Eucarvol*, 2:6:6-trimethyl- $\Delta^2:4$ -cycloheptadienone)



$C_{10}H_{14}O$

MW, 150

Oil with odour resembling menthone. B.p. 99–100°/22 mm., 88°/10 mm. D_4^{20} 0.9490. n_D^{20} 1.50872. Does not form bisulphite comp. Isomerises to carvacrol on boiling.

Oxime: cryst. from MeOH. M.p. 106°.

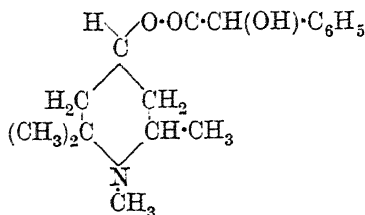
Semicarbazone: m.p. 186–8° (183–4°).

Wallach, Köhler, *Ann.*, 1905, 339, 94.

Clarke, Lapworth, *J. Chem. Soc.*, 1910, 97, 15.

Baeyer, Villiger, *Ber.*, 1898, 31, 2068.

Eucatropine (*Euphthalmine, betacaine mandelate*)



$C_{17}H_{25}O_3N$

MW, 291

Prisms from pet. ether. M.p. 113° (sinters at 108°). Sol. H_2O , EtOH, $CHCl_3$. Insol. Et_2O . Mydriatic.

B, HCl : m.p. $183-4^\circ$.

$B, HAuCl_4$: m.p. $158-9^\circ$.

Salicylate: m.p. $115-16^\circ$.

Kipping, *J. Chem. Soc.*, 1923, 123, 3115.

Harries, *Ber.*, 1898, 31, 665; *Ann.*, 1897, 296, 341.

Schering, D.R.P., 95,620, (*Chem. Zentr.*, 1898, I, 968).

Eucazulene

$C_{15}H_{18}$

MW, 198

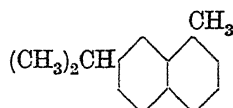
B.p. $135^\circ/0.5$ mm.

Picrate: m.p. $118-20^\circ$.

Styphnate: m.p. $122-3^\circ$.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, 9, 133.

Eudalene (1-Methyl-7-isopropyl-naphthalene)



$C_{14}H_{16}$

MW, 184

B.p. $140^\circ/11$ mm. D_4^{20} 0.9740. n_D^{20} 1.5833.

Picrate: needles from EtOH. M.p. 92° .

Styphnate: needles from EtOH. M.p. $119-20^\circ$.

Trinitrotoluene add. comp.: dull yellow cryst. M.p. $62-3^\circ$.

Ruzicka, Meyer, Mingazzini, *Helv. Chim. Acta*, 1922, 5, 361.

Ruzicka, Stoll, *ibid.*, 923.

Barnett, Sanders, *J. Chem. Soc.*, 1933, 435.

Eudesmene

$C_{15}H_{24}$

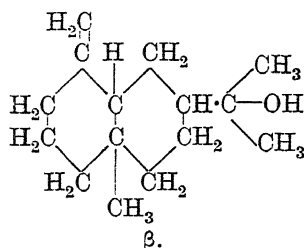
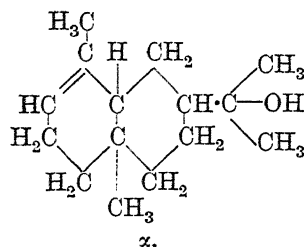
MW, 204

B.p. $135-6^\circ/14$ mm. D_4^{20} 0.9232. n_D^{20} 1.5099. $[\alpha]_D + 51^\circ$.

Dihydrochloride: m.p. $74-5^\circ$ ($79-80^\circ$). $[\alpha]_D + 20^\circ \pm 3^\circ$.

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, 14, 1140.

Eudesmol (*Selinelol, atractylol*)



$C_{15}H_{26}O$

MW, 222

Constituent of various eucalyptus oils. Mixture of α - and β -forms. M.p. $82-3^\circ$. B.p. $156^\circ/10$ mm. D^{20} 0.9884. n_D^{20} 1.516°. $[\alpha]_D + 31.3^\circ$ in $CHCl_3$. $AcOH-HCl \rightarrow$ eudesmene dihydrochloride.

Acetyl: b.p. $165-70^\circ/11$ mm. D^{20} 0.9933. n_D^{20} 1.49204. $[\alpha]_D^{20} + 31^\circ$.

Dibromide: m.p. $55-6^\circ$.

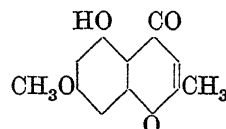
Allophanate: m.p. 174° .

Ruzicka, Wind, Koolhaas, *Helv. Chim. Acta*, 1931, 14, 1132.

Ruzicka, Capato, *Ann.*, 1927, 453, 62.

Semmler, Tobias, *Ber.*, 1913, 46, 2026.

Eugenin (5-Hydroxy-7-methoxy-2-methyl-chromone)



$C_{11}H_{10}O_4$

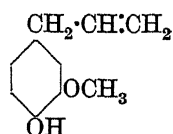
MW, 206

Constituent of *Eugenia aromatica*. Cryst. from EtOH. M.p. $119-20^\circ$. $FeCl_3 \rightarrow$ reddish violet col.

Acetyl: m.p. $152.5-153.5^\circ$.

Meyer, Schmid, *Helv. Chim. Acta*, 1948, 31, 1603.

Eugenol (4-Hydroxy-3-methoxyallylbenzene, 2-methoxy-4-allylphenol, 5-allylguaiacol)



$C_{10}H_{12}O_2$

MW, 164

Chief constituent of clove oil and present in many other essential oils. B.p. 254° (248°), 127°/15 mm., 123°/12 mm. D_4^{20} 1.0620. n_D^{20} 1.5439. Sol. EtOH, Et₂O, AcOH, caustic alkalis. Spar. sol. H₂O. Alkaline KMnO₄ → vanillin. Boiling alc. KOH → isoeugenol.

Me ether: 3:4-dimethoxy-1-allylbenzene, methyleugenol, 4-allylveratrole. C₁₁H₁₄O₂. MW, 178. Present in many essential oils. B.p. 248-9° (244°), 128-9°/11 mm. D_4^{20} 1.055. n_D^{20} 1.532.

Et ether: 3-methoxy-4-ethoxy-1-allylbenzene. C₁₃H₁₆O₂. MW, 192. B.p. 254°. D_4^{20} 1.0117. Polymerises on heating or dist. → product, leaflets from EtOH, m.p. 140° (125°).

Acetyl: see Aceteugenol.

Benzoyl: m.p. 70-5° (69-70°).

p-Nitrobenzoyl: m.p. 81°.

3:5-Dinitrobenzoyl: m.p. 130-8°.

Phenylcarbamate: m.p. 95-5°.

Picrate: brownish-red cryst. from CHCl₃. M.p. 62-3°.

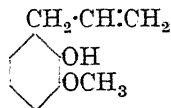
Claisen, Kremers, *Ann.*, 1919, 418, 113.

Wassermann, *Ann.*, 1875, 179, 366.

Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, 97, 1138.

Moureu, *Bull. soc. chim.*, 1896, 15, 651.

o-Eugenol (2-Hydroxy-3-methoxyallylbenzene, 3-allylguaiacol)



C₁₀H₁₂O₂ MW, 164

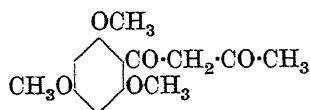
B.p. 115°/9 mm., 250-1°/760 mm. Sol. Et₂O, C₆H₆.

Allen, Gates, *Organic Syntheses*, 1945, XXV, 49.

Claisen, *Ber.*, 1912, 45, 3161.

Claisen, Eisleb, *Ann.*, 1913, 401, 112.

Eugenone (2:4:6-Trimethoxybenzoyl-acetone)



C₁₃H₁₆O₄ MW, 236

Constituent of *Eugenia caryophyllata*, Thunb. Cryst. M.p. 97-8°.

Schmid, Majer, *Helv. Chim. Acta*, 1948, 31, 748.

Euonymol

C₂₁H₃₀O₄ MW, 346

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. Prisms. M.p. 248-50°.

Acetyl deriv.: prisms. M.p. 215°.

Rogerson, *J. Chem. Soc.*, 1912, 101, 1046.

Dict. of Org. Comp.—II.

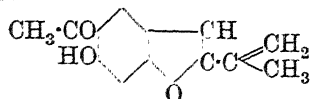
Euonysterol

C₃₁H₅₂O₂ MW, 456

Isolated from root bark of *Euonymus atropurpureus*, Jacquin. M.p. 137-8°. [α]_D²⁰ -25.2°. *Acetyl deriv.*: laminae. M.p. 116-15°.

Rogerson, *J. Chem. Soc.*, 1912, 101, 1047.

Euparin



C₁₃H₁₂O₃ MW, 216

Constituent of roots of *Eupatorium purpureum*. Yellow prisms from ligroin. Sol. Et₂O, CHCl₃, C₆H₆. Spar. sol. 8% NaOH.Aq. FeCl₃ → green col. in EtOH. Volatile in steam. Sublimes in vacuo.

Acetyl: prisms from ligroin. M.p. 80°.

Me ether: C₁₄H₁₄O₃. MW, 230. Needles from EtOH.Aq. M.p. 76-7°.

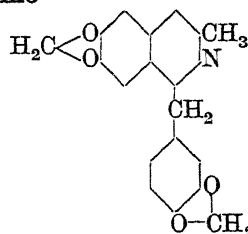
Oxime: prisms from EtOH.Aq. M.p. 147-8°.

Semicarbazone: yellow prisms from AcOEt. M.p. 255°.

2:4-Dinitrophenylhydrazones: brown prisms from AcOEt. M.p. 252°.

Kamthong, Robertson, *J. Chem. Soc.*, 1939, 925, 933.

Eupaverine



C₁₉H₁₅O₄N MW, 321

Colourless needles with blue fluor. from MeOH. M.p. 141°. Employed as substitute for papaverine. Salts used as antispasmodics and sedatives.

B.HCl: yellowish prisms from MeOH-Et₂O. M.p. 254-5° decomp.

Chloroaurate: decomp. at 202°.

Merck, B.P. 348,956, (*Chem. Zentr.*, 1931, II, 1196); D.R.P. 556,709, (*Chem. Zentr.*, 1932, II, 2847).

Bruckner, Krámlí, *J. prakt. Chem.*, 1936, 145, 291.

α-Euphol (Euphadienol)

C₃₀H₅₀O MW, 426

Tetracyclic triperpene of *Euphorbia* spp. Cryst. M.p. 116°. [α]_D^{19.5} + 32° in CHCl₃.

Acetyl: m.p. 106-5°. [α]_D¹⁹ + 26°.

Benzoyl: m.p. 137°. $[\alpha]_D^{25} + 59^\circ$.

Newbold, Spring, *J. Chem. Soc.*, 1944, 249.

Dupont *et al.*, *Bull. soc. chim.*, 1947, 1068.

McDonald, Warren, Williams, *J. Chem. Soc.*, 1949, *Suppl.* 155.

Haines, Warren, *J. Chem. Soc.*, 1950, 1562.

Bennett, Krusi, Warren, *J. Chem. Soc.*, 1951, 2534.

Gonzales, Calero, *Chem. Abstracts*, 1950, 46, 4014.

Vilkas, *Bull. soc. chim.*, 1950, 582.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1951, 34, 1675.

Jeger *et al.*, *Helv. Chim. Acta*, 1952, 35, 1756, 2073.

β -Euphol

$C_{30}H_{50}O$ MW, 426

Constituent of *Euphorbia resinifera*. Cryst. M.p. 125°. $[\alpha]_D^{25} + 14.3^\circ$.

Acetyl: m.p. 92°. $[\alpha]_D^{25} + 17.2^\circ$.

Benzoyl: m.p. 105–6°. $[\alpha]_D^{25} + 37^\circ$.

Dupont, Kopaczewski, Brodski, *Bull. soc. chim.*, 1947, 1068.

Euphorbol

$C_{30}H_{50}O$ MW, 426

Tetracyclic triterpene found in *Euphorbia* spp. M.p. 127–8°. $[\alpha]_D^{25} \pm 0^\circ$ in $CHCl_3$.

Acetyl: m.p. 124–5°. $[\alpha]_D^{25} \pm 0^\circ$ in $CHCl_3$.

Benzoyl: m.p. 133–5°. $[\alpha]_D^{25} + 15^\circ$ in Py.

Newbold, Spring, *J. Chem. Soc.*, 1944, 249.

Barbour, Warren, Wood, *J. Chem. Soc.*, 1951, 2537.

Euphthalmine.

See Eucatropine.

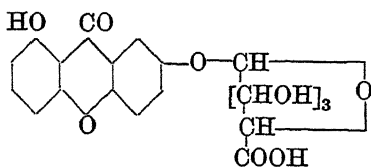
Euresol.

See under Resorcinol.

Euophene.

See 6-*tert*.-Butyl-*o*-cresol.

Euxanthic Acid



$C_{19}H_{16}O_{10}$ MW, 404

Exists as stable hydrate with $1H_2O$. M.p. 156–8° part. decomp.

Me ester: $C_{20}H_{18}O_{10}$ MW, 418. M.p. 212°.

Et ester: $C_{21}H_{20}O_{10}$ MW, 432. M.p. 198°.

Robertson, Waters, *J. Chem. Soc.*, 1931, 1709.

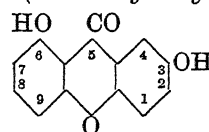
Neuberg, Neimann, *Z. physiol. Chem.*, 1905, 44, 114.

Graebe, *Ber.*, 1900, 33, 3360.

Euxanthogen.

See Mangiferin.

Euxanthone (3 : 6-Dihydroxyxanthone)



$C_{13}H_8O_4$

MW, 228

Occurs in *Platonia insignis*, Mart., *Mangnifera indica*, Linn., etc. Yellowish needles from toluene. M.p. 240°. Sol. hot EtOH, conc. alkalis. Spar. sol. Et_2O . Insol. H_2O . Sublimes with part. decomp. $FeCl_3 \rightarrow$ green col. KOH fusion \rightarrow hydroquinone + resorcinol. Forms stable Na, Ca, Ba, Mg, etc. salts.

6-Me ether: $C_{14}H_{10}O_4$. MW, 242. Pale yellow plates from C_6H_6 . M.p. 235° (240°).

3-Me ether: yellow plates from EtOH. M.p. 130–5°.

Di-Me ether: $C_{15}H_{12}O_4$. MW, 256. Needles from ligroin. M.p. 149–5°.

Di-Et ether: $C_{17}H_{16}O_4$. MW, 284. M.p. 126°.

3-Acetyl: yellowish prisms from EtOH. M.p. 160°.

Diacetyl: yellowish prisms from C_6H_6 . M.p. 185°.

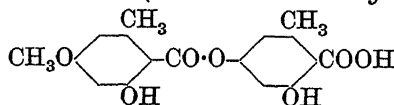
Dibenzoyl: yellow cryst. M.p. 221–2° (214°).

Robertson, Waters, *J. Chem. Soc.*, 1929, 2239.

Ullmann, Panchaud, *Ann.*, 1906, 350, 108.

Graebe, Aders, *Ann.*, 1902, 318, 365.

Evernic Acid (Lecanoric acid methyl ether)



$C_{17}H_{16}O_7$

MW, 332

Constituent of various lichens. Prisms from EtOH, needles from H_2O or Me_2CO . M.p. 170°. Sol. hot EtOH. Spar. sol. cold EtOH, Et_2O . Insol. cold H_2O .

Diacetyl: prisms from AcOEt–ligroin. M.p. 159° (144°).

Me ester: $C_{18}H_{18}O_7$. MW, 346. Prisms from Me_2CO . M.p. 148° (140°).

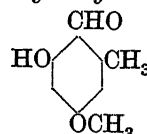
Et ester: $C_{19}H_{20}O_7$. MW, 360. Prisms from EtOH. M.p. 152°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1388.

Hesse, *J. prakt. Chem.*, 1898, 57, 246.

Fujikawa, Ishiguro, *J. Pharm. Soc. Japan*, 1936, 56, 837.

Everninaldehyde (3-Hydroxy-5-methoxy-*o*-toluic aldehyde, 6-hydroxy-2-methylanisaldehyde)



$C_9H_{10}O_3$

MW, 166

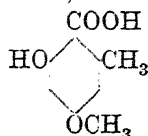
Prisms from 70% MeOH. M.p. 65°.

Acetyl: prisms from ligroin. M.p. 84°.

Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1390.

Hoesch, *Ber.*, 1913, 46, 889.

Everninic Acid (6-Hydroxy-2-methylanisic acid, orsellinic acid 5-methyl ether, 3-hydroxy-5-methoxy-o-toluic acid)



$C_9H_{10}O_4$ MW, 182

Needles from H_2O . M.p. 170° (157°). Sol. EtOH, Me_2CO , AcOEt. Spar. sol. Et_2O , C_6H_6 , ligroin.

Et ester: $C_{11}H_{14}O_4$. MW, 210. Prisms from EtOH. M.p. 72°.

Me ether: 3:5-dimethoxy-o-toluic acid. $C_{10}H_{12}O_4$. MW, 196. Prisms from EtOH. Aq. M.p. 140° decomp.

Et ether: $C_{11}H_{14}O_4$. MW, 210. Prisms from AcOEt-ligroin. M.p. 87°.

Acetyl: prisms from AcOEt-ligroin. M.p. 117° (111°).

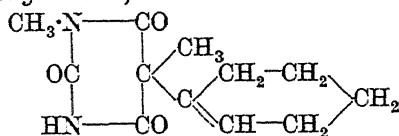
Robertson, Stephenson, *J. Chem. Soc.*, 1932, 1392.

Hesse, *J. prakt. Chem.*, 1915, 92, 425.

Hoesch, *Ber.*, 1913, 46, 892.

Fischer, Hoesch, *Ann.*, 1912, 391, 367.

Evipal (Evipan, N-Methyl-5-methyl-5-cyclohexenylbarbituric acid, N-methylcyclohexenylmethylmalonyl ureide)



$C_{12}H_{16}O_3N_2$ MW, 236

Tasteless cryst. powder. M.p. 143-5°. Sol. AcOEt, hot EtOH. Spar. sol. H_2O , Et_2O . Hypnotic.

Na salt: intravenous anaesthetic of short duration (15-20 mins.).

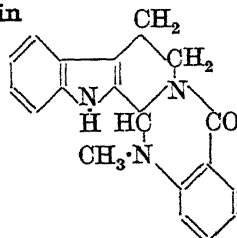
Weese, Scharpff, *Chem. Zentr.*, 1932, II, 2330.

Mayer, *ibid.*, 2078.

Evipan.

See Evipal.

Evodiamin



$C_{19}H_{17}ON_3$

MW, 303

Occurs in fruit of *Evodia rutascarpa*, Benth. and Hook. Leaflets from EtOH. M.p. 278°. $[α]_D^{25} = -352°$ in Me_2CO . Sol. Me_2CO . Spar. sol. EtOH, Et_2O , AcOH, $CHCl_3$. Insol. H_2O , C_6H_6 , pet. ether. Weak base, insol. dil. acids. Alc. $HCl \rightarrow$ inactive isoevodiamin, $C_{19}H_{19}O_2N_3$, m.p. 146-7°.

Asahina, Ohta, *Ber.*, 1928, 61, 319.

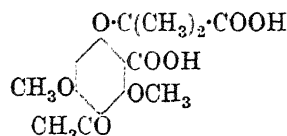
Asahina, Ishio, Kashiwagi, Mayeda, Fujita, *Chem. Zentr.*, 1923, III, 249.

Asahina, Fujita, *Chem. Zentr.*, 1922, I, 357.

Evodin.

See Limonin.

Evodionic Acid

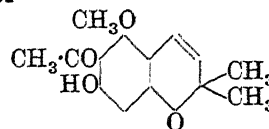


$C_{15}H_{18}O_8$ MW, 306

Degradation product of evodionol. Cryst. M.p. 134°.

Lahey, *Chem. Abstracts*, 1943, 37, 3432.

Evodionol



$C_{14}H_{16}O_4$ MW, 248

Present in *Evodia littoralis*. Yellow cryst. from pet. ether. M.p. 86°. Hot NaOH \rightarrow Me_2CO .

Me ether: $C_{15}H_{18}O_4$. MW, 262. Cryst. M.p. 79°. *Oxime*: prisms. M.p. 135°. *Benzylidene deriv.*: yellow needles from EtOH. M.p. 114°. 2:4-Dinitrophenylhydrazones: red cryst. M.p. 157°.

Acetyl: m.p. 66°.

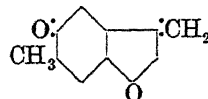
Benzylidene deriv.: red needles from EtOH. M.p. 94°.

Oxime: m.p. 89°.

Lahey, Jones, *Chem. Abstracts*, 1940, 34, 2133.

Lahey, *Chem. Abstracts*, 1943, 37, 3432.

Evodone



Suggested structure

$C_{10}H_{12}O_2$ MW, 164

Present in *Evodia hortensis*. Colourless cryst. from MeOH. M.p. 73°. $[α]_D^{25} = -53.9°$ in MeOH.

Semicarbazone: m.p. 188°.

Phenylhydrazones: m.p. 258-60°.

van Hulssen, *Chem. Abstracts*, 1942, 36, 4969.

Evoxanthine $C_{16}H_{13}O_4N$

MW, 283

Alkaloid of bark of *Evodia xanthoxyloides*.
Pale yellow needles. M.p. 217–18°.

Hughes, Lahey, Price, Webb, *Nature*,
1948, 162, 223.

Exalgin.

See *N*-Methylacetanilide.

Exaltolide.

See under 15-Hydroxypentadecylic Acid.

Exaltone.

See Cyclopentadecanone.

Exogonic Acid $C_{10}H_{14}O_3$

MW, 182

Present in *Convolvulaceæ*. Yellow liq. B.p.
175°/0.15 mm.

Ag salt: amorph. Decomp. in light.

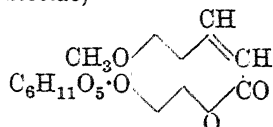
Me ester: b.p. 128–30°/0.14 mm.

"*Di-hydriodide*": $C_{10}H_{16}O_3I_2$. MW, 438.
M.p. 80–1°.

Mannich, Schumann, *Arch. Pharm.*, 1938,
276, 211.

F

Fabiatriin (7-Glucosido-6-methoxycoumarin, scopoletin glucoside)



$C_{16}H_{18}O_9$

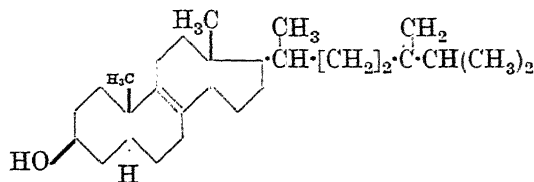
MW, 354

Present in leaves of *Fabiana imbricata*, Ruiz. et Pav. Needles + $2H_2O$ from H_2O . M.p. $226-8^\circ$. Sol. hot H_2O . Spar. sol. cold org. solvents. Hyd. \rightarrow glucose + scopoletin.

Edwards, Rogerson, *Biochem. J.*, 1927, 21, 1010.

F-Acid.

See 2-Naphthol-7-sulphonic Acid.

Fæcoesterol (*Fecosterol*)

Suggested structure

$C_{28}H_{46}O$

MW, 398

Needles from Me_2CO . M.p. $161-3^\circ$. $[\alpha]_D^{25} + 42.1^\circ$ in $CHCl_3$. Sol. Et_2O , $CHCl_3$, $AcOEt$, C_6H_6 , pet. ether. Spar. sol. $EtOH$, Me_2CO . Hydrogenation \rightarrow α -ergosterol.

Acetyl deriv.: leaflets from $EtOH$. M.p. $159-61^\circ$.

Benzoyl deriv.: m.p. $144-6^\circ$. $[\alpha]_D^{25} + 35.4^\circ$ in $CHCl_3$.

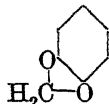
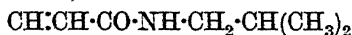
Wieland, Asano, *Ann.*, 1929, 473, 307.

Barton, *J. Chem. Soc.*, 1945, 813.

Wieland, Speer, Heyl, *Ann.*, 1941, 548, 34.

Barton, Cox, *J. Chem. Soc.*, 1949, 214.

Fagaramide (*N*-Isobutyl-3:4-methylenedioxy-cinnamic amide)



$C_{14}H_{17}O_3N$

MW, 247

Occurs in bark of *Zanthoxylum macrophyllum*, Oliver. Plates from $AcOEt$. M.p. 119.5° (softens at 105°). $KMnO_4 \rightarrow$ piperonal \rightarrow piperonylic acid. Alc. $KOH \rightarrow$ methylenedioxy-cinnamic acid + isobutylamine.

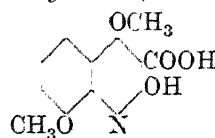
B_2, HCl : m.p. 137° .

Dibromide: m.p. $134-5^\circ$.

Goodson, *Biochem. J.*, 1921, 15, 123.

Thoms, Thumen, *Ber.*, 1911, 44, 3717.

γ -Fagaric Acid (2-Hydroxy-4:8-dimethoxyquinoline-3-carboxylic acid)



$C_{13}H_{11}O_5N$

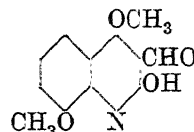
MW, 249

Degradation product of fagarine. Colourless cryst. from $AcOH$. M.p. 215° . Decarboxylated by hot HCl .

Deulofeu, Labriola, de Lanthé, *J. Am. Chem. Soc.*, 1942, 64, 2326.

Berinzaghi, Deulofeu et al., *J. Org. Chem.*, 1945, 10, 181.

γ -Fagaric Aldehyde (2-Hydroxy-4:8-dimethoxyquinoline-3-aldehyde)



$C_{12}H_{11}O_4N$

MW, 233

Obtained by ox. of fagarine. Cryst. M.p. 185° . Phenylhydrazones: yellow cryst. from $EtOH$. M.p. 207° .

Deulofeu, Labriola, de Lanthé, *J. Am. Chem. Soc.*, 1942, 64, 2326.

Berinzaghi, Deulofeu et al., *J. Org. Chem.*, 1945, 10, 181.

 α -Fagarine

$C_{21}H_{23}O_5N$

MW, 369

Alkaloid of *Fagara coco*. Prisms, m.p. 163° , or octahedra, m.p. 169° .

B, HCl : cryst. + $1EtOH$. M.p. $190-2^\circ$ decomp.

B, HBr : cryst. + $\frac{1}{2}EtOH$. M.p. $185-8^\circ$ decomp.

B, HI : cryst. + $1EtOH$. M.p. $192-4^\circ$ decomp.

B, H_2AuCl_4 : cryst. + $1H_2O$. M.p. 187° decomp.

Picrate: m.p. $207-8^\circ$.

Methiodide: m.p. $205-6^\circ$.

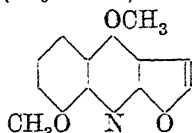
Deulofeu, Labriola, de Lanthé, *J. Am. Chem. Soc.*, 1942, 64, 2326.

Deulofeu, Labriola, Berinzaghi, *Chem. Abstracts*, 1949, 43, 7779.

Redemann, Wisegarver, Alles, *J. Am. Chem. Soc.*, 1949, 71, 1030.

β -Fagarine.

See Skimmianine.

 γ -Fagarine (*Aegelenine*) $C_{13}H_{11}O_3N$

MW, 229

Alkaloid present in *Fagara coco* and *Aegle marmelos* (Bihar variety). Cryst. M.p. 142°. Ox. \rightarrow fagaric aldehyde + fagaric acid.

B, H_2PtCl_6 : orange needles from H_2O . Decomp. above 200°.

Picrate: yellow cryst. from EtOH. M.p. 177°.

Picolonate: yellow cryst. M.p. 174–5°.

Berinzaghi, Deulofeu *et al.*, *J. Org. Chem.*, 1945, 10, 181.

Chakravarty, *J. Indian Chem. Soc.*, 1944, 21, 401.

Fagarine II $C_{20}H_{22}O_5N$

MW, 356

Alkaloid of *Fagara coco*. Cryst. from EtOH, AcOEt or C_6H_6 . M.p. 198–9°. $[\alpha]_D^{20}$ 0°. Bitter taste. Conc. $H_2SO_4 \rightarrow$ reddish violet \rightarrow purple col.

B, HCl : cryst. + $\frac{1}{2}H_2O$. M.p. 200–2° decomp.

B, HBr : cryst. + $\frac{1}{2}H_2O$. M.p. 208–10° decomp.

B, H_2AuCl_4 : m.p. 218–19°.

Picrate: m.p. 214°.

Methiodide: m.p. 234° decomp.

Redemann, Wisegarver, Alles, *J. Am. Chem. Soc.*, 1949, 71, 1030.

Fagarine III $C_{22}H_{26}O_4N$

MW, 368

Alkaloid of *Fagara coco*. Cryst. M.p. 181–3°. $[\alpha]_D^{25} - 300^\circ$ in $CHCl_3$.

B, HCl : m.p. 232–4° decomp.

Redemann, Wisegarver, Alles, *J. Am. Chem. Soc.*, 1949, 71, 1030.

Faganol $C_{20}H_{18}O_6$

MW, 354

Sterol occurring in root of *Zanthoxylum senegalense*, D.C. Needles from C_6H_6 -pet. ether. M.p. 127–8°. Sol. C_6H_6 , $CHCl_3$, Me_2CO , CS_2 . Spar. sol. EtOH, pet. ether.

Preiss, *Chem. Zentr.*, 1911, II, 94.

Fagopyrin $C_{42}H_{36}O_{10}N_2$

MW, 728

Photodynamic colouring matter of *Fagopyrum esculentum*. Cryst. from phenol- $MeOH$. $Py.HBr \rightarrow$ hypericin.

Brockmann, Weber, Pampus, *Ann.*, 1951, 575, 53.

Fangchinoline (For formula see Tetrandrine) $C_{37}H_{40}O_6N_2$

MW, 608

Alkaloid isolated from the Chinese drug Han-Fang-Chi. Cryst. from EtOH or Me_2CO . M.p. 237–8°. Alc. $FeCl_3 \rightarrow$ bluish-green col. $[\alpha]_D^{18} + 255.1^\circ$ in $CHCl_3$.

Mono-Me ether: Tetrandrine, *q.v.*

Et ether: needles from EtOH.Aq. M.p. 116–17°. *Picrate*: yellow prisms from Me_2CO . M.p. 242° decomp.

Picrate: cryst. from Me_2CO , m.p. 224° decomp. Cryst. from EtOH, m.p. 186° decomp.

Chuang, Hsing, Kao, Chang, *Ber.*, 1939, 72, 519.

Faradiol $C_{30}H_{50}O_2$

MW, 442

Present in coltsfoot, sunflower and arnica sap. Cryst. M.p. 236–7°. $[\alpha]_D + 43.1-44.5^\circ$. Hydrogenation \rightarrow dihydro deriv. Ox. \rightarrow faradione.

Diacetyl deriv.: m.p. 163–7°. $[\alpha]_D + 54.5-55.5^\circ$.

Dihydro deriv.: m.p. 241°. *Diacetyl*: m.p. 196°.

Klobb, *Compt. rend.*, 1941, 149, 999.

Zimmerman, *Helv. Chim. Acta*, 1943, 26, 642.

Jeger, Lardelli, *Helv. Chim. Acta*, 1947, 30, 1020.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1948, 31, 1815.

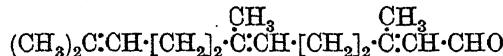
Faradione $C_{30}H_{46}O_2$

MW, 438

Obtained by ox. of faradiol. Cryst. M.p. 242°.

Dioxime: m.p. 268°.

Zimmerman, *Helv. Chim. Acta*, 1943, 26, 642.

Farnesal $C_{15}H_{24}O$

MW, 220

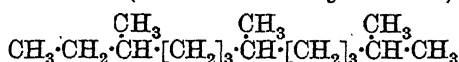
B.p. 172–4°/14 mm. $D^{18} 0.893$. $n_D 1.49951$. Reduces NH_3 , $AgNO_3$.

Semicarbazone: m.p. 133–5°.

Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, 23, 1724).

Kerschbaum, *Ber.*, 1913, 46, 1734.

Ruzicka, *Helv. Chim. Acta*, 1923, 6, 502.

Farnesane (2 : 6 : 10-Trimethyldodecane) $C_{15}H_{32}$

MW, 212

B.p. 126.5°/15 mm., 119.5–120°/11 mm. Spar. sol. MeOH, AcOH. D_4^{20} 0.7682. n_D^{20} 1.4303.

Kuhn, Ehmann, *Helv. Chim. Acta*, 1929, 12, 906.

Fischer, *Ann.*, 1928, 464, 88.

Fischer, Löwenberg, *Ann.*, 1929, 475, 193.

Farnesene

$(CH_3)_2C:CH[CH_2]_2C:CH[CH_2]_2C:CH:CH:CH_2$
 $C_{15}H_{24}$ MW, 204
 Mobile oil. B.p. 129–32°/12 mm. D_4^{20} 0.8410. n_D^{20} 1.4836.

Ruzicka, *Helv. Chim. Acta*, 1923, 6, 498.

Kerschbaum, *Ber.*, 1913, 46, 1733.

Harries, Haarmann, *ibid.*, 1741.

Farnesenic Acid (2:6:10-Trimethyl-undeca-1:5:9-triene-carboxylic acid, or 2:6:10-trimethylundeca-1:5:10-triene-carboxylic acid)

$(CH_3)_2C:CH[CH_2]_2C:CH[CH_2]_2C:CH-COOH$
 or
 $CH_2:C[CH_2]_3C:CH[CH_2]_2C:CH-COOH$
 $C_{15}H_{24}O_2$ MW, 236
 B.p. 202–6°/16 mm.
 Me ester: $C_{16}H_{26}O_2$. MW, 250. B.p. 177–185°/10 mm.

Kerschbaum, *Ber.*, 1913, 46, 1735.

Farnesol

$(CH_3)_2C:CH[CH_2]_2C:CH[CH_2]_2C:CH-CH_2OH$
 $C_{15}H_{26}O$ MW, 222

Occurs in many essential oils such as acacia, neroli, musk, and especially in oil from *Hibiscus abelmoschus*, Linn. B.p. 160°/10 mm., 149°/4 mm. (140–1°/3–4 mm.). D_4^{20} 0.8846. n_D^{20} 1.4877. $CrO_3 \rightarrow$ farnesal.

Acetyl: farnesyl acetate. B.p. 169–70°/10 mm.

Ruzicka, *Helv. Chim. Acta*, 1923, 6, 492.

Gresjean, Martinet, *Chem. Abstracts*, 1926, 20, 93 (Review).

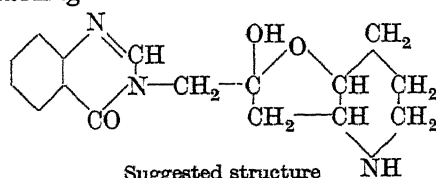
Fischer, *Ann.*, 1928, 464, 74, 87 (Bibl.).

Naef, D.R.P., 469,555, (*Chem. Abstracts*, 1929, 23, 1724).

Nivière, *Chem. Abstracts*, 1925, 19, 2258 (Review).

Ruzicka, Firmenich, *Helv. Chim. Acta*, 1939, 22, 392.

Febrifugine



$C_{16}H_{19}O_3N_3$

Suggested structure

MW, 301

Constituent of *Dichroa febrifuga*, Lour. having strong antimalarial properties. Needles from EtOH. M.p. 139–40°. $[\alpha]_D^{25} - 6^\circ$ in $CHCl_3$.

B.2HCl: prisms from 90% EtOH. M.p. 220–22°.

Koepli, Mead, Brockman, *J. Am. Chem. Soc.*, 1947, 69, 1837.

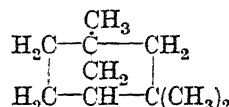
Koepli, Brockman, Moffat, *J. Am. Chem. Soc.*, 1950, 72, 3323.

Williams *et al.*, *J. Org. Chem.*, 1952, 17, 14, 19, 132.

Fecosterol.

See Fæcosterol.

Fenchane (1:3:3-Trimethylnorcamphane)



$C_{10}H_{18}$ MW, 138

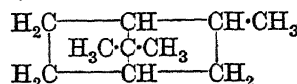
Liq. at -15° . B.p. 151–2°/765 mm. D_4^{20} 0.8345. n_D^{20} 1.44714. $[\alpha]_D^{20} - 18^\circ$. Sol. EtOH, Et_2O . Spar. sol. AcOH.

Wolff, *Ann.*, 1912, 394, 86.

Komppa, Hasselström, *Ann.*, 1932, 496, 164 (Bibl.).

Kondakov, *Chem. Abstracts*, 1930, 24, 2453.

α -Fenchane (2:7:7-Trimethylnorcamphane, isobornylane)



$C_{10}H_{18}$ MW, 138

B.p. 163.5–164.5°/753 mm. D_4^{20} 0.8579. n_D^{20} 1.4590. $[\alpha]_D^{20} - 12.36^\circ$.

Komppa, Hasselström, *Ann.*, 1932, 496, 164.

Nametkin, *Ann.*, 1924, 440, 60.

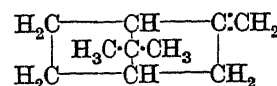
Fenchelene

$C_{10}H_{16}$ MW, 136

B.p. 175–8°, 66–70°/20 mm. D^{20} 0.842. n_D^{20} 1.47439.

Wallach, *Ann.*, 1898, 300, 311.

α -Fenchene



$C_{10}H_{16}$ MW, 136

l-. B.p. 157–9° (155–60°). D_4^{20} 0.8670 (0.8665). n_D^{20} 1.47133. $[\alpha]_D^{20} - 32.32^\circ$.

dl-. Isopinene.

B.p. 154–6°. D_4^{20} 0.8660, n_D^{20} 1.4705.

Hydrochloride: m.p. 35–7°.

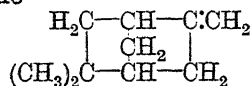
Wallach, *Ann.*, 1891, 263, 149.

Nametkin, Abahumowsky, Seliwanoff, *Ann.*, 1924, 440, 66.

Komppa, Hasselström, *Ann.*, 1932, 496, 165.

Komppa, Roschier, *Chem. Abstracts*, 1917, 11, 3276.

β-Fenchene



C₁₀H₁₆

MW, 136

d.

B.p. 150.5–153.5° (152–4°). D₄²⁰ 0.8599 (0.8597). n_D²⁰ 1.46511. [α]_D²⁵ + 62.5°.

Dibromide: m.p. 81–2°.

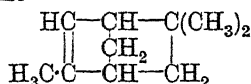
Nitrosochloride: m.p. 120°.

Komppa, Hasselström, *Ann.*, 1932, 496, 165; 1933, 502, 272.

Komppa, Beckmann, *Ann.*, 1933, 503, 130.

Quist, *Ann.*, 1918, 417, 278.

γ-Fenchene



C₁₀H₁₆

MW, 136

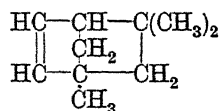
B.p. 145–7°. D₄²⁰ 0.8539. n_D²⁰ 1.46063.

Nitrosochloride: m.p. 150° decomp.

Kondakov, *Chem. Abstracts*, 1929, 23, 2707.

Komppa, Hasselström, *Ann.*, 1932, 496, 156.

δ-Fenchene (*Isopfenchene, fenchylene*)



C₁₀H₁₆

MW, 136

B.p. 139–40°. D₄²⁰ 0.8433 (0.8381). n_D²⁰ 1.44862 (1.4494). [α]_D – 68.8° in EtOH.

Nitrosochloride: m.p. 131°.

Komppa, Hasselström, *Ann.*, 1932, 496, 156.

Nametkin, *J. prakt. Chem.*, 1923, 106, 25.

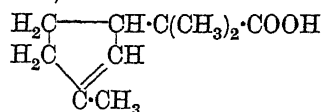
α-Fenchocamphorane.

See Apocamphane.

Fenchol.

See Fenchyl Alcohol.

α-Fencholenic Acid (*Methylcyclopentenyl-isobutyric acid*)



C₁₀H₁₆O₂

MW, 168

d.

Viscous oil. B.p. 254–6° decomp., 136–8°/12 mm. D₁₆²⁰ 1.0069. [α]_D + 32.35°.

Amide: C₁₀H₁₇ON. MW, 167. Leaflets from EtOH. M.p. 113–14°. [α]_D + 28.82° in EtOH.

Nitrile: C₁₀H₁₅N. MW, 149. B.p. 217–18° (211–12°). D₂₀²⁰ 0.9005 (0.898). [α]_D + 43.3°.

Nitrosochloride: m.p. 123–4°.

l.

Amide: m.p. 114–15°.

dl.

Amide: m.p. 98–9°.

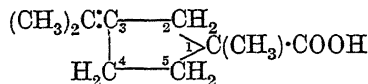
Wallach, *Ann.*, 1893, 272, 105, 108; 1911, 381, 75.

Blumann, Zeitschel, *Ber.*, 1909, 42, 2702.

Cockburn, *J. Chem. Soc.*, 1899, 75, 502.

Semmler, Bartelt, *Ber.*, 1907, 40, 435.

β-Fencholenic Acid (*1-Methyl-3-isopropylidenecyclopentane-1-carboxylic acid*)



C₁₀H₁₆O₂

MW, 168

Cryst. from pet. ether. M.p. 72–3° (68°). B.p. 259–60°, 140.5–141.5°/12 mm. D₄²⁰ 0.9638. [α]_D¹⁹ + 25.85° in Et₂O. Sol. EtOH, Et₂O. Spar. sol. C₆H₆, AcOH.

Me ester: C₁₁H₁₈O₂. MW, 182. B.p. 97–9°. D₂₀²⁰ 0.9608. n_D²⁰ 1.46459.

Amide: C₁₀H₁₇ON. MW, 167. M.p. 86.5–87.5°. Sol. EtOH, Et₂O.

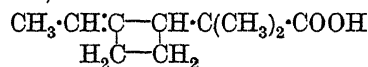
Nitrile: C₁₀H₁₅N. MW, 149. B.p. 217–19°. D₁₅⁶ 0.9203. [α]_D + 43.66° in EtOH.

Cockburn, *J. Chem. Soc.*, 1899, 75, 501.

Wallach, *Ann.*, 1911, 379, 205.

Semmler, *Ber.*, 1906, 39, 2854.

γ-Fencholenic Acid (*Ethylidenecyclobutylisobutyric acid*)



Probable structure

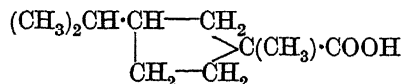
C₁₀H₁₆O₂

MW, 168

Oil. B.p. 151–3°/18 mm., 145–6°/10 mm. Sol. Et₂O. D₂₀²⁰ 1.0087. n_D²⁰ 1.47838. [α]_D + 52.3°. Readily changes to α-fencholenic acid.

Semmler, *Ber.*, 1907, 40, 434, 440.

Fencholic Acid (*1-Methyl-3-isopropylcyclopentane-1-carboxylic acid, dihydro-β-fencholenic acid*)



C₁₀H₁₈O₂

MW, 170

d.

F.p. 18.8°. M.p. 18–19°. B.p. 255–9°, 162–5°/22 mm., 119–20°/1 mm. D₄²⁰ 0.9698. n_D²⁰ 1.4563. Spar. volatile in steam.

Me ester: $C_{11}H_{20}O_2$. MW, 184. B.p. $91^\circ/12$ mm. D_4^{20} 0.9295.

Et ester: $C_{12}H_{22}O_2$. MW, 198. B.p. $222-3^\circ/97^\circ/10$ mm. D_4^{20} 0.9129. n_D^{20} 1.43958.

Chloride: $C_{10}H_{17}OCl$. MW, 188.5. B.p. $218-19^\circ/750$ mm., $105^\circ/20$ mm., $100^\circ/15$ mm. D_4^{20} 1.0045. n_D^{20} 1.4606. $[\alpha]_D^{20} - 2.43^\circ$.

Anhydride: $C_{20}H_{34}O_3$. MW, 322. B.p. $205-10^\circ/20$ mm.

Amide: $C_{10}H_{19}ON$. MW, 169. F.p. 95.3° . M.p. 94° . B.p. $160^\circ/11$ mm.

Nitrile: $C_{10}H_{17}N$. MW, 151. B.p. $217-18^\circ$. D_4^{20} 0.8680. n_D^{20} 1.4426.

l.
F.p. $16-18^\circ$. B.p. $144-5^\circ/13$ mm. $[\alpha]_D^{20} - 3.66^\circ$.

Et ester: b.p. $115-17^\circ/25$ mm. $[\alpha]_D^{20} - 3.753^\circ$.

Chloride: b.p. $118-19^\circ/24$ mm.

Amide: m.p. 94° .

dl.
Amide: m.p. 116° (108°). Sol. EtOH, Et₂O, C₆H₆.

Maxwell, *Ann. chim.*, 1922, 17, 341.

Wallach, *Ann.*, 1911, 379, 198, 213.

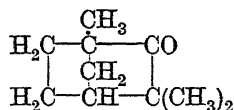
Bouveault, Levallois, *Bull. soc. chim.*, 1910, 7, 684, 966, 971.

Semmler, *Ber.*, 1906, 39, 2579.

Barbier, Grignard, *Bull. soc. chim.*, 1909, 5, 522.

Braun, Jakob, *Ber.*, 1933, 66, 1463.

Fenchone



$C_{10}H_{16}O$ MW, 152
d.

Occurs in essential oil of *Lavandula stoechas*, Linn. F.p. $5-6^\circ$. M.p. $3-5^\circ$. B.p. $193.5^\circ/122^\circ/100$ mm., $82^\circ/20$ mm., $68.3^\circ/10$ mm. D_4^{20} 0.9465. n_D^{20} 1.4623. $[\alpha]_D^{20} + 63.03^\circ$.

Hydrazone: m.p. $56-7^\circ$. B.p. $230-1^\circ$ decomp. $[\alpha]_D + 46.4^\circ$ in EtOH.

d. (or *l.*) α -*Oxime*: m.p. 165° . *Benzoyl deriv.*: m.p. 79° . $[\alpha]_D \pm 29^\circ$.

d. (or *l.*) β -*Oxime*: m.p. 123° . $[\alpha]_D \pm 129.3^\circ$ in EtOH. *Benzoyl deriv.*: m.p. 123° . $[\alpha]_D \pm 120^\circ$.

d. (or *l.*) 2:4-Dinitrophenylhydrazones: m.p. 140° . Sinters at 125° .

Azine: m.p. $106-7^\circ$.

l.
M.p. 5° (8.5°). B.p. $192-4^\circ$. D_4^{20} 0.948. $[\alpha]_D^{20} - 66.94^\circ$ in EtOH.

Semicarbazone: m.p. $182-3^\circ$.

dl.
M.p. -18 to -16° . B.p. $192-3^\circ$ ($193-4^\circ$), $72-3^\circ/12$ mm. D_4^{20} 0.9501. n_D^{20} 1.4702.

α -*Oxime*: m.p. $158-9^\circ$. *Benzoyl deriv.*: m.p. 77° .

β -*Oxime*: m.p. 129° . *Benzoyl deriv.*: m.p. $111-15^\circ$.

Semicarbazone: m.p. $172-3^\circ$.

Phenylhydrazones: b.p. $202-3^\circ/18$ mm.

Braun, Jakob, *Ber.*, 1933, 66, 1462.

Zeitschel, Todenhöfer, *J. prakt. Chem.*, 1932, 133, 376.

Bouveault, Levallois, *Bull. soc. chim.*, 1916, 7, 963, 968.

Roure-Bertrand Fils, *Chem. Abstracts*, 1922, 16, 2577.

Ruzicka, *Ber.*, 1917, 50, 1362 (*Bibl.*).

Maxwell, *Ann. chim.*, 1922, 17, 332.

Delépine, *Bull. soc. chim.*, 1924, 35, 1330.

Ruzicka, *Ann.*, 1924, 440, 322.

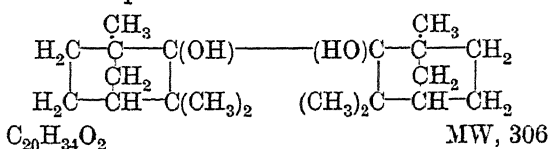
Humphrey, U.S.P., 1,850,983, (*Chem. Abstracts*, 1932, 26, 2752): U.S.P.,

1,876,454, (*Chem. Zentr.*, 1933, I, 848).

du Pont, F.P., 736,087, (*ibid.*, 1352).

Komppa, Klauri, *Ber.*, 1935, 68, 2001.

Fenchopinacone



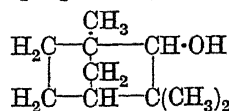
d.
Cryst. from EtOH or AcOH. M.p. 97° . B.p. $360-5^\circ$ decomp., $219-20^\circ/13$ mm. $[\alpha]_D^{20} + 45^\circ$ in AcOEt.

l.
 $[\alpha]_D^{20} - 44.78^\circ$ in AcOEt.

dl.
M.p. $104-5^\circ$.

Wallach, Wienhaus, *Ann.*, 1909, 369, 68.

Fenchyl Alcohol (*Fenchol*, 1:3:3-trimethylbicyclo-[1:2:2]-heptanol-2)



$C_{10}H_{18}O$ MW, 154

d.
M.p. 45° . B.p. $201-2^\circ$. $[\alpha]_D + 10.36^\circ$ in EtOH.

Acetyl: *d*-fenchylacetate. B.p. $125-7^\circ/5$ mm.

Phenylurethane: m.p. $82-82.5^\circ$.

Acid phthalate: m.p. $145-145.5^\circ$.

Oxalyl deriv.: cryst. from EtOH. M.p. $92-3^\circ$. $[\alpha]_D^{20} + 48.24^\circ$ in C₆H₆.

l.
Prisms. M.p. 47° . B.p. $94^\circ/20$ mm. D_4^{20} 0.9641. $[\alpha]_{5461}^{20} - 15.04^\circ$.

p-Chlorobenzoyl deriv.: m.p. $73-4^\circ$.

p-Nitrobenzoyl deriv.: m.p. $108-9^\circ$.

Acid phthalate: m.p. 146° .

Phenylurethane: m.p. 82° .

l-3-.

M.p. 3-4°. B.p. 91°/18 mm. $[\alpha]_{5461}^{20} - 27.97^\circ$.

p-Nitrobenzoyl deriv.: m.p. 82-3°.

Acid phthalate: m.p. 153°.

dl-

M.p. 38-9°. B.p. 201.4° (202-3°).

Phenylurethane: m.p. 104°.

α -Naphthylurethane: m.p. 149°.

Formyl deriv.: m.p. 21°. B.p. 207-8°. $D_{15}^{20} 0.996$. $n_D^{20} 1.46092$.

Acetyl: *dl*-fenchyl acetate. F.p. -0.5°. B.p. 79°/15 mm.

p-Nitrobenzoyl: m.p. 94-5°.

Oxalyl deriv.: m.p. 100.5-101.5°.

Acid phthalate: m.p. 169-169.5°.

Kenyon, Priston, *J. Chem. Soc.*, 1925, 127, 1472.

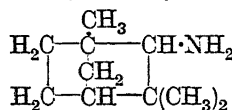
Zeitschel, Todenhöfer, *J. prakt. Chem.*, 1932, 133, 374.

Smith, U.S.P., 1,887,171, (*Chem. Zentr.*, 1933, I, 1017).

Nametkin, Seliwanoff, *J. prakt. Chem.*, 1923, 106, 28.

Komppa, Beckmann, *Ber.*, 1935, 68, 10.

Fenchylamine (2-Aminofenchane)



$C_{10}H_{19}N$

MW, 153

d-.

B.p. 195.3°/730 mm., 73.4°/11.5 mm. $[\alpha]_D^{20} + 25.89^\circ$ in EtOH.

N-Benzoyl: m.p. 90.2°. $[\alpha]_D^{25} + 24.43^\circ$.

N-Toluene-*p*-sulphonyl: monohydrate, m.p. 188-9°. $[\alpha]_D^{25} + 2.60^\circ$.

N-Benzylidene: m.p. 42°. $[\alpha]_D^{19} - 62.1^\circ$ in MeOH.

N-Salicylidene: m.p. 95°.

l-.

B.p. 195°. $D_{20}^{20} 0.9095$. $[\alpha]_D^{25} - 24.89^\circ$.

N-Formyl: m.p. 114°. $[\alpha]_D^{11} - 36.95^\circ$ in $CHCl_3$.

N-Acetyl: m.p. 98°. $[\alpha]_D^{25} - 46.62^\circ$ in $CHCl_3$.

N-Oxalyl: *N*:*N'*-difenchyloxamide. M.p. 188°.

N-Benzoyl: m.p. 133-5°.

N-Benzylidene: m.p. 42°. $[\alpha]_D^{18} + 73.23^\circ$ in $CHCl_3$.

N-Salicylidene: m.p. 95°. $[\alpha]_D^{16} + 66.59^\circ$ in $CHCl_3$. *Me ether*: m.p. 56°. $[\alpha]_D^{16} + 58.98^\circ$ in $CHCl_3$.

N-4-Hydroxybenzylidene: m.p. 175°. $[\alpha]_D^{19} + 72.00^\circ$ in $CHCl_3$. *Me ether*: m.p. 54-5°. $[\alpha]_D^{11} + 78.10^\circ$ in $CHCl_3$.

dl-.

B.p. 190-1°. $D_{20}^{20} 0.8971$. $n_D 1.4711$.

B, *HCl*: m.p. above 250°.

N-Benzoyl: m.p. 131-3°.

N-Salicylidene: m.p. 64-5°.

Wallach, Binz, *Ann.*, 1893, 276, 318.

Wallach, *Ann.*, 1893, 272, 105.

Ingersoll *et al.*, *J. Am. Chem. Soc.*, 1936, 58, 1808; 1939, 61, 2477.

Fenchylene.

See δ -Fenchene.

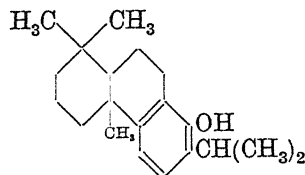
Ferrobilin.

See under Glucobilin.

Ferrocene.

See Iron dicyclopentadienyl.

Ferruginol



$C_{20}H_{30}O$

MW, 286

Constituent of resin of Miro tree, *Podocarpus ferrugineus*. B.p. 175°/0.3 mm. $D_4^{21} 1.008$. $n_D^{25} 1.5346$. $[\alpha]_D^{19} + 40.6^\circ$ in EtOH. Spar. sol. NaOH.Aq. $FeCl_3 \rightarrow$ green col. Se dehydrogenation \rightarrow pimanthrene and a hydroxyretene.

Me ether: $C_{21}H_{32}O$. MW, 300. B.p. 166°/0.3 mm. $D_4^{21} 0.9868$. $n_D^{25} 1.5290$.

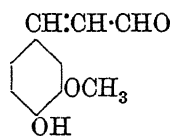
Formyl: needles from pet. ether. M.p. 96-7°.

Acetyl: needles from pet. ether. M.p. 81-2°. $[\alpha]_D^{16} + 60.3^\circ$ in EtOH.

Benzoyl: needles from pet. ether. M.p. 154-5°.

Brandt, Neubauer, *J. Chem. Soc.*, 1939, 1031.

Ferula-aldehyde (p-Coniferyl aldehyde, 4-hydroxy-3-methoxycinnamaldehyde)



$C_{10}H_{10}O_3$

MW, 178

Decomp. product of lignin.

Cis: (α).

Unstable. Only obtained as polymer.

Trans: (β).

Cryst. from C_6H_6 . M.p. 82.5°. B.p. 157°/2.5 mm.

Semicarbazone: m.p. 218°.

Hillmer, Hellriegel, *Ber.*, 1929, 62, 725.

Klason, *Ber.*, 1930, 63, 912.

Ferulene

$C_{15}H_{26}$

MW, 206

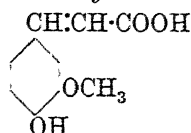
Occurs in essential oil from *Dorema ammoniacum*, D. Don. and many *Ferula* species. B.p. 124-6°/0.7 mm. $D_{20}^{20} 0.8698$. $n_D^{20} 1.48423$.

$[\alpha]_D^{25} + 6^\circ$. $H \rightarrow$ tetrahydroferulene, b.p. 113–22°/10 mm.

Semmler, Jonas, Roenisch, *Ber.*, 1917, 50, 1826.

Roenisch, *Chem. Abstracts*, 1921, 15, 2252.

Ferulic Acid (4-Hydroxy-3-methoxycinnamic acid, caffeic acid 3-methyl ether)



$C_{10}H_{10}O_4$ MW, 194

Occurs in *asafetida* as free acid. Prisms or needles from H_2O . M.p. 168–9° (170°). Sol. EtOH, AcOEt, hot H_2O . Mod. sol. Et_2O . Spar. sol. C_6H_6 , ligroin.

Me ester: $C_{11}H_{12}O_4$. MW, 208. M.p. 63–4°. B.p. 202°/11 mm. *Acetyl deriv.*: m.p. 124°.

Et ester: $C_{12}H_{14}O_4$. MW, 222. Cryst. + $1H_2O$. M.p. 75.5–76.5°.

Propyl ester: $C_{13}H_{16}O_4$. MW, 236. Cryst. + $1H_2O$. M.p. 78–9°.

Acetyl: m.p. 196–7°.

Carbomethoxyl: m.p. 186–7°. *Chloride*: m.p. 147°.

β -d-Glucoside: m.p. 227–8°. $[\alpha]_D^{20} -41.5^\circ$ in Py. *Tetra-acetyl*: m.p. 207–8°. $[\alpha]_D^{19} +32.9^\circ$ in $CHCl_3$.

Posner, *J. prakt. Chem.*, 1910, 82, 434.

Pacsu, Stieber, *Ber.*, 1929, 62, 2977.

Tanaka, *Chem. Abstracts*, 1930, 24, 2453.

Dutt, *J. Indian Chem. Soc.*, 1925, 1, 297.

Fischer, Hoesch, *Ann.*, 1912, 391, 357.

Kurien, Pandya, Surange, *J. Indian Chem. Soc.*, 1934, 11, 823.

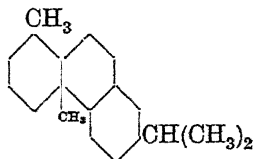
Helferich, Vorsatz, *J. prakt. Chem.*, 1936, 145, 270.

Pearl, Beyer, *J. Org. Chem.*, 1951, 16, 216.

Ferulic Aldehyde.

See Ferula-aldehyde.

Fichtelite



Probable structure

$C_{19}H_{34}$ MW, 262

Constituent of *Pinus pumilio*, Haenke, and peat. M.p. 46–5°. B.p. 355°/719 mm., 235–6°/43 mm. D_4^{25} 0.9380. n_D^{25} 1.5052. $[\alpha]_D^{25} +19.00^\circ$ in $CHCl_3$. Sol. $CHCl_3$, ligroin. Spar. sol. EtOH. $S \rightarrow$ retene.

Ruzicka, Balas, Schinz, *Helv. Chim. Acta*, 1923, 6, 692 (*Bibl.*).

Ruzicka, Waldmann, *Helv. Chim. Acta*, 1935, 18, 611.

Fiococeryl Alcohol

$C_{17}H_{34}O$ MW, 248

Occurs as ester of fiococerylic acid in wax of *Ficus ceriflua*, Jungh. Cryst. from EtOH. M.p. 195°.

Greshoff, Sack, *Rec. trav. chim.*, 1901, 20, 65.

Fiococerylic Acid

$C_{13}H_{26}O_2$ MW, 214

Occurs as fiococeryl ester in wax of *Ficus ceriflua*, Jungh. Cryst. from EtOH. M.p. 57°.

Greshoff, Sack, *Rec. trav. chim.*, 1901, 20, 65.

Ficusin.

See Psoralene.

Filicic Acid

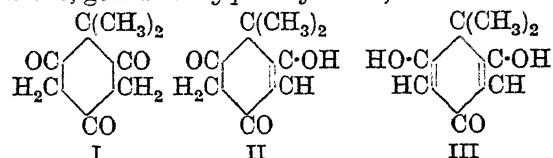
$C_{35}H_{40}O_{12}$ MW, 652

Occurs in male fern extract. Yellow plates from AcOEt. M.p. 184–5°. Sol. $CHCl_3$, CS_2 . Mod. sol. C_6H_6 , xylene. Spar. sol. Et_2O .

Boehm, *Ann.*, 1901, 318, 253.

Birch, Todd, *J. Chem. Soc.*, 1952, 3102.

Filicinic Acid (2:4:6-Triketo-1:1-dimethylcyclohexane, 1:1-dimethylcyclohexane-2:4:6-trione, gem-dimethylphloroglucinol)



$C_8H_{10}O_3$ MW, 154

Triketo form (I):

Occurs in male fern extract. Cryst. from EtOH. M.p. 213–15° decomp. Mod. sol. hot H_2O , hot EtOH. Spar. sol. Et_2O , AcOH. Reduces Tollen's reagent.

Monoenol form (II):

Me ether: $C_9H_{12}O_3$. MW, 168. Prisms from AcOEt. M.p. 205–7° (208°). B.p. 194–6°/18 mm. Mod. sol. EtOH. Spar. sol. Et_2O , C_6H_6 , hot H_2O . Insol. pet. ether. $FeCl_3 \rightarrow$ reddish-violet col.

Et ether: $C_{10}H_{14}O_3$. MW, 182. Prisms from hot EtOH. M.p. 215°. $FeCl_3 \rightarrow$ reddish-purple col.

Dienol form (III):

Di-Et ether: $C_{12}H_{18}O_3$. MW, 210. Plates or prisms from hot pet. ether. M.p. 103–5°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. hot H_2O .

Diacetyl: m.p. 82–5°.

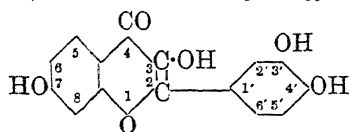
Dichloride: $C_8H_8OCl_2$. MW, 191. M.p. 79–80°.

Boehm, *Ann.*, 1899, 307, 249.

Robertson, Sandrock, *J. Chem. Soc.*, 1933, 1617.

Firpene.

See Pinene.

Fisetin (3 : 7 : 3' : 4'-Tetrahydroxyflavone) $C_{15}H_{10}O_6$

MW, 286

Colouring matter obtained from *Rhus* species. M.p. 330°.

3 : 3' : 4'-Tri-Me ether : $C_{18}H_{16}O_6$. MW, 328. Needles from AcOEt. M.p. 220°. Acetyl deriv.: m.p. 229°.

7 : 3' : 4'-Tri-Me ether : yellow needles. M.p. 186-7°. Acetyl deriv.: m.p. 167°.

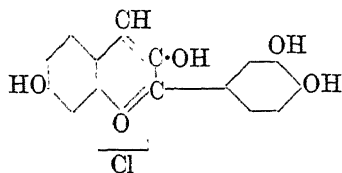
Tetra-Me ether : $C_{19}H_{18}O_6$. MW, 342. Needles from AcOEt. M.p. 180°.

Tetra-acetyl deriv.: m.p. 201-5° (196-8°).

Auwers, Pohl, *Ber.*, 1915, 48, 85 (*Bibl.*).

Allan, Robinson, *J. Chem. Soc.*, 1926, 2334.

Gerngross, Hübner, *Ber.*, 1927, 60, 2094.

Fisetinidin chloride $C_{15}H_{11}O_5Cl$

MW, 306.5

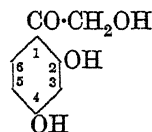
Reddish-brown needles with violet sheen. M.p. above 220°. Alc. $FeCl_3 \rightarrow$ blue col. Alkalis \rightarrow blue sols.

Tetra-Me ether : chocolate col. needles from 6% HCl.

Pratt, Robinson, *J. Chem. Soc.*, 1925, 127, 1136.

Robertson, Robinson, *J. Chem. Soc.*, 1935, 744.

Fisetol (2 : 4-Dihydroxyphenacyl alcohol, ω : 2 : 4-trihydroxyacetophenone, ω -hydroxyresacetophenone)

 $C_8H_8O_4$

MW, 168

Prisms from HCl.Aq. M.p. 189°.

ω -Me ether : $C_9H_{10}O_4$. MW, 182. M.p. 136°.

p-Nitrophenylhydrazones : m.p. 205° decomp.

4-Me ether : m.p. 128°. Diacetyl deriv.: m.p. 86°.

ω : 4-Di-Me ether : $C_{10}H_{12}O_4$. MW, 196. M.p. 66-8°. Et ether : $C_{12}H_{16}O_4$. MW, 224. M.p. 60-2° (67-8°).

2 : 4-Di-Me ether : m.p. 131°. Phenylhydrazone : m.p. 212°. Et ether : m.p. 56-7°. Acetyl deriv.: m.p. 75°.

Tri-Me ether : ω : 2 : 4-trimethoxyacetophenone. $C_{11}H_{14}O_4$. MW, 210. M.p. 61-2°.

ω -Et ether : $C_{10}H_{12}O_4$. MW, 196. M.p. 136-7°.

ω : 4-Di-Et ether : $C_{12}H_{16}O_4$. MW, 224. M.p. 42-4°.

Oxime : m.p. 105-7°.

Tri-Et ether : ω : 2 : 4-triethoxyacetophenone. $C_{14}H_{20}O_4$. MW, 252. M.p. 66-8°.

ω -Phenyl ether : phenyl 2 : 4-dihydroxyphenacyl ether, ω -2 : 4-dihydroxybenzoylanisole. $C_{14}H_{12}O_4$. MW, 244. M.p. 204-5° (sinters at 200°).

2 : 4-Di-Me ether : $C_{16}H_{16}O_4$. MW, 272. M.p. 115° (118-5°). B.p. 260-4°/18 mm.

Triacetyl : m.p. 129°. Phenylhydrazone : m.p. 109° decomp.

ω -Benzoyl : m.p. 200°.

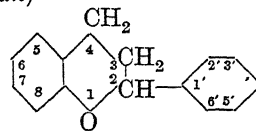
Nierenstein, Wang, Warr, *J. Am. Chem. Soc.*, 1924, 46, 2551 (*Bibl.*).

Kumar, Ram, Ray, *J. Indian Chem. Soc.*, 1946, 23, 365.

Flavacidin.

See Amylpenicillin.

Flavan (2-Phenyl-2 : 3-dihydrobenzpyran, 2-phenylchroman)

 $C_{15}H_{14}O$

MW, 210

Cryst. from MeOH. M.p. 44-5°. B.p. 190°/16 mm. Sol. ord. org. solvents.

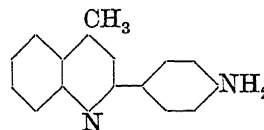
Harries, Busse, *Ber.*, 1896, 29, 380.

Hultzsch, *J. prakt. Chem.*, 1941, 158, 275.

Flavandione-3 : 4.

See Flavonol.

Flavaniline (4-Methyl-2-[p-aminophenyl]-quinoline, p-aminoflavoline, 2-p-aminophenyl-lepidine)

 $C_{16}H_{14}N_2$

MW, 234

Prisms from C_6H_6 . M.p. 97°. Spar. sol. H_2O . Sol. EtOH.

N-Acetyl : m.p. 162-3°.

Fischer, *Ber.*, 1886, 19, 1038.

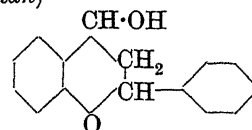
Goldschmidt, *Chem.-Ztg.*, 1903, 27, 279.

M.L.B., D.R.P., 19,766.

Baum, D.R.P., 27,948.

Majert, D.R.P., 28,323.

Flavanol (4-Hydroxyflavan, 4-hydroxy-2-phenylchroman)

 $C_{15}H_{14}O_2$

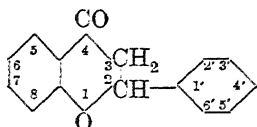
MW, 226

Cryst. from 30% EtOH. M.p. 119°. Sol. EtOH, CHCl₃, C₆H₆, Me₂CO. Mod. sol. Et₂O, ligroin.

Acetyl: m.p. 85-6°.

Freudenberg, Orthner, *Ber.*, 1922, 55, 1748.

Flavanone (2-Phenyl-2:3-dihydrobenz-γ-pyrone, 2-phenylchromanone)



C₁₅H₁₂O₂

MW, 224

Needles from ligroin. M.p. 76°.

3-Benzylidene: m.p. 103-4°.

3-Anisylidene: m.p. 148-9°.

3-Piperonylidene: m.p. 155-6°.

3-Vanillylidene: m.p. 92-4°.

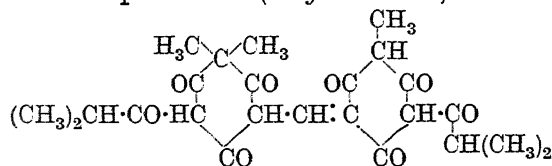
Ryan, Creuss-Callaghan, *Chem. Abstracts*, 1930, 24, 4037.

Löwenbein, *Ber.*, 1924, 57, 1515.

Reichel, Müller, *Ber.*, 1941, 74, 1741.

Freudenberg, Orthner, *Ber.*, 1922, 55, 1748.

Flavaspidic Acid (*Polystichocitrin*)



C₂₄H₂₈O₈

MW, 444

Occurs in male fern extract.

α-Form:

Cryst. from MeOH. M.p. 92°. Solidifies on heating further and remelts at 150°.

β-Form:

Cryst. from C₆H₆ or AcOH. M.p. 156°. FeCl₃ in EtOH → deep red col. Reduces Tollen's reagent.

Diacetyl deriv.: m.p. 142-3°.

Boehm, *Ann.*, 1903, 320, 310; 1901, 318, 253.

Mühlemann, *Chem. Abstracts*, 1944, 38, 1843.

Birch, *J. Chem. Soc.*, 1951, 3026.

Flavaspidin.

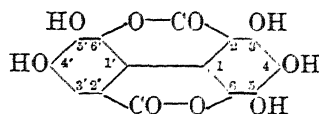
Constituent of *Filix mas* extract. Cryst. from AcOEt. M.p. 199°. Sol. C₆H₆, CHCl₃, AcOEt, Me₂CO, amyl alcohol. Spar. sol. EtOH, Et₂O, MeOH, pet. ether, CS₂. Possibly identical with phloraspin, *q.v.*

Kraft, *Chem. Zentr.*, 1902, II, 533.

Flaveanic Acid.

See Cyanothioformamide.

Flavellagic Acid (3:4:5:6:4':5':6'-Heptahydroxydiphenyl-2:2'-dicarboxylic acid-2:6':2':6-dilactone)



C₁₄H₆O₉

MW, 318

Pale yellow prisms. M.p. above 360°. Spar. sol. ord. org. solvents. Alkalis → green sols.

4:5:4':5'-Tetra-Me ether: C₁₈H₁₄O₉. MW, 374. Yellow needles from AcOH. M.p. 270-1°.

3-Acetyl: m.p. 237-8°.

3:4:5:4':5'-Penta-Me ether: C₁₉H₁₆O₉. MW, 388. Yellow cryst. from AcOH. M.p. 242°.

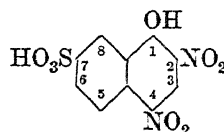
Penta-acetyl: m.p. 317-19°. Zn dust dist. → fluorene.

Penta-benzoyl: m.p. 287-9°.

Perkin, *J. Chem. Soc.*, 1906, 89, 251.

Perkin, Perkin, *J. Chem. Soc.*, 1908, 93, 1195.

Flavianic Acid (2:4-Dinitro-1-naphthol-7-sulphonic acid, Naphthol Yellow S)



C₁₀H₆O₈N₂S

MW, 314

Yellow needles from HCl.Aq. M.p. 151°. Forms ppts. with many org. bases.

Methylamine salt: decomp. at 265-8°.

Dimethylamine salt: decomp. at 230-5°.

Trimethylamine salt: decomp. at 217-23°.

Ethylenediamine salt: decomp. at 265-7°.

Trimethylhydroxylamine salt: decomp. at 215-19°.

Tetramethylammonium hydroxide salt: decomp. at 259°.

Isoamylamine salt: m.p. 215-17°.

Cadaverine salt: decomp. at 268-73°.

Putrescine salt: decomp. at 260-4°.

Betaine salt: decomp. at 229°.

Galegine salt: m.p. 159°.

Arginine salt: blackens above 200°. De-comp. at 275°.

Sievers, Müller, *Chem. Abstracts*, 1929, 23, 4702.

Kossel, Gross, *Z. physiol. Chem.*, 1924, 135, 167.

Felix, Dirr, *Z. physiol. Chem.*, 1928, 176, 38.

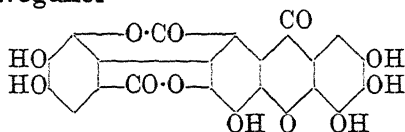
Müller, *Chem. Abstracts*, 1932, 26, 4792.

Badische, D.R.P., 10,785.

Knecht, Hibbert, *Ber.*, 1904, 37, 3475.

Flavindin.

See Quindoline-carboxylic Acid.

Flavogallol

Probable constitution

 $C_{21}H_8O_{12}$

MW, 452

Yellow needles. Chars without melting. Spar. sol. ord. org. solvents. NaOH \rightarrow orange sol. turning brown. $FeCl_3 \rightarrow$ green col.

Hexa-acetyl: m.p. 278–80°.

Hexa-benzoyl: m.p. 326–8°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, 109, 533.**Flavogallone** $C_{20}H_{10}O_{11}$

MW, 426

M.p. above 340°. Spar. sol. ord. org. solvents. Alc. $FeCl_3 \rightarrow$ blue col.

Hepta-acetyl deriv.: m.p. 257–9°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, 109, 537.**Flavogallonic Acid** $C_{21}H_{10}O_{13}$

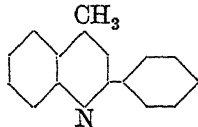
MW, 470

Needles. M.p. above 300°. $Ac_2O + Py \rightarrow$ hexa-acetylflavogallol.

Me ester: $C_{22}H_{12}O_{13}$. MW, 484. Hepta-acetyl deriv.: m.p. 181–3°.Et ester: $C_{23}H_{14}O_{13}$. MW, 498. M.p. above 300°. Hepta-acetyl deriv.: m.p. 215–17°.Bleuler, Perkin, *J. Chem. Soc.*, 1916, 109, 535.**Flavol.**

See 2 : 6-Dihydroxyanthracene.

Flavoline (4-Methyl-2-phenylquinoline, 2-phenyl-lepidine)

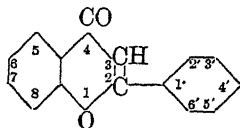
 $C_{16}H_{13}N$

MW, 219

Plates from ligroin. M.p. 64–5°. B.p. 373–5°. Methiodide: m.p. 185°.

Fischer, *Ber.*, 1886, 19, 1037.

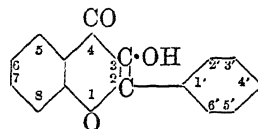
Flavone (2-Phenyl- γ -benzpyrone, 2-phenyl-chromone)

 $C_{15}H_{10}O_2$

MW, 222

Needles from EtOH.Aq. M.p. 97°. Sol. ord. org. solvents. Insol. H_2O .

Simonis, *Z. angew. Chem.*, 1926, 39, 1461 (Review, Bibl.).

Flavonol (3-Hydroxyflavone, flavandione-3 : 4) $C_{15}H_{10}O_3$

MW, 238

Colourless needles from MeOH or EtOH. M.p. 169–70°.

Acetyl deriv.: m.p. 110–11°.

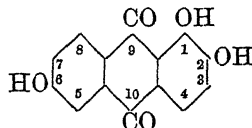
Me ether: m.p. 114°.

3-Oxime: m.p. 158–9° decomp.

Kostanecki, Szabranski, *Ber.*, 1904, 37, 2820.

Oyamada, *J. Chem. Soc. Japan*, 1934, 55, 1256.

Flavopurpurin (1 : 2 : 6-Trihydroxyanthraquinone, 6-hydroxyalizarin)

 $C_{14}H_8O_5$

MW, 256

Yellow needles. M.p. above 330°. B.p. 459° decomp. Sublimes above 160°. Sol. EtOH, C_6H_6 . Mod. sol. boiling H_2O . Spar. sol. Et_2O . Violet sol. in caustic alkalis, red to reddish-violet in conc. H_2SO_4 .

2 : 6-Di-Me ether: $C_{16}H_{12}O_5$. MW, 284. Yellow needles. M.p. 239°. Sol. $CHCl_3$. Spar. sol. EtOH. Acetyl: m.p. 210°.

1 : 2 : 6-Tri-Me ether: $C_{17}H_{14}O_5$. MW, 298. Yellow needles. M.p. 225–6°. Sol. C_6H_6 , AcOH. Spar. sol. EtOH.

2 : 6-Di-Et ether: $C_{18}H_{16}O_5$. MW, 312. Reddish-yellow needles from EtOH. M.p. 209°. Sol. hot AcOH.

Diacetyl deriv.: m.p. 238°.

Triacetyl: m.p. 202–3°.

Liebermann, Jellinek, *Ber.*, 1888, 21, 1171.

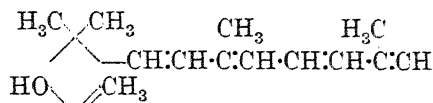
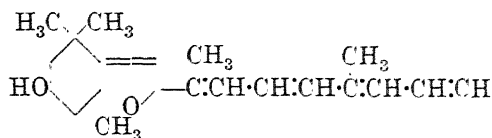
Graebe, Thode, *Ann.*, 1906, 349, 214.

Bistrzycki, Yssel, de Schipper, *Ber.*, 1898, 31, 2799.

Frobenius, Hepp, *Ber.*, 1907, 40, 1049.

Bayer, B.P., 26,601, (*Chem. Abstracts*, 1910, 4, 118).

Bayer, D.R.P., 217,552, (*Chem. Zentr.*, 1910, I, 700).

Flavoxanthin

Suggested structure

 $C_{40}H_{56}O_3$

MW, 584

Occurs in *Taraxacum officinale* and other plants. Red prisms from MeOH. M.p. 184°. $[\alpha]_D^{20} +190^\circ$ in C_6H_6 . Absorption bands at 478, 447.5 and 420 m μ in CS_2 ; 450, 422 m μ in pet. ether. 25% HCl \rightarrow blue col.

Diacetyl deriv.: m.p. 157°.

Kuhn, Brockmann, *Z. physiol. Chem.*, 1932, 213, 191.

Karrer, Rutschmann, *Helv. Chim. Acta*, 1942, 25, 1144.

Karrer, Jucker, *Helv. Chim. Acta*, 1945, 28, 300.

Flazine $C_{18}H_{16}O_5N_2$

MW, 344

Fluorescent compound present in Saké grains. Cryst. M.p. 218–21°. Sols. in EtOH, Me_2CO or aq. acids show yellowish-green fluor.

B, HCl: monohydrate, m.p. 140°.

B, HI: yellow cryst. M.p. 246–7°.

Mononitro deriv.: monohydrate, m.p. 280° decomp. Explodes on rapid heating.

Higashi, *Bull. Inst. Phys. Chem. Research (Tokyo)*, 1936, 15, 1060.

Tadokoro, Takasugi, *J. Chem. Soc. Japan*, 1938, 59, 1167.

Flemingin $C_{12}H_{12}O_3$

MW, 204

Dye from root of *Flemingia congesta*, Roxb. (Waras). Dark orange needles. M.p. 171–3°. Sol. EtOH. Spar. sol. hot AcOH, C_6H_6 , $CHCl_3$. Insol. CS_2 . Sol. alkalis. KOH fusion \rightarrow salicylic and acetic acids.

Perkin, *J. Chem. Soc.*, 1898, 73, 661.

Floribundine $C_{18}H_{19}O_2N$

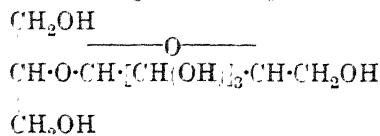
MW, 281

Alkaloid from *Papaver floribundum*. Prisms from Me_2CO . M.p. 193–5°. $[\alpha]_D -204.3^\circ$ in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O . Conc. $HNO_3 \rightarrow$ violet col. which changes to yellow.

Tartrate: needles from EtOH. M.p. 181–3°.

Methiodide: cryst. from EtOH. M.p. 178–80°.

Konowalowa, Yunussoff, Orechhoff, *Ber.*, 1935, 68, 2281.

Floridoside (Glycerol-2- α -d-galactoside) $C_9H_{15}O_5$

MW, 224

Galactoside present in red algae, e.g., *Rhodomenia palmata*. Prisms from EtOH. M.p. 86–7°. $[\alpha]_D +15.1^\circ$ in H_2O . Hot 5% HCl \rightarrow glycerol – d-galactose.

Colin, *Bull. soc. chim.*, 1937, [5], 4, 277.

Floripavidine $C_{21}H_{29}O_5N$

MW, 375

Alkaloid from *Papaver floribundum*. Prisms from EtOH or Me_2CO . M.p. 241–2°. $[\alpha]_D -156^\circ$ in MeOH. Sol. $CHCl_3$. Spar. sol. Et_2O , C_6H_6 . Conc. $HNO_3 \rightarrow$ violet col. which changes to yellow.

B, HCl: cryst. M.p. 209–10°.

Methiodide: needles from EtOH. M.p. 228–30°.

Konowalowa, Yunussoff, Orechhoff, *Ber.*, 1935, 68, 2281.

Floripavine $C_{19}H_{21}O_4N$

MW, 327

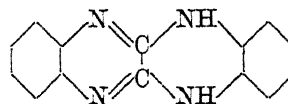
Alkaloid from *Papaver floribundum*. Needles from EtOH. M.p. 200–1°. $[\alpha]_D +90.5^\circ$ in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. Et_2O , C_6H_6 . Turns brown in light.

B, HCl: needles from EtOH. M.p. 235–6°.

Picrate: yellow needles from EtOH. M.p. 223–4°.

Methiodide: needles from EtOH. M.p. 220–1°.

Konowalowa, Yunussoff, Orechhoff, *Ber.*, 1935, 68, 2282.

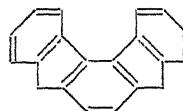
Fluoflavine (5:11-Dihydroquinoxaliquinoxaline) $C_{14}H_{10}N_4$

MW, 234

Yellow needles from AcOH. M.p. above 360°. Sol. hot AcOH with yellowish-green fluor. Spar. sol. ord. org. solvents.

Hinsberg, Pollak, *Ber.*, 1896, 29, 784.

Hinsberg, *Ann.*, 1901, 319, 267.

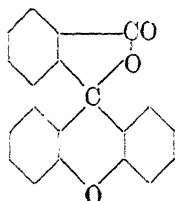
Fluoracene (7:12-Dihydro-indeno-[1, 2-a]-fluorene) $C_{20}H_{14}$

MW, 254

Colourless cryst. M.p. 203–4°. Sublimes.

Radulescu, Alexa, *Chem. Abstracts*, 1943, 37, 3750.

Fluoran

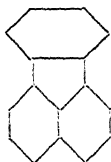
 $C_{20}H_{12}O_3$

MW, 300

Needles from EtOH. M.p. 182-3°.

Meyer, Hoffmeyer, *Ber.*, 1892, 25, 1385, 2118.

Fluoranthene (1:2-Benzacenaphthene, idryl, benz-(jk)-fluorene)

 $C_{16}H_{10}$

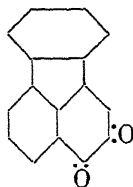
MW, 202

Needles or plates from EtOH. M.p. 110°. B.p. 250-1°/60 mm., 217°/30 mm. Sol. EtOH, Et₂O, CHCl₃, CS₂, C₆H₆, AcOH. Warm conc. H₂SO₄ → blue col.

Picrate: m.p. 184-5°.

Meyer, Taeger, *Ber.*, 1920, 53, 1264.v. Braun, Anton, *Ber.*, 1929, 62, 145.Coulson, *Chemistry and Industry*, 1941, 699.Orchin, Reggel, *J. Am. Chem. Soc.*, 1947, 69, 505.

Fluoranthenequinone

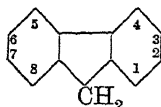
 $C_{16}H_8O_2$

MW, 232

Red needles from EtOH. M.p. 188°. Sol. EtOH, AcOH.

v. Braun, Anton, *Ber.*, 1929, 62, 151.

Fluorene (Diphenylenemethane, 2 : 3-benzindene)

 $C_{13}H_{10}$

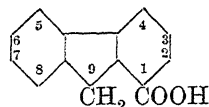
MW, 166

Fluorescent cryst. from EtOH. M.p. 116°. B.p. 293-5°. Sol. Et₂O, C₆H₆, CS₂, hot EtOH. CrO₃ in AcOH → fluorenone. Forms mono-metallic derivs. with alkali metals. Forms many addn. comps.

Picrate: m.p. 77°.

Zelinsky, Titz, Gaverdowskaja, *Ber.*, 1926, 59, 2591.Jaeger, B.P., 364,629, (*Chem. Abstracts*, 1933, 27, 1643).Staudinger, Gaule, Siegwart, *Helv. Chim. Acta*, 1921, 4, 214.Orchin, *J. Am. Chem. Soc.*, 1945, 67, 499.

Fluorene-1-carboxylic Acid

 $C_{14}H_{10}O_2$

MW, 210

Cryst. from EtOH.Aq. M.p. 245-6°. Sublimes. Sol. hot EtOH. Alk. KMnO₄ → fluorenone-1-carboxylic acid. Heat with lime → fluorene.

Et ester: C₁₆H₁₄O₂. MW, 238. M.p. 53-5°.Fittig, Liepmann, *Ann.*, 1880, 200, 13.

Fluorene-2-carboxylic Acid.

Yellow cryst. Sublimes at 340°. Sol. hot AcOH.

Me ester: C₁₅H₁₂O₂. MW, 224. M.p. 120°.Nitrile: 2-cyanofluorene. C₁₄H₉N. MW, 191. M.p. 88°.Fortner, *Monatsh.*, 1904, 25, 448.

Fluorene-4-carboxylic Acid.

Cryst. from Et₂O. M.p. 175°.

Me ester: m.p. 64°.

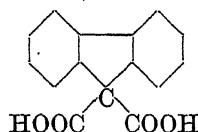
Graebe, Aubin, *Ann.*, 1888, 247, 283.Bachmann, Sheehan, *J. Am. Chem. Soc.*, 1940, 62, 2687.

Fluorene-9-carboxylic Acid (Diphenyleneacetic acid).

Needles from AcOH. M.p. 230-2°.

Me ester: C₁₅H₁₂O₂. MW, 224. M.p. 63°.Et ester: C₁₆H₁₄O₂. MW, 238. M.p. 44-5°. B.p. 207-9°/19 mm.Chloride: C₁₄H₉OCl. MW, 228.5. M.p. 77°.Amide: C₁₄H₁₁ON. MW, 209. M.p. 251°.Anhydride: C₂₈H₁₈O₃. MW, 402. M.p. 164-5°.Nitrile: 9-cyanofluorene. C₁₄H₉N. MW, 191. M.p. 151-2°.Vorländer, Pritzsche, *Ber.*, 1913, 46, 1794.Schlenk, Hillemann, Rodloff, *Ann.*, 1931, 487, 152.Kliegl, *Ber.*, 1931, 64, 2420.Wislicenus, Ruthing, *Ber.*, 1913, 46, 2771.

Fluorene-9 : 9-dicarboxylic Acid (Diphenylenemalonic acid)

 $C_{15}H_{10}O_4$

MW, 254

Di-Me ester: $C_{17}H_{14}O_4$. MW, 282. M.p. 167°.

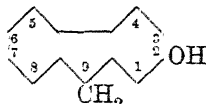
Di-Et ester: $C_{19}H_{16}O_4$. MW, 310. Cryst. from EtOH. M.p. 99-5°. B.p. 220-2°/13 mm.

Adickes, Brunnert, Lücker, Schäfer, *J. prakt. Chem.*, 1932, 133, 320.

Fluorene Ketone.

See Fluorenone.

2-Fluorenol (2-Hydroxyfluorene, 2-fluorenyl alcohol)



$C_{13}H_{10}O$

MW, 182

Leaflets from H_2O . Needles from $CHCl_3$. M.p. 171°. Sol. EtOH, Et_2O , AcOH. Insol. cold H_2O . Sol. alkalis, hot NH_3 . Aq.

Me ether: $C_{14}H_{12}O$. MW, 196. M.p. 106-8°.

Diels, *Ber.*, 1901, 34, 1761.

Riuz, *Chem. Abstracts*, 1929, 23, 4691.

3-Fluorenol (3-Hydroxyfluorene, 3-fluorenyl alcohol).

Cream col. cryst. M.p. 136-7°.

Benzoyl: m.p. 128°.

Lothrop, *J. Am. Chem. Soc.*, 1939, 61, 2115.

9-Fluorenol (9-Hydroxyfluorene, 9-fluorenyl alcohol, diphenylenecarbinol).

Cryst. from pet. ether. M.p. 153° (156°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. EtOH. Aq.

Me ether: m.p. 43-5°.

Fluorenyl ether: difluorenyl ether. $C_{26}H_{18}O$. MW, 346. Cryst. from Ac_2O . M.p. 228° (270°).

Acetyl: (i) m.p. 75°. (ii) M.p. 208-9°.

Benzoyl: (i) m.p. 100°. (ii) M.p. 161°.

Staudinger, Gaule, *Ber.*, 1916, 49, 1956.

Kliegl, *Ber.*, 1929, 62, 1327.

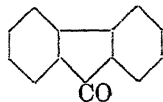
Bachmann, *J. Am. Chem. Soc.*, 1933, 55, 773.

Ferrier, *Compt. rend.*, 1945, 220, 460.

Fluorenol-carboxylic Acid.

See Hydroxyfluorene-carboxylic Acid.

Fluorenone (Fluorene ketone, diphenylene ketone)



$C_{13}H_{10}O$

MW, 180

M.p. 83.0-83.5° (84-6°). B.p. 341.5°. Insol. H_2O . Forms many add. comps.

Oxime: 9-isonitrosofluorene. M.p. 195°. *Me ether*: m.p. 145-6°. *Acetyl deriv.*: m.p. 79° (76°).

Hydrazone: m.p. 149-50°. *N-Benzylidene*: m.p. 91-4° (82-4°).

Phenylhydrazones: m.p. 151-2°.

Dict. of Org. Comp.—II.

p-Nitrophenylhydrazones: m.p. 269°.

Phenylsemicarbazones: m.p. 222°.

Di-Me acetal: m.p. 87-8°.

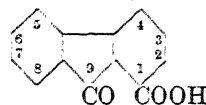
Huntress, Hershberg, Cliff, *J. Am. Chem. Soc.*, 1931, 53, 2720.

Jaeger, U.S.P., 1,868,531, (*Chem. Abstracts*, 1932, 26, 5315).

Courtot, Pierron, *Bull. soc. chim.*, 1929, 65, 290.

See also Kuhn, Wassermann, *Ber.*, 1925, 58, 2230.

Fluorenone-1-carboxylic Acid



$C_{14}H_8O_3$

MW, 224

Orange-red needles from dil. EtOH. M.p. 191-2°. Sol. EtOH, Et_2O . Prac. insol. cold H_2O . Heat \rightarrow fluorenone. $NaHg \rightarrow$ fluorene-1-carboxylic acid. $Zn \rightarrow$ fluorene. KOH fusion \rightarrow diphenyl-2 : 3'-dicarboxylic acid.

Me ester: $C_{15}H_{10}O_3$. MW, 238. Yellow needles. M.p. 86-9°.

Et ester: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from dil. EtOH. M.p. 84-6°.

Chloride: $C_{14}H_7O_3Cl$. MW, 242.5. Yellow needles from C_6H_6 . M.p. 140°.

Amide: $C_{14}H_9O_2N$. MW, 223. Yellow needles from EtOH. M.p. 229-30°.

Oxime: yellow prisms from EtOH. M.p. 230° decomp.

Fittig, Liepmann, *Ann.*, 1880, 200, 6.

Fluorenone-2-carboxylic Acid.

Yellow needles from EtOH or AcOH. Sublimes at about 340°. Spar. sol. EtOH.

Me ester: yellow needles from MeOH. M.p. 181°.

Chloride: golden-yellow cryst. M.p. 183-4°.

Bamberger, Hooker, *Ann.*, 1885, 229, 158.

Fortner, *Monatsh.*, 1904, 25, 451.

Dziewonski, Schnayder, *Chem. Abstracts*, 1931, 25, 5416.

Ray, Rieveschl, *J. Am. Chem. Soc.*, 1943, 65, 836.

Fluorenone-4-carboxylic Acid.

Yellow needles from EtOH. M.p. 227°. Insol. H_2O . $HI + P$ at 180-200° \rightarrow fluorene. $Zn + NH_3 \rightarrow$ 9-hydroxyfluorene-4-carboxylic acid. KOH fusion \rightarrow diphenic acid.

Me ester: yellow needles. M.p. 132°.

Et ester: yellow needles from EtOH. M.p. 103°.

Chloride: yellow needles from C_6H_6 . M.p. 128°.

Amide: yellow needles + $\frac{1}{2}$ EtOH from EtOH. M.p. 230° (225°).

Nitrile: $C_{14}H_9ON$. MW, 205. Yellow needles. M.p. 240° .

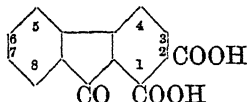
Oxime: m.p. 263° .

Graebe, Aubin, *Ber.*, 1887, 20, 845.

Stobbe, Seydel, *Ann.*, 1909, 370, 134.

Bell, Briggs, *J. Chem. Soc.*, 1938, 1561; 1941, 282.

Fluorenone-1 : 2-dicarboxylic Acid



$C_{15}H_9O_5$

MW, 268

Lemon-yellow cryst. M.p. 330° .

Mono-Me ester: $C_{16}H_{10}O_5$. MW, 282. M.p. about 230° decomp.

Di-Me ester: $C_{17}H_{12}O_5$. MW, 296. Yellow cryst. M.p. 199° .

Anhydride: yellow cryst. M.p. $315-20^\circ$.

Charrier, Gigli, *Ber.*, 1936, 69, 2211.

Fluorenone-1 : 5-dicarboxylic Acid.

Orange cryst. M.p. $295-9^\circ$ decomp.

Di-Me ester: pale yellow cryst. M.p. 120° .

Charrier, Gigli, *Ber.*, 1936, 69, 2211.

Fluorenone-1 : 7-dicarboxylic Acid.

Yellow needles from $AcOH$. Sol. $PhNO_2$. Spar. sol. $AcOH$. Prac. insol. H_2O , $EtOH$, Et_2O , $CHCl_3$, C_6H_6 . $NaHg \rightarrow$ fluorene-1 : 7-dicarboxylic acid. Ox. \rightarrow hemimellitic and trimellitic acids. KOH fusion \rightarrow diphenyl-2 : 4 : 3'-tricarboxylic acid.

Di-Me ester: cryst. from C_6H_6 . M.p. $188-9^\circ$ (184°).

Di-Et ester: $C_{19}H_{16}O_5$. MW, 324. Yellow needles. M.p. $114-5^\circ$.

Bamberger, Hooker, *Ann.*, 1885, 229, 151.

Fluorenone-2 : 3-dicarboxylic Acid.

Bright yellow. M.p. $250-75^\circ$ with loss of H_2O .

Di-Me ester: yellow cryst. M.p. $131-3^\circ$.

Di-Et ester: yellow cryst. M.p. $161-2^\circ$.

Anhydride: yellow. M.p. $322-3^\circ$.

Lothrop, Coffman, *J. Am. Chem. Soc.*, 1941, 63, 2564.

Fluorenone-2 : 7-dicarboxylic Acid.

M.p. 407° decomp.

Di-Me ester: m.p. 218° .

Diamide: m.p. $337-8^\circ$ decomp.

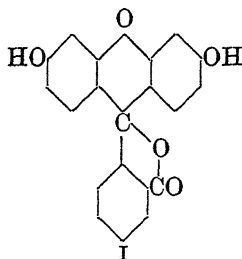
Phenylhydrazone: m.p. 332° decomp.

Dziewoński, Kuzdrzał, Mayer, *Chem. Abstracts*, 1935, 29, 1084.

Fluorenyl Alcohol.

See Fluorenone.

Fluorescein (*Resorcinolphthalein*)



$C_{20}H_{12}O_5$

MW, 332

Compound showing intense fluor. in alk. sol. Antiseptic and mild purgative. Employed in cancer treatment.

I.

Yellow amorph. form. M.p. $314-16^\circ$ (sealed tube). Becomes cryst. on heating. Sol. Me_2CO , $MeOH$, formic acid. Spar. sol. H_2O , $EtOH$, Et_2O , $CHCl_3$, C_6H_6 , $AcOH$, xylene, $PhNO_2$. Insol. pet. ether.

Me ether: $C_{21}H_{14}O_5$. MW, 346. M.p. 272° .

Et ether: $C_{22}H_{16}O_5$. MW, 360. M.p. $253-4^\circ$.

II.

Red cryst. form with green iridescence. M.p. $314-16^\circ$ decomp. (sealed tube). Sol. hot formic acid, hot aniline, hot Me_2CO . Spar. sol. H_2O , $EtOH$, Et_2O , $MeOH$, $AcOH$. Insol. pet. ether.

Me ester: $C_{21}H_{14}O_5$. MW, 346. Red cryst. with green iridescence from $MeOH$. M.p. 282° . Spar. sol. ord. org. solvents. *Me ether*: $C_{22}H_{16}O_5$. MW, 360. Orange-yellow needles or deep red cryst. with metallic lustre from C_6H_6-MeOH . M.p. 208° .

Et ester: $C_{22}H_{16}O_5$. MW, 360. Green leaflets from $EtOH$. M.p. 247° (242°). Spar. sol. $EtOH$, Me_2CO , $AcOH$. Insol. H_2O . *Et ether*: $C_{24}H_{20}O_5$. MW, 388. Yellow needles from $EtOH.Aq$. M.p. 159° . *Acetyl deriv.*: m.p. 191° .

Liebig, *J. prakt. Chem.*, 1912, 86, 472.

Fischer, Hepp, *Ber.*, 1913, 46, 1952.

Kehrmann, *ibid.*, 3028.

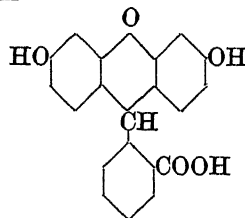
George, *Chem. Abstracts*, 1927, 21, 239.

Orndorff, Hemmer, *J. Am. Chem. Soc.*, 1927, 49, 1272 (*Review, Bibl.*).

McKenna, Sowa, *J. Am. Chem. Soc.*, 1938, 60, 124.

See also Dominikiewicz, *Chem. Abstracts*, 1931, 25, 941.

Fluorescein



$C_{20}H_{14}O_5$

MW, 334

Needles from AcOH. M.p. 125–7°. Sol. Et₂O. Turns yellow in air. Sol. alkalis → colourless sols. Ox. → fluorescein.

Derivs. of this comp. are often wrongly described as derivs. of fluorescein. The literature of fluorescein and fluorescein is somewhat confused.

Di-Me ether: C₂₂H₁₈O₅. MW, 362. Needles from EtOH. M.p. 204–5°. *Me ester*: C₂₂H₂₀O₅. MW, 376. Cryst. from EtOH. M.p. 136°.

Di-Et ether: C₂₄H₂₂O₅. MW, 390. M.p. 187°. CrO₃ in AcOH → fluorescein di-Et ether. *Et ester*: C₂₆H₂₆O₅. MW, 418. Needles from EtOH. M.p. 111°.

Et ester: C₂₂H₁₈O₅. MW, 362. Needles from AcOH. M.p. 195–6°. Turns yellow in air.

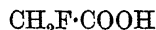
Diacetyl: m.p. 200–2°.

Liebig, *J. prakt. Chem.*, 1913, 88, 42.

Fluoroacetanilide.

See under Fluoroaniline.

Fluoroacetic Acid



C₂H₃O₂F MW, 78

M.p. 33°. B.p. 165°. Heat of comb. C₂ 171.08 Cal. Burns with green flame. Na salt is a strong rat poison.

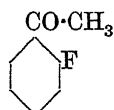
Me ester: C₃H₅O₂F. MW, 92. B.p. 104.5°. D₁₅ 1.16128. Sol. H₂O.

Et ester: C₄H₇O₂F. MW, 106. B.p. about 120°. Heat of comb. C₄ 502.55 Cal.

Amide: fluoroacetamide. C₂H₄ONF. MW, 77. Cryst. from CHCl₃. M.p. 108°.

Swarts, *Bull. soc. chim.*, 1896, 15, 1134.

o-Fluoroacetophenone



C₈H₇OF MW, 138

B.p. 80–5°/16 mm.

Oxime: m.p. 72–4°.

Semicarbazone: m.p. 193°.

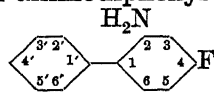
Borsche, Wagner, Roemmich, *Ann.*, 1941, 546, 273.

p-Fluoroacetophenone.

M.p. –4.5°. B.p. 77–8°/10 mm. D₄²⁵ 1.1382. n_D²⁵ 1.5081.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1345.

4-Fluoro-2-aminodiphenyl



C₁₂H₁₀NF MW, 187

N-Acetyl: m.p. 98°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2'-Fluoro-2-aminodiphenyl.

M.p. 91°.

N-Acetyl: m.p. 102°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

4'-Fluoro-2-aminodiphenyl.

M.p. 42–42.5°. B.p. 186–7°/40 mm. Ox. → p-fluorobenzoic acid.

N-Acetyl: m.p. 120°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2-Fluoro-4-aminodiphenyl.

Ox. → benzoic acid.

N-Acetyl: prisms. M.p. 155°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2'-Fluoro-4-aminodiphenyl.

M.p. 36°. B.p. 199–201°/25 mm.

N-Acetyl: m.p. 147–8°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

4'-Fluoro-4-aminodiphenyl.

Leaflets from EtOH. M.p. 120° (121°).

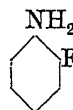
N-Acetyl: m.p. 205–205.5°.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.
van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

3-Fluoro-β-aminoethyl-benzene.

See 2-m-Fluorophenylethylamine.

o-Fluoroaniline



C₆H₆NF MW, 111

M.p. –34.6° (–28.95°). B.p. 174.5–176°/757 mm., 94.6°/55 mm., 68.5°/14 mm., 58°/11 mm.

N-Acetyl: o-fluoroacetanilide. C₈H₈ONF. MW, 153. M.p. 80°. B.p. 140–2°/14 mm.

N-Dimethyl: o-fluorodimethylaniline. C₈H₁₀NF. MW, 139. B.p. 64–5°/13 mm. *Picrate*: m.p. 131°.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3041.

Braun, Rudolf, *Ber.*, 1931, 64, 2469.

m-Fluoroaniline.

Yellow liq. B.p. 186.1°/754 mm. (187–9°). 82.3°/18 mm. D₁₅²⁵ 1.16004.

N-Acetyl: m-fluoroacetanilide. M.p. 88° (84.6°, 83°).

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.

Braun, Rudolf, *Ber.*, 1931, 64, 2470.

Schiemann, *Z. physik. Chem.*, 1931, 156A, 418.

p-Fluoroaniline.

M.p. -0.82° (-1.9°). B.p. $184-6^{\circ}$, $85^{\circ}/19$ mm. D_4^{20} 1.1725. n_D^{20} 1.51954.

B,HCl: b.p. $167^{\circ}/27$ mm.

N-Acetyl: p-fluoroacetanilide. M.p. 152° .

N-Benzoyl: p-fluorobenzanilide. M.p. 185° .

N-p-Nitrobenzoyl: m.p. 180.5° .

N-Dimethyl: p-fluorodimethylaniline. M.p. 25° . B.p. $78-79.5^{\circ}/16$ mm. *B,HCl*: m.p. 118° .

Picrate: m.p. 151.5° .

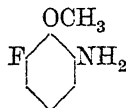
N-Diethyl: p-fluorodiethylaniline. $C_{10}H_{14}NF$. MW, 167. B.p. $92.5^{\circ}/12$ mm.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, 135, 258.

Schiemann, Winkelmüller, *Ber.*, 1933, 66, 731.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3041.

6-Fluoro-o-anisidine (6-Fluoro-2-amino-anisole)



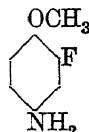
C_7H_8ONF MW, 141

B.p. $94^{\circ}/10$ mm.

p-Nitrobenzoyl: yellow cryst. M.p. $147-8.5^{\circ}$.

Niemann, Benson, Mead, *J. Am. Chem. Soc.*, 1941, 63, 2204.

2-Fluoro-p-anisidine (2-Fluoro-4-amino-anisole)



C_7H_8ONF MW, 141

M.p. 82.6° .

B,HCl: m.p. $180-200^{\circ}$ decomp.

Schiemann, Miao, *Ber.*, 1933, 66, 1186.

English, Mead, Niemann, *J. Am. Chem. Soc.*, 1940, 62, 350.

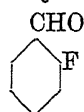
3-Fluoro-p-anisidine.

Cryst. M.p. 50° .

Hodgson, Nicholson, *J. Chem. Soc.*, 1940, 1268.

Fluoroanisole.

See under Fluorophenol.

o-Fluorobenzaldehyde

C_7H_5OF MW, 124

M.p. -44.5° . B.p. 175° , $80.5^{\circ}/36$ mm.

Oxime: m.p. 63° .

Phenylhydrazone: m.p. 89.5° .

p-Nitrophenylhydrazone: m.p. 205° .

Schiemann, *Z. physik. Chem.*, 1931, 156A, 417.

Shoosmith, Sosson, Slater, *J. Chem. Soc.*, 1926, 2761.

m-Fluorobenzaldehyde.

Oil. B.p. 173° , $76^{\circ}/26$ mm.

Oxime: m.p. 63° .

Phenylhydrazone: m.p. 114° .

p-Nitrophenylhydrazone: m.p. 202° .

Schiemann, *Z. physik. Chem.*, 1931, 156A, 417.

Shoosmith, Sosson, Slater, *J. Chem. Soc.*, 1926, 2761.

p-Fluorobenzaldehyde.

M.p. -10° . B.p. $174.5^{\circ}/752$ mm. (181.5°), $104.5^{\circ}/74$ mm.

Oxime: (a) *syn*-, m.p. $116-17^{\circ}$. (b) *Anti*-, m.p. 86.5° .

Phenylhydrazone: m.p. 147° .

p-Nitrophenylhydrazone: m.p. 212° .

Schiemann, *Z. physik. Chem.*, 1931, 156A, 417.

Shoosmith, Sosson, Slater, *J. Chem. Soc.*, 1926, 2761.

Fluorobenzanilide.

See under Fluoroaniline.

Fluorobenzene

C_6H_5F MW, 96

F.p. -39.2° (-40.5°). M.p. -41.2° . B.p. 85.2° . D_4^{20} 1.0236. n_D^{20} 1.46773. Heat of comb. C_7 746.26, C_p 746.84 Cal.

$C_6H_5F, SbCl_3$: m.p. 10° decomp.

Balz, Schieman, *Ber.*, 1927, 60, 1188.

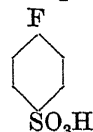
Tronov, Krüger, *Chem. Abstracts*, 1927, 21, 3887.

Flood, *Organic Syntheses*, 1933, XIII, 46 (*Bibl.*).

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

Voznesenskii, Kurskii, *J. Gen. Chem.*

U.S.S.R., 1938, 8, 524, (*Chem. Abstracts*, 1938, 32, 8379).

p-Fluorobenzenesulphonic Acid

$C_6H_5O_3FS$ MW, 176

Salts sol. H_2O , EtOH. *K* salt heated with $HCl \rightarrow$ fluorobenzene.

Chloride: $C_6H_4O_2FCIS$. MW, 194.5. M.p. 30° . Sol. Et_2O , C_6H_6 , $CHCl_3$.

Amide: $C_6H_4O_2NFS$. MW, 175. Plates or needles from H_2O . M.p. 123° . Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , C_6H_6 .

Holleman, *Rec. trav. chim.*, 1905, 24, 30.

Lenz, *Ber.*, 1879, 12, 580.

o-Fluorobenzoic Acid

C₇H₅O₂F

MW, 140

Cryst. from H₂O. M.p. 126.5°. Sol. EtOH, Et₂O. $k = 3 \times 10^{-4}$ at 25°. Heat of comb. C_v 739.92 Cal.

Me ester: C₈H₇O₂F. MW, 154. M.p. -20°. B.p. 209°, 89-90°/14 mm.

Et ester: C₉H₉O₂F. MW, 168. B.p. 221°.

Chloride: C₇H₄OCIF. MW, 158.5. M.p. 4°. B.p. 206°, 85°/14 mm.

Amide: C₇H₆ONF. MW, 139. M.p. 116° (114°).

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 5, 1905.

Meyer, Hub, *Monatsh.*, 1910, 31, 933.

Bergmann, Bondi, *Ber.*, 1931, 64, 1474.

Rinkes, *Chem. Zentr.*, 1919, I, 821.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 324.

m-Fluorobenzoic Acid.

Leaflets from hot H₂O. M.p. 123.6° (124°). $k = 1.4 \times 10^{-4}$ at 25°. Heat of comb. C_v 737.36 Cal.

Me ester: m.p. -10°. B.p. 197°.

Et ester: b.p. 209°.

Chloride: m.p. -30°. B.p. 189° (204°), 91°/18 mm.

Amide: m.p. 130°.

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 5, 1905.

Meyer, Hub, *Monatsh.*, 1910, 31, 933.

p-Fluorobenzoic Acid.

Prisms from H₂O. M.p. 182.6°. Sol. EtOH, Et₂O, hot H₂O. $k = 1.4 \times 10^{-4}$ at 25°. Heat of comb. C_v 739.43 Cal.

Me ester: m.p. 4.5°. B.p. 198°.

Et ester: m.p. 26°. B.p. 210°.

Chloride: m.p. 9°. B.p. 193°.

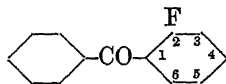
Amide: m.p. 154.5°. B.p. 104°/38 mm.

Nitrile: p-fluorobenzonitrile. C₇H₄NF. MW, 121. M.p. 34.8°. B.p. 188.2°/750 mm.

Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.

Schiemann, Winkel Müller, *Organic Syntheses*, 1933, XIII, 52 (Bibl.).

2-Fluorobenzophenone (Phenyl 2-fluorophenyl ketone)

C₁₃H₉OF

MW, 200

Oil. B.p. 150°/16 mm.

Oxime: m.p. 126°.

Bergmann, Bondi, *Ber.*, 1931, 64, 1474.

4-Fluorobenzophenone (Phenyl 4-fluorophenyl ketone).

Cryst. from pet. ether. M.p. 48.2-48.7°. B.p. 159-61°/13 mm.

Oxime: m.p. 135°.

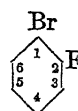
Phenylhydrazone: m.p. 105°.

Bergmann, Hoffmann, Meyer, *J. prakt. Chem.*, 1933, 135, 257.

Koopal, *Rec. trav. chim.*, 1915, 34, 157.

Dunlop, Gardner, *J. Am. Chem. Soc.*, 1933, 55, 1665.

o-Fluorobromobenzene

C₆H₄FBr

MW, 175

B.p. 57°/22 mm.

Bergmann, Engel, St. Sándor, *Z. physik. Chem.*, 1930, 10B, 120.

m-Fluorobromobenzene.

B.p. 149-51°/764 mm.

Schiemann, Pillarsky, *Z. physik. Chem.*, 1931, 156A, 413.

p-Fluorobromobenzene.

F.p. -17.4°. M.p. -8 to -7.5°. B.p. 151.6-151.9°/755 mm. (153.5°/756 mm). D₄²⁰ 1.597. n_D²⁵ 1.52855.

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1343.

Suter, Weston, *J. Am. Chem. Soc.*, 1941, 63, 602.

4'-Fluoro-4-bromodiphenyl

C₁₂H₈FBr

MW, 251

Needles from EtOH. M.p. 97-9°. Ox. → p-bromobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1344.

sym.-Fluorobromoethane (Ethylene fluorobromide)

C₂H₄FBr

MW, 127

B.p. 71-72.5°. D₄²⁵ 1.7044. n_D²⁵ 1.4226.

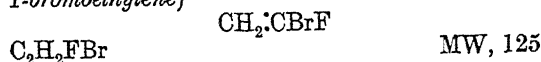
Swarts, *Rec. trav. chim.*, 1914, 33, 262.

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, 58, 887.

sym.-Fluorobromoethylene.

See Acetylene fluorobromide.

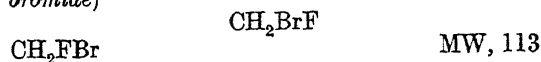
unsym.-Fluorobromoethylene (1-Fluoro-1-bromoethylene)



B.p. 12.5° (30–35°, 6–8°).

Swarts, *Chem. Zentr.*, 1909, II, 1414; 1911, II, 848.

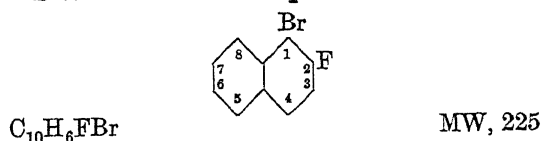
Fluorobromomethane (Methylene fluorobromide)



B.p. 18–20°.

Swarts, *Chem. Zentr.*, 1910, I, 1868.

2-Fluoro-1-bromonaphthalene



Cryst. from MeOH. M.p. 49°.

Nataka, *Ber.*, 1931, 64, 2067.

4-Fluoro-1-bromonaphthalene.

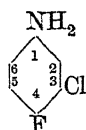
Needles from MeOH. M.p. 37°. Sol. ord. org. solvents.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 285.

Fluorobutane.

See Butyl fluoride.

4-Fluoro-3-chloroaniline



Plates. M.p. 43.9° (44°).

Rinkes, *Chem. Abstracts*, 1916, 10, 194.

Ingold, Vass, *J. Chem. Soc.*, 1928, 423.

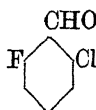
3-Fluoro-4-chloroaniline.

M.p. 61–2°. B.p. about 220°.

N-Acetyl: 3-fluoro-4-chloroacetanilide. $\text{C}_8\text{H}_7\text{ONFCl}$ MW, 187.5. M.p. 115°.

Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

6-Fluoro-2-chlorobenzaldehyde

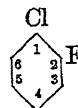


B.p. 104–5°/20 mm.

Semicarbazone: m.p. 213°.

Willstaedt, *Ber.*, 1931, 64, 2691.

o-Fluorochlorobenzene



M.p. –42.5°. B.p. 138–40°/758 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 423.

Rinkes, *Chem. Abstracts*, 1916, 10, 194.

m-Fluorochlorobenzene.

B.p. 127.6°. D_4^{25} 1.221. n_D^{27} 1.4911.

Lock, Stoits, Glassner, *Ber.*, 1936, 69, 2253.

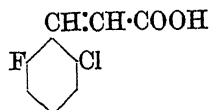
p-Fluorochlorobenzene.

F.p. –27.7°. M.p. –26.85°. B.p. 130°/756 mm. (130.15°/757 mm.). $D_4^{20.5}$ 1.226. $n_D^{11.2}$ 1.4989.

Ingold, Vass, *J. Chem. Soc.*, 1928, 2265.

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

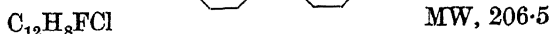
6-Fluoro-2-chlorocinnamic Acid



M.p. 212°.

Willstaedt, *Ber.*, 1931, 64, 2692.

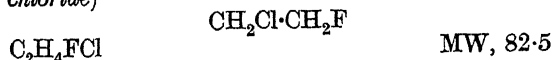
4'-Fluoro-4-chlorodiphenyl



Needles from EtOH. M.p. 87–8°.

Marler, Turner, *J. Chem. Soc.*, 1931, 1362.

sym.-Fluorochloroethane (Ethylene fluorochloride)

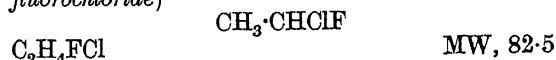


B.p. 10–11°. Sol. EtOH. Insol. H_2O .

Swarts, *Chem. Zentr.*, 1903, I, 13.

McCombie, Saunders, *Nature*, 1946, 158, 382.

unsym.-Fluorochloroethane (Ethylidene fluorochloride)



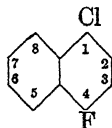
B.p. 16.1–16.2°.

Henne, Renoll, *J. Am. Chem. Soc.*, 1936, 58, 887.

Fluorochloroethylene.

See Acetylene fluorochloride.

4-Fluoro-1-chloronaphthalene

 $C_{10}H_6FCl$

MW, 180.5

Cryst. from EtOH. M.p. 85°.

Mauzelius, *Öfversigt Kongelige Svenska Vetenskaps Akademiens, Förhandlingar*, 1890, 445.

5-Fluoro-1-chloronaphthalene.

Prisms. M.p. 32°. Sol. EtOH.

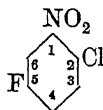
Mauzelius, *Öfversigt Kongelige Svenska Vetenskaps Akademiens, Förhandlingar*, 1889, 581.

8-Fluoro-1-chloronaphthalene.

M.p. 44°. B.p. 130-2°/12.5 mm.

Bergmann, Hirshberg, *J. Chem. Soc.*, 1936, 331.

5-Fluoro-2-chloronitrobenzene

 $C_6H_3O_2NFCI$

MW, 175.5

Prisms. M.p. 37-25°. B.p. 238.5°.

Swarts, *Rec. trav. chim.*, 1915, 35, 144.

4-Fluoro-3-chloronitrobenzene.

M.p. 41.5°. B.p. 227-32°. Volatile in steam.

Rinkes, *Chem. Weekblad*, 1914, 11, 952.
Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

5-Fluoro-3-chloronitrobenzene.

B.p. 198-200°/762 mm.

Degiori, Zappi, *Chem. Abstracts*, 1939, 33, 152.

6-Fluoro-3-chloronitrobenzene.

Prisms from ligroin. M.p. 10-2°. B.p. 138.5°/29 mm. KOH \rightarrow 4-chloro-2-nitrophenol.

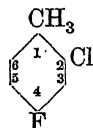
Swarts, *Rec. trav. chim.*, 1915, 35, 135.

3-Fluoro-4-chloronitrobenzene.

Pale yellow leaflets from ligroin. M.p. 63-4°. B.p. 114-16°/24 mm.

Ingold, Vass, *J. Chem. Soc.*, 1928, 422.

4-Fluoro-o-chlorotoluene

 C_7H_6FCl

MW, 144.5

B.p. 151.5-53°. D_4^{20} 1.1972. n_D^{25} 1.4985.

Magidson, Travin, *J. Gen. Chem. U.S.S.R.*, 1941, 11, 243, (*Chem. Abstracts*, 1941, 35, 7966).

6-Fluoro-o-chlorotoluene.

B.p. 153-4°.

Willstaedt, *Ber.*, 1931, 64, 2691.

 α -Fluorocinnamic Acid $C_6H_5 \cdot CH:CF \cdot COOH$ $C_9H_7O_2F$

MW, 166

Prisms. M.p. 157.6°. B.p. 290°. Sol. EtOH, Et₂O. Heat of comb. C_v 1011.3 Cal. $k = 2.0 \times 10^{-3}$ at 25°. Br in CHCl₃ \rightarrow α -fluoro- $\alpha\beta$ -dibromohydrocinnamic acid.

Swarts, *Bull. soc. chim.*, 1919, 25, 326, 329.

2-Fluorocinnamic Acid (*o*-Fluorocinnamic acid) $CH:CH \cdot COOH$  $C_9H_7O_2F$

MW, 166

Needles from H₂O. M.p. 175°. Br \rightarrow *o*-fluoro- $\alpha\beta$ -dibromohydrocinnamic acid, m.p. 183°. Et ester: $C_{11}H_{11}O_2F$. MW, 194. B.p. 140-1°/11 mm.

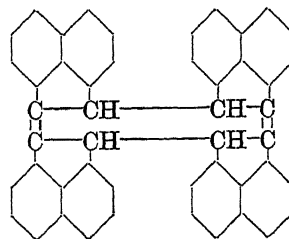
Willstaedt, *Ber.*, 1931, 64, 2689.

3-Fluorocinnamic Acid (*m*-Fluorocinnamic acid).

M.p. 166.5°.

Schiemann, *Ber.*, 1932, 65, 1438.

Fluorocyclene (Tetraperinaphthylencyclo-octadiene)

 $C_{48}H_{28}$

MW, 604

Yellow needles from C₆H₆. M.p. 396-7°. Sol. hot PhNO₂, hot cymene. Spar. sol. hot CHCl₃, hot C₆H₆, hot CS₂. Insol. EtOH, Et₂O. Sols. show violet fluor. Na₂Cr₂O₇ in AcOH \rightarrow naphthalic anhydride.

Suknarowski, *Ber.*, 1918, 51, 463.

Dziewoński, Suszko, *Ber.*, 1925, 58, 723.

Dziewoński, Gizler, *Chem. Abstracts*, 1938, 32, 1691.

Fluorodiethylaniline.

See under Fluoroaniline.

Fluorodimethylaniline.

See under Fluoroaniline.

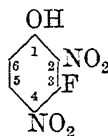
Fluorodinitroanisole.

See under Fluorodinitrophenol.

Fluorodinitrophenetole.

See under Fluorodinitrophenol.

3-Fluoro-2 : 4-dinitrophenol

 $C_6H_3O_5N_2F$

MW, 202

Pale yellow cryst. from ligroin. M.p. 138–9°. Volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

5-Fluoro-2 : 4-dinitrophenol.

Needles from H_2O or ligroin. M.p. 80°. Volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

6-Fluoro-2 : 4-dinitrophenol.

M.p. 102°.

Me ether: 6-fluoro-2 : 4-dinitroanisole.

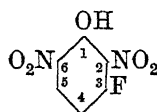
$C_7H_5O_5N_2F$. MW, 216. B.p. 164–5°/10 mm.

Et ether: 6-fluoro-2 : 4-dinitrophenetole.

$C_8H_7O_5N_2F$. MW, 230. B.p. 168°/13 mm.

Schiemann, Miao, *Ber.*, 1933, 66, 1185.

3-Fluoro-2 : 6-dinitrophenol

 $C_6H_3O_5N_2F$

MW, 202

Needles from ligroin. M.p. 68–5°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1881.

4-Fluoro-2 : 6-dinitrophenol.

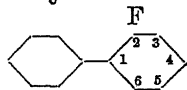
M.p. 50–50.2°.

Me ether: 4-fluoro-2 : 6-dinitroanisole.

$C_7H_5O_5N_2F$. MW, 216. M.p. 81.7–82.7°.

Schiemann, Miao, *Ber.*, 1933, 66, 1186.

2-Fluorodiphenyl

 $C_{12}H_9F$

MW, 172

Prisms. M.p. 73.5°. B.p. 248°. Volatile in steam. D_4^{25} 1.2452.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

Schiemann, Roselius, *Ber.*, 1929, 62, 1809.

Mascarelli, Gatti, Pirona, *Atti accad.*

Lincei, 1931, 14, 510.

3-Fluorodiphenyl.

M.p. 26–7°. D_4^{25} 1.2874.

Schiemann, Roselius, *Ber.*, 1929, 62, 1810.

4-Fluorodiphenyl.

Plates. M.p. 74.2°. B.p. 253°. Volatile in steam. D_4^{25} 1.247.

Schiemann, Roselius, *Ber.*, 1929, 62, 1810.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

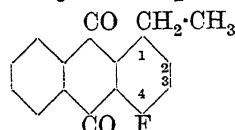
Fluoroethane.

See Ethyl fluoride.

Fluoroethyl Alcohol.

See Ethylene fluorohydrin.

4-Fluoro-1-ethylantraquinone

 $C_{16}H_{11}O_2F$

MW, 254

Cryst. from C_6H_6 . M.p. 80–2°.

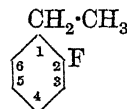
Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

3-Fluoro-2-ethylantraquinone.

Cryst. from C_6H_6 . M.p. 110°.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

o-Fluoro-ethylbenzene

 C_8H_9F

MW, 124

B.p. 136–7°. D_4^0 1.002, D_6^0 0.983.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

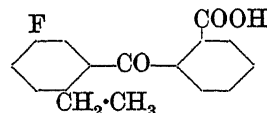
p-Fluoro-ethylbenzene.

B.p. 142–3°/755 mm. (141°). D_6^0 0.994, D_6^0 0.967.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1344.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

o-[5-Fluoro-2-ethylbenzoyl]-benzoic Acid

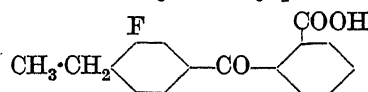
 $C_{16}H_{13}O_3F$

MW, 272

Cryst. from C_6H_6 or AcOH. M.p. 210–20°. $H_2SO_4 \rightarrow$ 4-fluoro-1-ethylantraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

o-[3-Fluoro-4-ethylbenzoyl]-benzoic Acid

 $C_{16}H_{13}O_3F$

MW, 272

Cryst. from C_6H_6 or $AcOH$. M.p. 120° .
 $H_2SO_4 \rightarrow$ 3-fluoro-2-ethylanthraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

Fluoroethylene.

See Vinyl fluoride.

Fluoroform (Trifluoromethane)



CHF_3 MW, 70

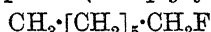
M.p. -160° . B.p. -84.4° , 20° at 40 atm. press.
 Sol. H_2O . Alc. $KOH \rightarrow KF + H\cdot COOK$.

Valentiner, Schwarz, D.R.P., 105,916,
 (*Chem. Zentr.*, 1900, I, 525).

Booth, Bixby, *Ind. Eng. Chem.*, 1932, 24,
 640 (*Bibl.*).

Henne, *J. Am. Chem. Soc.*, 1937, 59, 1200.

1-Fluoroheptane (n-Heptyl fluoride)

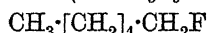


$C_7H_{15}F$ MW, 118

B.p. $120.55^\circ/765$ mm.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

1-Fluorohexane (n-Hexyl fluoride)

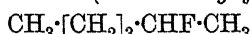


$C_6H_{13}F$ MW, 104

B.p. $93.15^\circ/753$ mm. D_4^{20} 0.8200. n_D^{20} 1.3748.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

2-Fluorohexane (sec.-n-Hexyl fluoride)



$C_6H_{13}F$ MW, 104

B.p. $86.1-86.2^\circ/758$ mm. D_4^{20} 0.7916. n_D^{20} 1.3693.

Desreux, *Chem. Zentr.*, 1934, II, 2516.

Bergmann, Polanyi, Szabo, *Trans. Faraday Soc.*, 1936, 32, 843.

2-Fluorohippuric Acid (o-Fluorobenzoyl-glycine)



$C_9H_8O_3NF$ MW, 197

M.p. $121-121.5^\circ$. Sol. $EtOH$, Et_2O , $AcOEt$.
 Mod. sol. $CHCl_3$. Insol. C_6H_6 , CS_2 .

Coppola, *Gazz. chim. ital.*, 1883, 13, 522.

3-Fluorohippuric Acid (m-Fluorobenzoyl-glycine).

Needles from Et_2O . M.p. $152-3^\circ$. Sol. hot H_2O . Spar. sol. $CHCl_3$. Insol. C_6H_6 , CS_2 .

Coppola, *Gazz. chim. ital.*, 1883, 13, 522.

4-Fluorohippuric Acid (p-Fluorobenzoyl-glycine).

Needles from Et_2O . M.p. $161-161.5^\circ$. Insol. C_6H_6 , $CHCl_3$, CS_2 .

Coppola, *Gazz. chim. ital.*, 1883, 13, 522.

3-Fluorohydrocinnamic Acid



$C_9H_9O_2F$ MW, 168

M.p. 46° .

Amide: $C_9H_{10}ONF$. MW, 167. M.p. 95.5° .

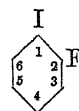
Schiemann, *Ber.*, 1932, 65, 1438.

4-Fluorohydrocinnamic Acid.

Cryst. M.p. 91° .

Kindler, Tsauping, *Ber.*, 1941, 74, 315.

o-Fluoriodobenzene



C_6H_4FI MW, 222

M.p. -41.5° . B.p. 188.6° . Volatile in steam.

Rinkes, *Chem. Zentr.*, 1919, I, 820.

p-Fluoriodobenzene.

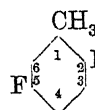
Exists in two forms. (i) M.p. -27.2° .
 (ii) M.p. -18° . B.p. 183.2° (182.4°).

Rinkes, *Chem. Zentr.*, 1919, I, 820.

Wallach, Hensler, *Ann.*, 1888, 243, 227.

Varma, Raman, Nilkantiah, *J. Indian Chem. Soc.*, 1944, 21, 112.

5-Fluoro-2-iodotoluene



C_7H_6FI MW, 236

B.p. $138-9^\circ/9$ mm.

Varma, Raman, Nilkantiah, *J. Indian Chem. Soc.*, 1944, 21, 112.

6-Fluoro-2-iodotoluene.

B.p. $114-16^\circ/8$ mm.

Varma, Raman, Nilkantiah, *J. Indian Chem. Soc.*, 1944, 21, 112.

4-Fluoro-3-iodotoluene.

B.p. $122-5^\circ/30$ mm. D_20^{20} 1.8337. n_D^{18} 1.5757.

Stoughton, Adams, *J. Am. Chem. Soc.*, 1932, 54, 4429.

6-Fluoro-3-iodotoluene.

Light yellow. B.p. $85^\circ/8$ mm.

Varma, Raman, Nilkantiah, *J. Indian Chem. Soc.*, 1944, 21, 112.

3-Fluoro-4-iodotoluene.

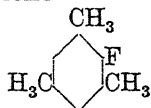
B.p. $138-9^\circ/9$ mm.

Varma, Raman, Nilkantiah, *J. Indian Chem. Soc.*, 1944, 21, 112.

Fluoroisopentane.

See Isoamyl fluoride.

Fluoromesitylene



$C_9H_{11}F$ MW, 138
M.p. -36.7° . B.p. $171-2^\circ$. D_4^{25} 0.9745. n_D^{25} 1.4809.

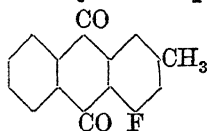
Töhl, *Ber.*, 1892, 25, 1525.

McBee, Leech, *Ind. Eng. Chem.*, 1947, 39, 393.

Fluoromethane.

See Methyl fluoride.

4-Fluoro-2-methylantraquinone



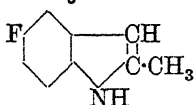
$C_{15}H_9O_2F$ MW, 240
Cryst. from C_6H_6 . M.p. $135.5-137^\circ$.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

2'-Fluoro-4'-methylbenzophenone-2-carboxylic Acid.

See 2'-Fluoro-*p*-toluylbenzoic Acid.

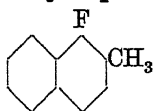
5-Fluoro-2-methylindole



C_9H_8NF MW, 149
Yellow needles. M.p. 102° .

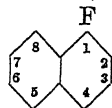
Schiemann, Winkelmüller, *Ber.*, 1933, 66, 730.

1-Fluoro-2-methylnaphthalene



$C_{11}H_9F$ MW, 160
B.p. $260-2^\circ$.

Willstaedt, Scheiber, *Ber.*, 1934, 67, 473.

1-Fluoronaphthalene (α -Fluoronaphthalene)

$C_{10}H_7F$ MW, 146
M.p. -9 to -8° . B.p. 212° ($215^\circ/756$ mm.), $89^\circ/17$ mm., $80^\circ/11$ mm. Sol. EtOH, AcOH, C_6H_6 , $CHCl_3$. $D_4^{19.5}$ 1.1332, D_4^{16} 1.141. $n_D^{19.5}$ 1.59389.

Picrate: m.p. 113° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 275 (*Bibl.*).

Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

Nakata, *Ber.*, 1931, 64, 2066.

2-Fluoronaphthalene (β -Fluoronaphthalene).

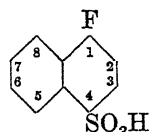
Cryst. from EtOH. M.p. 61° . B.p. $211.5^\circ/737$ mm., $90^\circ/16$ mm. Sol. EtOH, AcOH, C_6H_6 , $CHCl_3$. Sublimes.

Picrate: m.p. 101° .

Nakata, *Ber.*, 1931, 64, 2066.

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 276 (*Bibl.*).

1-Fluoronaphthalene-4-sulphonic Acid



$C_{10}H_7O_3FS$ MW, 226

Cryst. + $\frac{1}{2}H_2O$. M.p. 100° .

Et ester: $C_{12}H_{11}O_3FS$. MW, 254. M.p. 93° .

Chloride: $C_{10}H_6O_2FCIS$. MW, 244.5. Cryst. from $CHCl_3$. M.p. 86° . B.p. $145-8^\circ/4$ mm., $131.5-132^\circ/0.05$ mm. Sol. EtOH, C_6H_6 , $CHCl_3$. Insol. H_2O , pet. ether.

Amide: $C_{10}H_8O_2NFS$. MW, 225. M.p. 206° .

Anilide: m.p. 144° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 277.

1-Fluoronaphthalene-5-sulphonic Acid.

Leaflets + $3(?)H_2O$ from H_2O . M.p. $105-6^\circ$.

Me ester: $C_{11}H_9O_3FS$. MW, 240. Cryst. from Et_2O . M.p. 118° .

Et ester: prisms from Et_2O . M.p. 79° (74°).

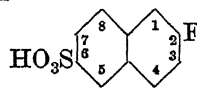
Chloride: prisms. M.p. $122-3^\circ$.

Bromide: $C_{10}H_6O_2FBrS$. MW, 289. M.p. 145° .

Amide: m.p. $196-7^\circ$.

Mauzelius, *Ber.*, 1889, 22, 1844.

2-Fluoronaphthalene-6-sulphonic Acid



$C_{10}H_7O_3FS$ MW, 226

Cryst. + $1H_2O$. M.p. 105° . Hygroscopic.

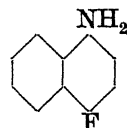
Chloride: $C_{10}H_6O_2FCIS$. MW, 244.5. Cryst. from $CHCl_3$. M.p. 97° . B.p. $144^\circ/0.05$ mm.

Amide: $C_{10}H_8O_2NFS$. MW, 225. M.p. 133° .

Anilide: m.p. 129° .

Schiemann, Gueffroy, Winkelmüller, *Ann.*, 1931, 487, 279.

4-Fluoro-1-naphthylamine



$C_{10}H_8NF$ MW, 161

M.p. 48° . B.p. $162^\circ/16$ mm. Volatile in steam. Rapidly turns dark violet.

B.HCl: m.p. 280° decomp. (sealed tube).

B₂H₂SO₄: m.p. 230°.

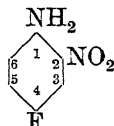
N-Benzoyl: m.p. 197°.

Schiemann, Gueffroy, Winkel Müller, *Ann.*, 1931, 487, 283.

Fluoronitroacetanilide.

See under Fluoronitroaniline.

4-Fluoro-2-nitroaniline



$C_6H_5O_2N_2F$

MW, 156

Orange prisms. M.p. 92·45°.

N-Acetyl: 4-fluoro-2-nitroacetanilide.

$C_8H_7O_3N_2F$. MW, 198. Pale yellow prisms. M.p. 71·5°.

Swarts, *Rec. trav. chim.*, 1915, 35, 142.

5-Fluoro-2-nitroaniline.

Bright yellow cryst. M.p. 97°.

Acetyl: pale yellow. M.p. 85°.

Hodgson, Nicholson, *J. Chem. Soc.*, 1941, 766.

4-Fluoro-3-nitroaniline.

Orange needles from H_2O . M.p. 98°.

N-Acetyl: 4-fluoro-3-nitroacetanilide. M.p. 138·5°.

Holleman, Beekman, *Rec. trav. chim.*, 1904, 23, 237.

Swarts, *Rec. trav. chim.*, 1915, 35, 141.

5-Fluoro-3-nitroaniline.

Orange needles. M.p. 115–16°.

Degorgi, Zappi, *Bull. soc. chim.*, 1937, [5], 4, 1636.

6-Fluoro-3-nitroaniline.

Yellow needles. M.p. 101·5°. 400 times sweeter than glucose.

N-Acetyl: 6-fluoro-3-nitroacetanilide. Cryst. from C_6H_6 . M.p. 178·4°.

Swarts, *Rec. trav. chim.*, 1915, 35, 142.

3-Fluoro-4-nitroaniline.

Yellow cryst. M.p. 153°.

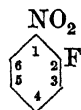
Acetyl: m.p. 138°.

Hodgson, Nicholson, *J. Chem. Soc.*, 1941, 766.

Fluoronitroanisole.

See under Fluoronitrophenol.

o-Fluoronitrobenzene



$C_6H_4O_2NF$

MW, 141

M.p. — 5·9°. B.p. 214·6°, 110–12°/22 mm., 86–7°/11 mm. D_{17}^{25} 1·3375. n_D^{17} 1·5331.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3040.

m-Fluoronitrobenzene.

Exists in three forms. (i) Stable. M.p. 41°. (ii) Labile. M.p. 3·1°. (iii) Labile. M.p. 3·6°. B.p. 200·2°/756 mm. (199–200°), 86°/19 mm. D_4^{15} 1·3254. n_D^{19} 1·52622.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3041.

Ingold, Vass, *J. Chem. Soc.*, 1928, 421.

Hasselblatt, *Z. physik. Chem.*, 1913, 63, 23.

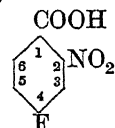
p-Fluoronitrobenzene.

Exists in two forms. (i) Stable. M.p. 27° (26·5°). (ii) Labile. F.p. 21·5°. B.p. 205·3°/735 mm., 95–97·5°/22 mm., 86·6°/14 mm. D_4^{20} 1·3300. n_D^{20} 1·53156. Heat of comb. C_p 701·7 Cal., C_v 702·1 Cal.

Schiemann, Pillarsky, *Ber.*, 1929, 62, 3040.

Holleman, *Rec. trav. chim.*, 1905, 24, 25.

4-Fluoro-2-nitrobenzoic Acid (p-Fluoro-o-nitrobenzoic acid)



$C_7H_4O_4NF$

MW, 185

M.p. 130°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

5-Fluoro-2-nitrobenzoic Acid.

M.p. 134·5°.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 336.

6-Fluoro-2-nitrobenzoic Acid.

M.p. 127°. Sol. H_2O .

van Loon, Meyer, *Ber.*, 1896, 29, 841.

2-Fluoro-3-nitrobenzoic Acid (o-Fluoro-m-nitrobenzoic acid).

Needles. M.p. 160° decomp.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 335.

4-Fluoro-3-nitrobenzoic Acid.

Needles from H_2O . M.p. 121–2°. $k = 4·33 \times 10^{-4}$ at 25°. The salts have yellow to red col. *Et ester*: $C_9H_8O_4NF$. MW, 213. Yellow cryst. M.p. 45°.

Chloride: $C_7H_5O_3NFCl$. MW, 203·5. B.p. 210°/130 mm.

Amide: $C_7H_5O_3N_2F$. MW, 184. M.p. 153°. Govaert, *Chem. Abstracts*, 1930, 24, 2448. Rouche, *Chem. Abstracts*, 1923, 17, 2876. Slothouwer, *Rec. trav. chim.*, 1914, 33, 335.

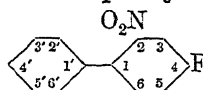
6-Fluoro-3-nitrobenzoic Acid.

Cryst. from H_2O . M.p. 138-9°. $k = 1.88 \times 10^{-3}$ at 25°.

Et ester: m.p. 49.5°.

Govaert, *Chem. Abstracts*, 1930, 24, 2448.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 334.

4-Fluoro-2-nitrodiphenyl

$C_{12}H_8O_2NF$ MW, 217

Prisms. M.p. 53-4°. Ox. \rightarrow 4-fluoro-2-nitrobenzoic acid.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2'-Fluoro-2-nitrodiphenyl.

M.p. 71.5°. $CrO_3 \rightarrow$ *o*-nitrobenzoic acid.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

4'-Fluoro-2-nitrodiphenyl.

Needles. M.p. 59-60°. Ox. \rightarrow *p*-fluorobenzoic acid.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2-Fluoro-4-nitrodiphenyl.

Needles. M.p. 81°.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

2'-Fluoro-4-nitrodiphenyl.

Yellow needles. M.p. 74.5°. Ox. \rightarrow *p*-nitrobenzoic acid.

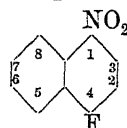
van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

4'-Fluoro-4-nitrodiphenyl.

Yellow needles from EtOH. M.p. 123° (120-1°). Ox. \rightarrow *p*-nitrobenzoic acid.

Marler, Turner, *J. Chem. Soc.*, 1931, 1361.

van Hove, *Bull. soc. chim. Belg.*, 1923, 32, 52.

4-Fluoro-1-nitronaphthalene

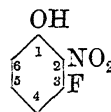
$C_{10}H_6O_2NF$ MW, 191

Yellow needles from EtOH. M.p. 80°. Sol. most org. solvents.

Schiemann, Gueffroy, Winkel Müller, *Ann.*, 1931, 487, 281.

Fluoronitrophenetole.

See under Fluoronitrophenol.

3-Fluoro-2-nitrophenol

$C_6H_4O_3NF$ MW, 157

Red needles from ligroin. M.p. 39°. Volatile in steam.

Me ether: 3-fluoro-2-nitroanisole. $C_7H_6O_3NF$. MW, 171. Needles from ligroin. M.p. 43.5°.

Benzoyl: needles. M.p. 114°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

4-Fluoro-2-nitrophenol.

Yellow cryst. from EtOH. M.p. 73.7°.

Me ether: 4-fluoro-2-nitroanisole. Prisms from EtOH. M.p. 61.6°.

Et ether: 4-fluoro-2-nitrophenetole. $C_8H_8O_3NF$. MW, 185. Needles from EtOH. M.p. 33.7°. B.p. 225-7°.

Swarts, *Bulletin de L'Académie Royale de Belgique, Classe des Sciences*, 1913, 278 (*Chem. Abstracts*, 1914, 8, 681).

5-Fluoro-2-nitrophenol.

Yellow needles from ligroin. M.p. 32°. Volatile in steam.

Me ether: 5-fluoro-2-nitroanisole. Cryst. from ligroin. M.p. 52°.

Benzoyl: m.p. 110-11°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

6-Fluoro-2-nitrophenol.

Yellow cryst. M.p. 91-1°.

Niemann, Benson, Mead, *J. Am. Chem. Soc.*, 1941, 63, 2204.

5-Fluoro-3-nitrophenol.

Pale yellow scales from HCl.Aq. M.p. 112°.

Degiori, Zappi, *Chem. Abstracts*, 1937, 31, 4657.

2-Fluoro-4-nitrophenol.

Me ether: 2-fluoro-4-nitroanisole. $C_7H_6O_3NF$. MW, 171. M.p. 104.6°.

Et ether: 2-fluoro-4-nitrophenetole. $C_8H_8O_3NF$. MW, 185. M.p. 77°.

Schiemann, Miao, *Ber.*, 1933, 66, 1183.

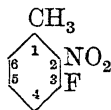
3-Fluoro-4-nitrophenol.

Needles from H_2O or ligroin. M.p. 42°. Non-volatile in steam.

Me ether: 3-fluoro-4-nitroanisole. Needles from ligroin. M.p. 56.5°.

Benzoyl: plates. M.p. 118°.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1880.

3-Fluoro-*o*-nitrotoluene $C_7H_6O_2NF$

MW, 155

M.p. 17.5–18°. B.p. 92.4–92.8°/12 mm.

Schiemann, *Ber.*, 1929, 62, 1802.4-Fluoro-*o*-nitrotoluene.M.p. — 8.85°. B.p. 213°/768 mm. (218°), 102.4°/20 mm. D^{20}_D 1.2686. n^{20}_D 1.52358.Desirant, *Chem. Abstracts*, 1933, 27, 4781.
van Loon, Meyer, *Ber.*, 1896, 29, 841.5-Fluoro-*o*-nitrotoluene.

M.p. 27–8°. B.p. 97–8°/10 mm.

Schiemann, *Ber.*, 1929, 62, 1802.6-Fluoro-*o*-nitrotoluene.

M.p. — 2°. B.p. 97–97.2°/11 mm.

Schiemann, *Ber.*, 1929, 62, 1805.2-Fluoro-*m*-nitrotoluene.

B.p. 110–11°/12 mm.

Braun, Rudolf, *Ber.*, 1931, 64, 2471.4-Fluoro-*m*-nitrotoluene.M.p. 26.48° (1–2°). B.p. 241°, 134–5°/83 mm., 124–5°/21 mm., 104.2°/9 mm. D^{28} 1.2619. n^{28}_D 1.52371.Slothouwer, *Chem. Zentr.*, 1914, II, 1431.
Schiemann, *Ber.*, 1929, 62, 1799.
Desirant, *Chem. Abstracts*, 1933, 27, 4781.6-Fluoro-*m*-nitrotoluene.

M.p. 41.5°. B.p. 99.4–99.6°/13 mm.

Schiemann, *Ber.*, 1929, 62, 1804.2-Fluoro-*p*-nitrotoluene.

M.p. 34–5°. B.p. 65–8°/2 mm.

Schmelkes, Rubin, *J. Am. Chem. Soc.*, 1944, 66, 1631.3-Fluoro-*p*-nitrotoluene.

Needles from EtOH. M.p. 53.2°.

Schiemann, *Ber.*, 1929, 62, 1801.

Fluoro-octane.

See Octyl fluoride.

1-Fluoropentane.

See Amyl fluoride.

2-Fluoropentane.

See sec.-*n*-Amyl fluoride.

Fluorophenetole.

See under Fluorophenol.

o-Fluorophenol C_6H_5OF

MW, 112

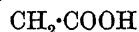
M.p. 16.1°. B.p. 151–2°, 52.9°/14 mm.

Me ether: *o*-fluoroanisole. C_7H_7OF . MW, 126. M.p. — 39°. B.p. 64°/17 mm., 59.2°/12 mm.*Et ether*: *o*-fluorophenetole. C_8H_9OF . MW, 140. M.p. — 16.7°. B.p. 171.4°, 63.9–64.3°/11 mm.Schiemann, Miao, *Ber.*, 1933, 66, 1183.Schiemann, *Z. physik. Chem.*, 1931, 156A, 417 (*Bibl.*).Rinkes, *Chem. Abstracts*, 1916, 10, 194.Swarts, *Chem. Abstracts*, 1914, 8, 680.*m*-Fluorophenol.

M.p. 13.8°. B.p. 177.8°, 108°/70 mm., 76.8°/14 mm.

Me ether: *m*-fluoroanisole. M.p. — 35°. B.p. 51°/14 mm., 47°/12 mm.*Et ether*: *m*-fluorophenetole. M.p. — 27.5°. B.p. 171.4°, 65–65.5°/15 mm. $D^{16.4}$ 1.0716. $n^{16.4}_D$ 1.4847.Schiemann, *Z. physik. Chem.*, 1931, 156A, 414.Swarts, *Chem. Abstracts*, 1914, 8, 680.*p*-Fluorophenol.

Exists in two forms. (i) F.p. 46.5°. M.p. 48°. (ii) M.p. 26.5–27°. B.p. 185.5°, 102–5°/30 mm., 81.5°/13 mm.

Me ether: *p*-fluoroanisole. M.p. — 45°. B.p. 157°, 57.2°/19 mm., 50.7°/13 mm.*Et ether*: *p*-fluorophenetole. M.p. — 8.5°. B.p. 172.8°, 71°/18 mm. $D^{18.2}$ 1.07148. $n^{18.2}_D$ 1.48257.*Acetyl*: b.p. 85–7°/16 mm. D^{25}_4 1.170. n^{25}_D 1.4830.Rinkes, *Chem. Abstracts*, 1916, 10, 194.Swarts, *Chem. Abstracts*, 1914, 8, 688.Suter, Lawson, Smith, *J. Am. Chem. Soc.*, 1939, 61, 161.*p*-Fluorophenylacetic Acid $C_8H_7O_2F$

MW, 154

Leaflets from H_2O . M.p. 86°.Dippy, Williams, *J. Chem. Soc.*, 1934, 1466.2-*m*-Fluorophenylethylamine (3-Fluoro- β -amino-ethylbenzene) $C_8H_{10}NF$

MW, 139

B.p. 87°/15 mm.

Picrate: m.p. 157° decomp.Schiemann, *Ber.*, 1932, 65, 1438.

2-*p*-Fluorophenylethylamine (4-*Fluoro-β*-aminoethylbenzene).

B.p. 99–100°/24 mm. D_4^{20} 1.069. n_D^{20} 1.5080.
B, HCl: m.p. 206–8° decomp.

Suter, Weston, *J. Am. Chem. Soc.*, 1941, 63, 602.

***p*-Fluorophenylhydrazine**



$C_6H_7N_2F$

MW, 126

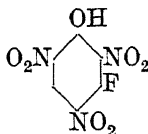
M.p. 39°. B.p. 129.2°/21 mm.

Schiemann, Winkelmüller, *Ber.*, 1933, 66, 729.

1-*p*-Fluorophenylpropane.

See *p*-Fluoropropylbenzene.

Fluoropicric Acid (3-*Fluoro-2:4:6-trinitrophenol*)



$C_6H_2O_7N_3F$

MW, 247

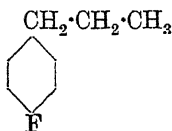
Plates from H_2O . M.p. 173°. Non-volatile in steam.

Hodgson, Nixon, *J. Chem. Soc.*, 1928, 1882.

Fluoropropane.

See Propyl fluoride.

***p*-Fluoropropylbenzene** (1-*p*-Fluorophenylpropane)



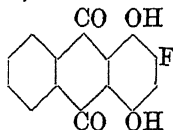
$C_9H_{11}F$

MW, 138

B.p. 164–5°.

Schiemann, Pillarsky, *Ber.*, 1931, 64, 1344.

2-Fluoroquinizarin (2-*Fluoro-1:4-dihydroxyanthraquinone*)



$C_{14}H_7O_4F$

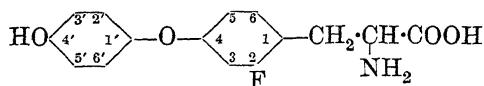
MW, 258

Red prisms. Bluish-red sol. in KOH.Aq.

Diacetyl: yellow needles from AcOH. M.p. 189°.

Dimroth, Hilcken, *Ber.*, 1921, 54, 3056.

2-Fluorothyronine (α -Amino- β -*p*-hydroxyphenoxy-2-fluorophenylpropionic acid)



$C_{15}H_{14}O_4NF$

MW, 291

Decomp. at 264.5°.

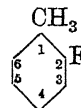
Schiemann, *Ber.*, 1932, 65, 1437.

5'-Fluorothyronine.

Plates. M.p. 238° decomp.

Niemann, Mead, Benson, *J. Am. Chem. Soc.*, 1941, 63, 609.

***o*-Fluorotoluene**



C_7H_7F

MW, 110

B.p. 114°, 30°/26 mm., 19°/17 mm. $D^{13.2}_{1.0041}$. Heat of comb. C_v 901.61 Cal.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 6, 1905.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 325.

Schiemann, *Ber.*, 1929, 62, 1798.

Waterman, de Kok, *Rec. trav. chim.*, 1934, 53, 1133.

***m*-Fluorotoluene.**

B.p. 116°. $D^{13.4}_{0.9972}$.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 6, 1905.

Slothouwer, *Rec. trav. chim.*, 1914, 33, 325.

Schiemann, *Ber.*, 1929, 62, 1798.

***p*-Fluorotoluene.**

B.p. 115.5°/756 mm. D^{16}_4 1.0007. Heat of comb. C_v 901.86 Cal.

Holleman, Slothouwer, *Chem. Abstracts*, 1911, 6, 1905.

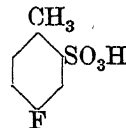
Allen, Sugden, *J. Chem. Soc.*, 1932, 762.

Schiemann, *Ber.*, 1927, 60, 1188.

ω -Fluorotoluene.

See Benzyl fluoride.

***p*-Fluorotoluene-*o*-sulphonic Acid**



$C_7H_7O_3FS$

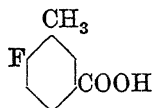
MW, 190

Chloride: $C_7H_6O_2FClS$. MW, 208.5. B.p. 145–50°/20 mm.

Amide: $C_7H_8O_2NFS$. MW, 189. Prisms from EtOH. M.p. 155° (140°). Sol. EtOH.

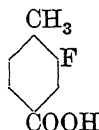
de Roode, *Am. Chem. J.*, 1891, 13, 219.

Holleman, *Rec. trav. chim.*, 1906, 25, 332.

6-Fluoro-*m*-toluic Acid $C_8H_7O_2F$

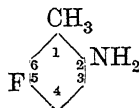
MW, 154

M.p. 165°.

Schiemann, Roselius, *Ber.*, 1932, 65, 745.2-Fluoro-*p*-toluic Acid $C_8H_7O_2F$

MW, 154

Cryst. from EtOH.Aq. M.p. 160–1°.

Paternó, Oliveri, *Gazz. chim. ital.*, 1882, 12, 93.5-Fluoro-*o*-toluidine C_7H_8NF

MW, 125

B.p. 94°/17 mm.

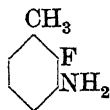
N-Benzoyl: m.p. 166°.

N-*p*-Nitrobenzoyl: m.p. 168°.

Picrate: m.p. 199°.

Schiemann, *Ber.*, 1929, 62, 1803.6-Fluoro-*o*-toluidine.

M.p. 7°. B.p. 89–89.5°/15 mm.

Acetyl: 6-fluoro-*o*-acet-toluidide. Needles from EtOH. M.p. 132°.Lock, *Ber.*, 1936, 69, 2253.2-Fluoro-*m*-toluidine C_7H_8NF

MW, 125

B.p. 85–7°/12 mm.

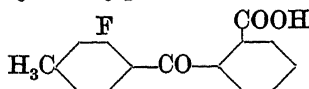
B.HCl: m.p. 197°.

N-Acetyl: 2-fluoro-*m*-acet-toluidide. B.p. 167–70°/14 mm.

Picrate: m.p. 205°.

Braun, Rudolph, *Ber.*, 1931, 64, 2471.

2'-Fluoro-*p*-toluylbenzoic Acid (2'-Fluoro-4'-methylbenzophenone-2-carboxylic acid, *o*-[2-fluoro-4-methyl-benzoyl]-benzoic acid)

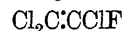
 $C_{15}H_{11}O_3F$

MW, 258

Cryst. from C_6H_6 or AcOH. M.p. 129°. $H_2SO_4 \rightarrow$ 4-fluoro-2-methylantraquinone.

Quayle, Reid, *J. Am. Chem. Soc.*, 1925, 47, 2359.

Fluorotrichloroethylene

 C_2Cl_3F

MW, 149.5

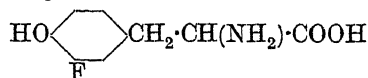
M.p. –108.9°. B.p. 71.0°/760 mm. D_4^{20} 1.5460. n_D^{20} 1.4379.

Henne, Ruh, *J. Am. Chem. Soc.*, 1948, 70, 1025.

Fluorotrinitrophenol.

See Fluoropicric Acid.

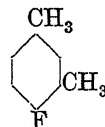
3-Fluorotyrosine

 $C_9H_{10}O_3NF$

MW, 199

Decomp. at 277° (275–8°).

N-Benzoyl: m.p. 221–2°.

Schiemann, *Ber.*, 1932, 65, 1435.Niemann, Benson, Mead, *J. Am. Chem. Soc.*, 1941, 63, 2204.English, Mead, Niemann, *J. Am. Chem. Soc.*, 1940, 62, 350.4-Fluoro-*m*-xylene C_8H_9F

MW, 124

B.p. 143–4°/749 mm.

Klages, Liecke, *J. prakt. Chem.*, 1900, 61, 328.Balz, Schiemann, *Ber.*, 1927, 60, 1188.

Folic Acid (Vitamin B_{12} , vitamin M, Lactobacillus casei growth factor).

The name "folic acid" is used to describe a series of growth factors comprising pteroylglutamic acid and glutamic acid peptide conjugates thereof.

See Pteroylglutamic Acid.

Folinerin.

See Oleandrin.

Folliculin.

See Oestriol.

Folliculosterone.

Synthetic female ovarian hormone. Cryst. M.p. 248–48.5°. $[\alpha]_D^{25} +162^\circ$ in $CHCl_3$.

Acetyl: m.p. 112–16°.

Benzoyl: m.p. 202°.

Oxime: m.p. 236°.

Semicarbazone: m.p. 260–2°.

Remezov, *Rec. trav. chim.*, 1937, 56, 1092.

Formaldehyde (Methanal)CH₂O

MW, 30

M.p. — 92°. B.p. — 21°. D²⁰ 0.815. Stable at temps. below — 30°. Misc. with non-hydroxylic solvents except pet. ether. Heat of polymerisation 15 Cal. The 40% aq. sol. is the "formalin" of commerce. NaOBr → H·COONa. NH₃ → hexamethylenetetramine. H₂SO₄ → polyoxymethylenes. HCN → glycollic nitrile. Phenols → "phenol-formaldehyde" resins. Reduces AgNO₃ and H₂O₂. Ox. → formic acid. Red. → methyl alcohol. R·NH₂ → R·N·CH₂ or R·NH·CH₂OH. Caustic alkalis → CH₃OH + H·COONa. excess alkali or CaO, etc. → α-acrose. C₂H₅OH (+ HCl) → C₂H₅·O·CH₂Cl. R·CO·NH₂ → R·CO·NH·CH₂OH or CH₂(NH·CO·R)₂.

Anhydrous polymer: m.p. 170–2°. Sol. 0.017 gm./100 c.c. H₂O at 20°.

Paraformaldehyde: m.p. 121–3°. Sol. 0.24 gm./100 c.c. H₂O at 20°.

Oxime: formaldoxime. CH₃ON. MW, 45. B.p. 84°. Sol. H₂O. Gradually turns to amorph. trimeride insol. H₂O. *Hydrochloride*: (CH₃ON)₃·HCl. Prisms. M.p. 136°.

Semicarbazone: m.p. 169° decomp. (255–6° decomp.).

Phenylhydrazone: m.p. 145°.

p-Nitrophenylhydrazone: yellow needles from C₆H₆. M.p. 181–2°.

2:4-Dinitrophenylhydrazone: prisms from ligroin. M.p. 167° (155°).

Ammonia comp.: see Hexamethylenetetramine.

Cyanhydrin: see under Glycollic Acid.

Dimethyl acetal: dimethylformal. See Methylal.

Diethyl acetal: diethylformal, diethoxymethane, ethylal, methylene diethyl ether. C₅H₁₂O₂. MW, 104. B.p. 89°. D⁰ 0.851. Sol. 11 vols. H₂O at 18°.

Trimeride: metaformaldehyde. See Trioxymethylene.

Walker, *J. Am. Chem. Soc.*, 1933, 55, 2821; *Ind. Eng. Chem.*, 1931, 23, 1220 (*Bibl., Review*).

Schwyzler, *Chem. Abstracts*, 1930, 24, 1181. Coulouma, *Chem. Abstracts*, 1928, 22, 4105 (*Bibl., Review*).

Trotman, *Chem. Trade J.*, 1928, 82, 242 (*Review*).

Raschig, *Prahl, Ber.*, 1928, 61, 179.

Plotnikov, Balyasni, *Chem. Abstracts*, 1938, 32, 5373.

Horner, *J. Soc. Chem. Ind.*, 1941, 60, 213.

Marelli, *Chem. Abstracts*, 1942, 36, 1054.

Patry, Monceaux, *Compt. rend.*, 1945, 221, 259.

Bisulphite comp.: OH·CH₂·O·SO₂Na. Cryst. + 1H₂O from H₂O. Sol. MeOH. Spar. sol. EtOH. Red. of 2 mols. with 1Zn + AcOH → sodium formaldehyde-hydrosulphite, "Hyraldite," (CH₂O)₂Na₂S₂O₄. Needles from H₂O. Red. of 1 mol. with 1Zn + AcOH → sodium formaldehyde-sulphoxylate, "Rongalite," "Formosul," HO·CH₂·SO₂Na. Needles from H₂O. The hydrosulphites and sulphoxylates are used in calico-printing for printing vat dyes and for discharging. Zinc formaldehyde-sulphoxylate (Decroline, zinc Formosul) is also employed in the textile industry as a reducing agent.

Schwartz, Baumann, Sünder, Thesmar, *Bulletin de la société industrielle de Mulhouse*, 1903, 73, 183.

Bach-Nikolajowa, *Chem. Zentr.*, 1927, II, 1014.

Badische, D.R.P.s 180,529, 168,729.

Schneider, D.R.P. 403,193.

Binz, Râth, Walter, *Ber.*, 1924, 57, 1398.

Baumann, Thesmar, Frossard, *Bulletin de la société industrielle de Mulhouse*, 1904, 74, 348.

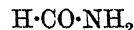
Dubose, *Rev. prod. chim.*, 1921, 24, 11.

Formaldehyde-sulphoxylate.

See under Formaldehyde.

Formaldoxime.

See under Formaldehyde.

FormamideCH₃ON

MW, 45

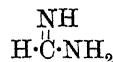
M.p. 2.5°. B.p. 111°/20 mm., 103°/9 mm. D²⁰ 1.1334. n_D²⁰ 1.4472. Heat of comb. C_p 134.9 Cal. Hygroscopic. Misc. with EtOH. Sol. 1.4 gm./100 c.c. abs. Et₂O at ord. temps. Insol. C₆H₆, CHCl₃, hexane.

N-Allyl: formylallylamine. C₄H₇ON. MW, 85. B.p. 109°/15 mm. D⁰ 1.0078.

I.G. (Wietzel), D.R.P., 550,749, (*Chem. Abstracts*, 1932, 26, 4829).

Smith, *J. Chem. Soc.*, 1931, 3257.

Deschamps, *Chimie et Industrie*, Special No., 1931, 589 (*Review*); *Chem. Abstracts*, 1931, 25, 3620.

FormamidineCH₄N₂

MW, 44

Known only as salts.

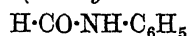
B·HCl: MW, 108. M.p. 80°. Deliquescent.

B₂, H₂PtCl₆: orange prisms from EtOH.

Claisen, Matthews, *Ber.*, 1883, 16, 310.

Pinner, *Die Iminodether*, Berlin, 1892.

Brown, *J. appl. Chem.*, 1952, 2, 202.

Formanilide (Formylaniline)C₇H₇ON

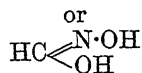
MW, 121

Cryst. from ligroin-xylene. M.p. 50°. B.p. 216°/120 mm., 166°/14 mm. D_{20}^{25} 1.1322. Mod. sol. H_2O . Sol. EtOH, C_6H_6 . Heat of comb. C_p 861.4 Cal. $SOCl_2$ in cold \rightarrow $PhN:CHNHPH$, HCl.

Fröschl, Bomberg, *Monatsh.*, 1927, 48, 573.

Schmidt, B.P., 252,460, (*Chem. Abstracts*, 1927, 21, 2273).

Formhydroxamic Acid (*Formhydroximic acid*)



CH_3O_2N

MW, 61

Glistening waxy leaflets. M.p. 82°. Sol. EtOH, H_2O . Spar. sol. Et_2O . Insol. $CHCl_3$, ligroin, C_6H_6 . $k = 1 \times 10^{-7}$ at 25°. Decomp. above m.p. to $CO + NH_2OH$. Forms metallic salts.

Me ester: $C_2H_5O_2N$. MW, 75. Prisms. M.p. 38–9° (99–100°). B.p. 117°/33 mm.

Et ester: $C_3H_7O_2N$. MW, 89. Needles from CCl_4 . M.p. 80°. B.p. 76–7°/15 mm.

Rimini, *Chem. Zentr.*, 1901, II, 100.

Jones, Oesper, *Am. Chem. J.*, 1909, 42, 518.

Houben, *J. prakt. Chem.*, 1922, 105, 7.

Baudisch, *Chem. Abstracts*, 1925, 19, 3221.

Oddo, Deleo, *Ber*, 1936, 69, 287.

Formic Acid



CH_2O_2

MW, 46

M.p. 8.4°. B.p. 100.5°, 50°/120 mm. D_{20}^{20} 1.220. n_D^{20} 1.3714. $k = 2.4 \times 10^{-4}$ at 25°. Heat of comb. (vapour) C_p 69.4 Cal.; (liq.) C_p 61.7 Cal. Vapour burns with blue flame. Liq. is misc. in all proportions with H_2O , EtOH, Et_2O . Mod. sol. C_6H_6 . Good solvent for many inorg. and org. comps. Reducing agent.

Me ester: see Methyl formate.

Et ester: see Ethyl formate.

Propyl ester: $C_4H_8O_2$. MW, 88. B.p. 81°. D_4^{20} 0.9058.

Allyl ester: $C_4H_6O_2$. MW, 86. B.p. 83°. D_{17}^{17} 0.932.

n-Amyl ester: $C_6H_{12}O_2$. MW, 116. B.p. 130°. D_0^{10} 0.9018.

Isoamyl ester: see Isoamyl formate.

Glycerol esters: see Monoformin, Diformin, and Triformin.

Benzyl ester: $C_8H_8O_2$. MW, 136. B.p. 202–3°/747 mm., 84–5°/10 mm. D_{25}^{25} 1.081.

p-Bromophenacyl ester: cryst. from EtOH. M.p. 99°.

Amide: see Formamide.

Nitrile: see Hydrocyanic acid.

Anilide: see Formanilide.

Dict. of Org. Comp.—II.

Toluidide: see Formo-toluidide.

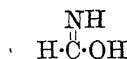
Pryanishnikov, Shakhova, *Chem. Abstracts*, 1933, 27, 2672.

Sucharda, Mazonski, *ibid.*, 5954.

I.G., F.P. 718,672, (*Chem. Abstracts*, 1932, 26, 3261).

Cie de Bethune, F.P. 673,337, (*Chem. Abstracts*, 1930, 24, 2474).

Formimidic Acid



CH_3ON

MW, 45

Known only as esters (formiminoethers).

Et ester: formimino ethyl ether. C_3H_7ON . MW, 73. Liq. B.p. 80–4°. D_4^{16} 0.81175. n_D^{16} 1.36829. *Hydrochloride*: prisms. Decomp. at 100°. On keeping $\rightarrow NH_4Cl$ + ethylal.

Isopropyl ester: *hydrochloride*, m.p. 117–18°.

Pinner, *Ber.*, 1883, 16, 354, 1644.

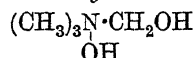
Pinner, *Die Iminoäther*, Berlin, 1892.

Cornforth, Cornforth, *J. Chem. Soc.*, 1947, 96.

Formin.

See Monoformin, Diformin, Triformin and Hexamethylenetetramine.

Formocholine (*Hydroxytrimethylaminomethanol, trimethylhydroxymethylammonium hydroxide, hydroxytetramethylammonium hydroxide*)



$C_4H_{13}O_2N$

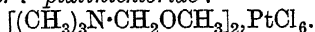
MW, 107

Hygroscopic cryst. mass. Absorbs CO_2 from the air.

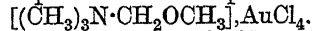
Iodide: *acetyl deriv.*, acetoxytetramethylammonium iodide, $(CH_3)_3NI \cdot CH_2O \cdot CO \cdot CH_3$. Needles from EtOH. M.p. 152°.

Platinichloride: $[(CH_3)_3N \cdot CH_2OH]_2PtCl_6$. M.p. 230° decomp.

Me ether: *platinichloride*:



Prisms. M.p. 234° decomp. *Aurichloride*:



M.p. 235–6° (135–6°). *Iodide*: $C_5H_{14}ONI$. MW, 231. M.p. 84°. *Picrate*: m.p. 198°.

Et ether: *platinichloride*: m.p. 241–2°. *Aurichloride*: m.p. 138–9°. *Iodide*: $C_6H_{16}ONI$. MW, 245. M.p. 94°.

Propyl ether: *platinichloride*: m.p. 236–7°. *Aurichloride*: m.p. 114°. *Iodide*: $C_7H_{18}ONI$. MW, 259. M.p. 108°.

Butyl ether: *platinichloride*: m.p. 243–4°. *Aurichloride*: m.p. 81°. *Iodide*: $C_8H_{20}ONI$. MW, 273. M.p. 98°.

Schmidt, Litterscheid, *Ann.*, 1904, 337, 74.

Ewins, *Biochem. J.*, 1914, 8, 371.

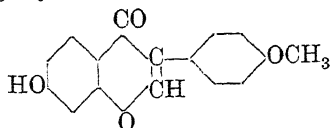
Renshaw, Ware, *J. Am. Chem. Soc.*, 1925, 47, 2990.

Formodiphenylamide.

See under Diphenylamine.

Formonitrile.

See Hydrocyanic Acid.

Formo-ononetin (Formononetin, 7-hydroxy-4'-methoxyisoflavone) $C_{16}H_{12}O_4$

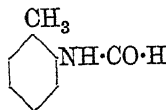
MW, 268.

The aglucone from ononetin. Cryst. M.p. 257°. $Ac_2O + HI \rightarrow$ daidzein.*Me ether*: dimethyldaidzein. See under Daidzein.*Benzyl ether*: m.p. 182°.*Acetyl*: m.p. 170°.Wessely, Kornfeld, Lechner, *Ber.*, 1933, 66, 685.Zemplen, Farkas, Bein, *Ber.*, 1944, 77, 452.**Formophenetidide.**

See under Phenetidine.

Formosul.

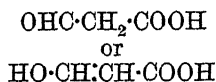
See under Formaldehyde.

Formo-o-toluidide (Formyl-o-toluidine) C_8H_9ON

MW, 135

Leaflets from EtOH. M.p. 62° (57°). B.p. 288°. Very sol. EtOH. K in liq. NH_3 or KOMe \rightarrow indole.Hirst, Cohen, *J. Chem. Soc.*, 1895, 67, 830.Tyson, *J. Am. Chem. Soc.*, 1941, 63, 2024.**Formo-m-toluidide** (Formyl-m-toluidine).

B.p. 278°/724 mm. (part. decomp.), 176–8°/17 mm.

N-Benzyl: m.p. 60–1°.Niementowski, *Ber.*, 1887, 20, 1892.**Formo-p-toluidide** (Formyl-p-toluidine).Needles. M.p. 53° (45°). Very sol. EtOH. sol. H_2O .Hirst, Cohen, *J. Chem. Soc.*, 1895, 67, 830.Hübner, Rudolph, *Ann.*, 1881, 209, 372.**Formylacetic Acid** (Malonaldehydic acid, aldehydoacetic acid, 2-hydroxyacrylic acid, malonic semi-aldehyde) $C_3H_4O_3$

MW, 88

Neither the free acid nor its methyl or ethyl esters have been isolated.

Nitrile: see Cyanoacetaldehyde.*Oxime*: see Isonitrosopropionic Acid.*Semicarbazone*: m.p. 116° decomp.*Me ester diethyl acetal*: methyl 2:2-diethoxypropionate. $C_8H_{16}O_4$. MW, 176. B.p. 193°.*Et ester*: *oxime*, m.p. 57–9°. *Semicarbazone*: m.p. 147–8°.*Et ester diethyl acetal*: ethyl 2:2-diethoxypropionate. $C_9H_{18}O_4$. MW, 190. B.p. 93°/22 mm.Rinkes, *Rec. trav. chim.*, 1927, 46, 273.Straus, Voss, *Ber.*, 1926, 59, 1681.Claisen, *Ber.*, 1903, 36, 3666.Wohl, Emmerich, *Ber.*, 1900, 33, 2763.Cogan, *Bull. soc. chim.*, 1941, 8, 125.**Formylacetone.**

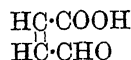
See Acetoacetaldehyde.

Formylacetoneitrile.

See Cyanoacetaldehyde.

 ω -Formylacetophenone.

See Benzoylacetalddehyde.

Formylacrylic Acid (Maleic semialdehyde, malealdehydic acid) $C_4H_4O_3$

MW, 100

Needles from $Et_2O-C_6H_6$. M.p. 55°. B.p. 145°/10 mm. slight decomp. Very sol. H_2O , EtOH, Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. ligroin.*Me ester*: $C_5H_6O_3$. MW, 114. M.p. 35–6°.*Et ester*: 2:4-dinitrophenylhydrazones, m.p. 290–2°.*Oxime*: cryst. from Et_2O . M.p. 130–40° decomp.*Phenylhydrazones*: citron yellow needles. M.p. 158–9°.Fecht, *Ber.*, 1905, 38, 1272.**Formylallylamine.**

See under Formamide.

Formylaniline.

See Formanilide.

p-Formylbenzophenone.

See 4-Benzoylbenzaldehyde.

Formylbenzyl cyanide.

See under Phenylformylacetic Acid.

 β -Formylbutyrophenone.

See 1-Benzoylbutyraldehyde.

3-Formylcamphor.

See 3-Hydroxymethylenecamphor.

7-Formylcaprylic Acid.

See Azelaic Semi-aldehyde.

p-Formylcinnamic Acid.

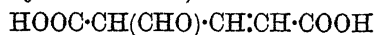
See 4-Aldehydocinnamic Acid.

Formyldiethylamine.See *N*-Diethylformamide.**Formyldimethylamine.**

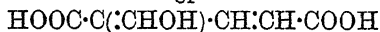
See Dimethylformamide.

Formyldiphenylamine.

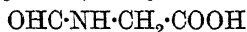
See under Diphenylamine.

3-Formylglutaconic Acid (*3-Hydroxy-methyleneglutaconic acid*)

or

 $\text{C}_6\text{H}_6\text{O}_5$ MW, 158

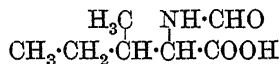
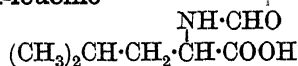
The free acid has not been characterized.

Di-Me ester: $\text{C}_8\text{H}_{10}\text{O}_5$. MW, 186. Needles. M.p. 88–9°. Sol. Et_2O . Spar. sol. CHCl_3 , C_6H_6 . Insol. ligroin.*Di-Et ester*: $\text{C}_{10}\text{H}_{14}\text{O}_5$. MW, 214. Leaflets from Et_2O or C_6H_6 . M.p. 66–7°. Sol. ord. org. solvents. $\text{FeCl}_3 \rightarrow$ bluish-violet col. On standing in moist air or heating above m.p. changes to oily dimeride which with $\text{FeCl}_3 \rightarrow$ red col. Heat at 120° \rightarrow trimesic ester + ethyl acetate + formic acid.Wislicenus, Wrangell, *Ann.*, 1911, **381**, 367, 376.**Formylglycine** (*Formylaminoacetic acid*) $\text{C}_3\text{H}_5\text{O}_3\text{N}$ MW, 103Leaflets from H_2O or EtOH . M.p. 153–4° decomp. Very sol. hot H_2O , EtOH . Spar. sol. Me_2CO , AcOEt . Very spar. sol. Et_2O , C_6H_6 .*Chloride*: $\text{C}_3\text{H}_4\text{O}_2\text{NCl}$. MW, 121.5. Cryst. from acetyl chloride. Decomp. at 100°. Sol. hot CHCl_3 , C_6H_6 . Spar. sol. Et_2O .Fischer, Warburg, *Ber.*, 1905, **38**, 3999.Max, *Ann.*, 1909, **369**, 285.**Formylglycollic Acid.**

See Hydroxypyruvic Acid.

Formylisobutyric Acid.

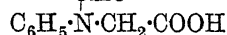
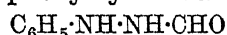
See Aldehydoisobutyric Acid.

Formyl-isoleucine (*Note*. The *d*- and *l*- refer to configuration (D-, L-), not to sign of rotation) $\text{C}_7\text{H}_{13}\text{O}_3\text{N}$ MW, 159*d*-.Cryst. from EtOH . M.p. 156–7° (sinters at 154°). $[\alpha]_D^{20} - 26.8^\circ$ in EtOH .*l*-.Cryst. from EtOH . M.p. 156–7° (sinters at 154°). $[\alpha]_D^{20} + 26.6^\circ$ in EtOH .*dl*-.Cryst. from H_2O . M.p. 121–2°.*Et ester*: $\text{C}_9\text{H}_{17}\text{O}_3\text{N}$. MW, 187. B.p. 163°/17 mm. $D_4^{20} 1.056$.Abderhalden, Zeisset, *Z. physiol. Chem.*, 1931, **195**, 121.Locquin, *Bull. soc. chim.*, 1907, **4**, 598.**Formyl-leucine** $\text{C}_7\text{H}_{13}\text{O}_3\text{N}$ MW, 159*dl*-.Prisms from H_2O . M.p. 115–16°. Very sol. EtOH , hot H_2O . Spar. sol. Et_2O , CHCl_3 , C_6H_6 . Insol. pet. ether.Fischer, Warburg, *Ber.*, 1905, **38**, 3998.Fischer, *Ber.*, 1906, **39**, 2928.**Formylmalonic Acid.**

See Aldehydomalonic Acid.

Formylnaphthoic Acid.

See Naphthaldehydic Acid.

Formylphenylglycine (*Phenylformylaminoacetic acid*) $\text{C}_9\text{H}_9\text{O}_3\text{N}$ MW, 179Needles from H_2O . M.p. 125°. Sol. EtOH , Et_2O . Mod. sol. cold H_2O .*Et ester*: $\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}$. MW, 207. B.p. 290–5°.Vorländer, Mumme, *Ber.*, 1901, **34**, 1648. **β -Formylphenylhydrazine** $\text{C}_7\text{H}_8\text{ON}_2$ MW, 136Leaflets from EtOH . M.p. 146°. Very sol. dil. aq. alkalis. Sol. EtOH , hot H_2O . Spar. sol. C_6H_6 , CHCl_3 , cold H_2O .Claisen, *Ann.*, 1895, **287**, 369.Willstätter, Stoll, *Ber.*, 1909, **42**, 4874.**Formylpropionic Acid.**

See Aldehydopropionic Acid.

 β -Formylpropiophenone.

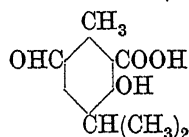
See 1-Benzoylpropionaldehyde.

Formylprotocatechuic Acid.

See Isonoropianic Acid.

Formylsuccinic Acid.

See Aldehydosuccinic Acid.

Formylthymotinic Acid (*3-Hydroxy-4-isopropyl-6-aldehydo-o-toluic acid*) $\text{C}_{12}\text{H}_{14}\text{O}_4$ MW, 222Cryst. from dil. EtOH . M.p. 180–5°.*Semicarbazone*: m.p. 184–5°.Heyl, Meyer, *Ber.*, 1895, **28**, 2796. **δ -Formylvaleric Acid.**

See Adipaldehydic Acid.

Formylveratric Acid.

See Opianic Acid and Iso-opianic Acid.

Forsythigenol $\text{C}_{21}\text{H}_{24}\text{O}_6$ MW, 372Occurs in *Forsythia coreana*, Nakai, as glucoside forsythin. M.p. 132–5°. $\text{KMnO}_4 \rightarrow$ veratric and vanillic acids.

Mono-Me ether: m.p. 124°.

Kunimine, Suzuki, *J. Pharm. Soc. Japan*, 1938, 58, 572; 1937, 57, 902.

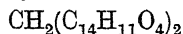
Forsythin

$C_{27}H_{34}O_{11}$ MW, 534

Constituent of *Forsythia coreana*, Nakai. Cryst. + $1\frac{1}{2}H_2O$. M.p. 181°. $[\alpha]_D^{25} + 46.4^\circ$ in EtOH. Hyd. \rightarrow forsythigenol + glucose.

Kunimine, Suzuki, *J. Pharm. Soc. Japan*, 1938, 58, 572; 1937, 57, 902.

Fortoin (*Methylene-dicotoin*. See Cotoin)



$C_{29}H_{24}O_8$ MW, 500

Yellow cryst. with cinnamon-like odour. M.p. 211–13° decomp. (128°). Sol. alkalis, AcOH, Me_2CO , $CHCl_3$. Spar. sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O .

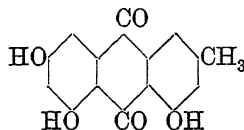
Jodlbauer, Kurz, *Biochem. Z.*, 1916, 74, 351.

Boehm, *Ann.*, 1904, 329, 276.

Overlach, *Chem. Zentr.*, 1900, I, 872.

Zimmer, D.R.P., 104,362, (*Chem. Zentr.*, 1899, II, 951).

Frangula-emodin (4 : 5 : 7-Trihydroxy-2-methylantraquinone, *rheum-emodin*)



$C_{15}H_{10}O_5$ MW, 270

Aglycone obtained by hydrolysis of frangulin. Orange needles from Py.Aq. M.p. 256–7°.

Mono-Me ether: see Physcione.

Triacetyl: m.p. 193–4°.

Jacobson, Adams, *J. Am. Chem. Soc.*, 1924, 46, 1312.

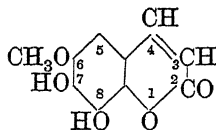
Frangulin (*Franguloside*, *ramnoxanthin*)

$C_{21}H_{20}O_9$ MW, 416

Glycoside of alder buckthorn bark. Orange needles + $1H_2O$ from Py.Aq. M.p. 246–9° (turns red at 197°). $[\alpha]_D - 134^\circ$ in 80% AcOH. Acid hyd. \rightarrow rhamnose + frangula-emodin.

Bridel, Charaux, *Bull. soc. chim. biol.* 1933, 15, 642.

Fraxetin (7 : 8-Dihydroxy-6-methoxy-coumarin)



$C_{10}H_8O_5$ MW, 208

Aglucone obtained by hydrolysis of fraxin. Plates from EtOH.Aq. M.p. 227–8° (230–2°), (turns yellow at 150°). Sol. EtOH, HCl.Aq.

Spar. sol. Et_2O , boiling H_2O . $FeCl_3 \rightarrow$ greenish-blue col.

Me ether: see Fraxidin.

Di-Me ether: 6 : 7 : 8-trimethoxycoumarin. $C_{12}H_{12}O_5$. MW, 236. M.p. 103–4°. B.p. 90–100°/0.2 mm.

Et ether: 8-hydroxy-6-methoxy-7-ethoxycoumarin. $C_{12}H_{12}O_5$. MW, 236. M.p. 153–4°.

Me-Et ether: 6 : 7-dimethoxy-8-ethoxycoumarin. $C_{13}H_{14}O_5$. MW, 250. M.p. 108.5°.

Di-Et ether: 6-methoxy-7 : 8-diethoxycoumarin. $C_{14}H_{16}O_5$. MW, 264. M.p. 81–2°.

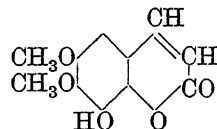
Diacetyl: m.p. 192–3°.

Wessely, Lechner, *Monatsh.*, 1932, 60, 159.

Wessely, Demmer, *Ber.*, 1929, 62, 120; 1928, 61, 1279.

Späth, Dobrovolny, *Ber.*, 1938, 71, 1831.

Fraxidin (8-Hydroxy-6 : 7-dimethoxycoumarin, *fraxetin* 7-methyl ether)



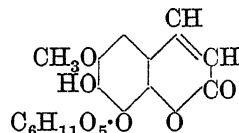
$C_{11}H_{10}O_5$ MW, 222

Constituent of bark of ash. Cryst. from H_2O . M.p. 196–7°.

Späth, Jerzmanowska-Sienkiewiczowa, *Ber.*, 1938, 71, 1831; 1937, 70, 1019, 1672.

Wessely, Demmer, *Ber.*, 1929, 62, 120.

Fraxin (8-Glucosidofraxetin)



$C_{16}H_{18}O_{10}$ MW, 370

Glucoside of ash, *Fraxinus excelsior*, Linn., and other plants. Yellowish needles from EtOH. M.p. 205°. Dil. alk. sols. fluor. bluish-green.

Späth, Jerzmanowska-Sienkiewiczowa, *Ber.*, 1938, 71, 1931; 1937, 70, 1019, 1672.

Wessely, Demmer, *Ber.*, 1929, 62, 120.

Fraxinellone

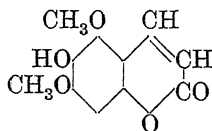
$C_{14}H_{16}O_3$ MW, 232

Present in *Dictamnus albus*, Linn. Cryst. M.p. 120°. $[\alpha]_D^{19} - 39.57^\circ$ in Me_2CO .

Acetyl: m.p. 169–70°. *p*-Nitrophenylhydrazine: m.p. 198°.

Kaku, Pi, *J. Pharm. Soc. Japan*, 1935, 55, 219.

Fraxinol (6-Hydroxy-5:7-dimethoxycoumarin)



$C_{11}H_{10}O_5$ MW, 222

From bark of *Fraxinus excelsior*, Linn.
Cryst. from Et_2O or H_2O . M.p. 171–2°.

Me ether: b.p. 160°/0.1 mm.

Acetyl: cryst. from EtOH. M.p. 140–1°.

Späth, Jerzmanowska-Sienkiewiczowa,
Ber., 1937, 70, 698.

Freon (Difluorodichloromethane)



CCl_2F_2 MW, 121

Almost odourless gas. M.p. –155°. B.p. –29.8°. Spar. sol. H_2O . Employed as refrigerant.

Thompson, *Ind. Eng. Chem.*, 1932, 24, 620.

Tanetic Chem., U.S.P. 2,005,709, (*Chem. Zentr.*, 1936, I, 2630).

General Motors, U.S.P. 1,990,692, (*Chem. Zentr.*, 1935, II, 436); U.S.P. 2,013,050, (*Chem. Zentr.*, 1936, I, 2630).

Freund's Acid.

See 1-Naphthylamine-3:6-disulphonic Acid.

Friedelin

$C_{30}H_{50}O$ MW, 426

Triterpene ketone, containing a hydrogenated pentacyclic structure, occurring in cork. Cryst. from AcOEt. M.p. 255–61°. $[\alpha]_D^{25}$ –29.4°. Fuming $H_2SO_4 \rightarrow$ red col.

Oxime: plates from AcOEt- C_6H_6 . M.p. 290–4°.

p-Nitrophenylhydrazone: orange cryst. from C_6H_6 . M.p. 277–9°.

2:4-Dinitrophenylhydrazone: orange cryst. from C_6H_6 . M.p. 297–9° decomp.

Enol benzoate: leaflets from C_6H_6 -AcOEt. M.p. 255–62°.

Enol phenylacetate: m.p. 244–51°.

Drake, Jacobsen, *J. Am. Chem. Soc.*, 1935, 57, 1570.

Drake, Shrader, *ibid.*, 1854.

Drake, Campbell, *J. Am. Chem. Soc.*, 1936, 58, 1681.

Drake, Wolfe, *J. Am. Chem. Soc.*, 1940, 62, 3018.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1944, 27, 972; 1949, 32, 1246.

Fritzsche's Reagent.

See 2:7-Dinitroanthraquinone.

Fructigenin

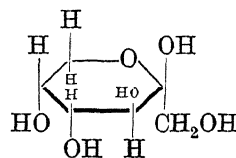
$C_{26}H_{44}O_7N_2$

MW, 496

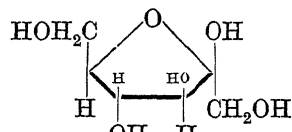
Antibiotic of *Fusarium fructigenum*. Cryst. M.p. 129°. $[\alpha]_D^{25}$ –103° in EtOH.

Cook, Cox, Farmer, *J. Chem. Soc.*, 1949, 1022.

Fructose (*Levulose*, fruit sugar)



Fructopyranose



Fructofuranose

$C_6H_{12}O_6$ MW, 180

The furanose modification is known only in the form of its derivatives.

Pyranose form:

d-.

Occurs in a large variety of fruits, etc. Prisms from EtOH. M.p. 102–4° decomp. Very sol. H_2O . Sol. 12 parts EtOH at 18°. Sol. Me_2CO . Mod. sol. Py. $[\alpha]_D^{20}$ –133° initial, –92° final, in 10% aq. sol. Heat of comb. C_p 671.6 Cal. $NaHg \rightarrow$ *d*-mannitol + *d*-sorbitol. Oxidises rapidly in alk. sol. Reduces alk. Cu salts more rapidly than any other naturally occurring sugar.

α-Methylglycoside: $C_7H_{14}O_6$, MW, 194. M.p. 102°. $[\alpha]_D^{20}$ +92.76° in EtOH. *Tetra-acetyl*: m.p. 112°. $[\alpha]_D^{20}$ +45.0° in $CHCl_3$.

β-Methylglycoside: m.p. 119–20°. $[\alpha]_D^{20}$ –172.1° in H_2O . *Tetra-acetyl*: m.p. 75–6°. $[\alpha]_D^{20}$ –124.4° in $CHCl_3$. *Tetra-benzoyl*: m.p. 113°.

$[\alpha]_D^{20}$ –171.8° in $CHCl_3$. *Tetra-Me ether*: $C_{11}H_{22}O_6$, MW, 250. M.p. 33–4°. B.p. 105–6°/0.06 mm. $[\alpha]_D^{17}$ –149.1° in H_2O .

β-Benzylglycoside: m.p. 157°. $[\alpha]_D^{21}$ –130° in H_2O . *Tetra-acetyl*: m.p. 69–69.5°. $[\alpha]_D^{25}$ –139.8° in $CHCl_3$. *Tetra-Me ether*: syrup. n_D^{20} 1.5045. $[\alpha]_D^{20}$ –110.3° in $CHCl_3$.

1:3:4:5-Tetra-Me ether: $C_{10}H_{20}O_6$, MW, 236. M.p. 98–9°. B.p. 139–41°/12 mm. $[\alpha]_D^{20}$ –121.3° in H_2O .

1:3:4:5-Tetra-acetyl: m.p. 127–9°. $[\alpha]_D^{20}$ –109° in $CHCl_3$.

Penta-acetyl: *α*-form, m.p. 70°. $[\alpha]_D^{30}$ +34.75° in $CHCl_3$. *β*-Form: m.p. 108–9°. $[\alpha]_D^{20}$ –120.5° in $CHCl_3$.

Penta-p-phenylazobenzoyl: red cryst. M.p. 135–6°. $[\alpha]_D^{20}$ –345°.

1:2:4:5-α-Di-acetone deriv.: m.p. 119–20°. $[\alpha]_D^{20}$ –162.8° in H_2O .

2:3:4:5-β-Di-acetone deriv.: m.p. 97°. B.p. 110–15°/0.17–0.5 mm. $[\alpha]_D^{22}$ –32.9° in H_2O .

p-Nitrophenylhydrazone: m.p. 176°. $[\alpha]_D^{20}$ +16° in Py-EtOH.

Phenylosazone: *d*-glucosazone, *d*-mannosazone. M.p. 210°.

2 : 4-Dichlorophenylosazone: m.p. 120°.

Haworth, Hirst, Learner, *J. Chem. Soc.*, 1927, 1040.

Hudson, Brauns, *J. Am. Chem. Soc.*, 1916, 38, 1216; 1915, 37, 2736.

Schlubach, Schroter, *Ber.*, 1930, 63, 367.

Brigl, Schinle, *Ber.*, 1933, 66, 327.

Butler, Cretcher, *J. Am. Chem. Soc.*, 1929, 51, 3161.

Fischer, Taube, *Ber.*, 1927, 60, 485.

I.G., D.R.P., 574,803, (*Chem. Abstracts*, 1933, 27, 4714).

Furanose form:

α -Methylglycoside: m.p. 80.5–81°. $[\alpha]_D^{20} + 9.3^\circ$ in H_2O . *Tetra-acetyl*: m.p. 48–48.5°. $[\alpha]_D^{18} + 88.1^\circ$ in $CHCl_3$. *Tetra-Me ether*: syrup. $n_D^{20} 1.4417$. $[\alpha] + 115.9^\circ$ in $CHCl_3$.

Ethylglycoside: $C_8H_{16}O_6$. MW, 208. Syrup. $[\alpha]_D + 28^\circ$ in EtOH.

α -Benzylglycoside: m.p. 89°. $[\alpha]_D^{20} + 45.7^\circ$ in H_2O . *Tetra-acetyl*: m.p. 84.5–85°. $[\alpha]_D^{20} + 65.65^\circ$.

1 : 3 : 4 : 6-Tetra-acetyl: syrup. $[\alpha]_D + 38.7^\circ$ in C_6H_6 .

3 : 4 : 6-Tri-Me ether: $C_9H_{18}O_6$. MW, 222. B.p. 115°/0.02 mm. (146°/0.37 mm.). $[\alpha]_D^{18} + 30.51^\circ$ in H_2O .

1 : 3 : 4 : 6-Tetra-Me ether: b.p. 95–7°/0.01 mm. $[\alpha]_D^{18} + 31.3^\circ$ in H_2O .

Avery, Haworth, Hirst, *J. Chem. Soc.*, 1927, 2308.

Allpress, Haworth, Inkster, *ibid.*, 1233.

Purves, Hudson, *J. Am. Chem. Soc.*, 1937, 59, 49.

l-.

Dextrorotatory syrup. Not fermentable.

Phenylosazone: *l*-glucosazone, *l*-mannosazone. M.p. 208°.

Fischer, *Ber.*, 1890, 23, 389.

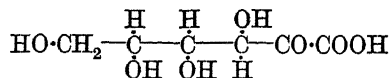
dl-.

See α -Acrose.

Fructosone.

See Glucosone.

Fructuronic Acid (*l*-Keto-*d*-gluconic acid)



$C_6H_{10}O_7$

MW, 194

Formed by many bacteria, e.g. *B. gluconium*, from glucose. Neither the acid nor lactone exists in free state. Acid ox. \rightarrow *d*-arabonic acid. Alk. ox. \rightarrow oxalic acid. $[\alpha]_D - 99.62^\circ$.

Me ester: $C_7H_{12}O_7$. MW, 208. Cryst. from MeOH. M.p. 173° decomp. $[\alpha]_D^{20} - 82.08^\circ$. Exhibits mutarotation. Sol. AcOH, Py. Spar. sol. most solvents. *Phenylhydrazone*: cryst. from EtOH. M.p. 163°. $[\alpha]_D^{20} - 124.1^\circ$. *Tetra-*

acetyl: b.p. 199–203°/0.5 mm. $[\alpha]_D^{18} - 38.8^\circ$ in $CHCl_3$. *Di-acetone deriv.*: needles from EtOH.Aq. M.p. 52°. $[\alpha]_D^{20} - 44.7^\circ$ in $CHCl_3$.

Et ester: $C_8H_{14}O_7$. MW, 222. Prisms from EtOH. M.p. 123–4°. $[\alpha]_D^{17} - 66.64^\circ$ in H_2O .

Di-acetone deriv.: $C_{12}H_{18}O_7$. MW, 274. Prisms from C_6H_6 -pet. ether. M.p. 99–100°.

$[\alpha]_D^{18} - 49.35^\circ$ in $CHCl_3$. Sol. most solvents. Insol. pet. ether. *Amide*: $C_{12}H_{19}O_6N$. MW, 273. Needles from C_6H_6 -pet. ether. M.p. 98–9°.

$[\alpha]_D^{17} - 50.58^\circ$ in $CHCl_3$. *Anilide*: cryst. from pet. ether. M.p. 107°. $[\alpha]_D^{20} - 16.15^\circ$.

Insol. H_2O . *Brucine salt*: m.p. 175°.

Brucine salt: cryst. from Me_2CO .Aq. M.p. 166° decomp.

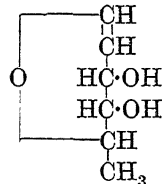
Phenylhydrazine salt of phenylhydrazone: cryst. from H_2O . M.p. 102–3°.

Ohle, Walter, *Ber.*, 1930, 63, 843.

Frugoside.

See under Coroglaucigenin.

***l*-Fucal**



$C_6H_{10}O_3$

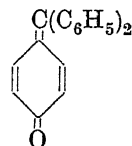
MW, 130

Needles from C_6H_6 . M.p. 70–2° corr. Sublimes. $[\alpha]_D^{18} + 10.4^\circ \pm 2^\circ$ (c, 1.434 in Me_2CO).

Diacetyl: cryst. from C_6H_6 -ligroin. M.p. 49–50° corr. Sublimes. $[\alpha]_D^{18} + 9.9^\circ \pm 2^\circ$ (c, 1.007 in Me_2CO).

Iselin, Reichstein, *Helv. Chim. Acta*, 1944, 27, 1200.

Fuchsone



$C_{19}H_{14}O$

MW, 258

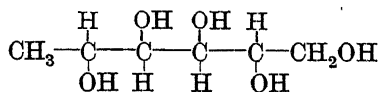
Brownish-yellow tablets from C_6H_6 -ligroin. M.p. 167–8°. Sublimes. Sol. AcOH, $CHCl_3$, Me_2CO . Insol. Et_2O , ligroin. Dil. alkalis \rightarrow *p*-hydroxytriphenylcarbinol.

Perchlorate: red needles. M.p. about 215–16°.

Bistrzycki, Herbst, *Ber.*, 1903, 36, 2335.

Hamamura, Ikuta, *Chem. Abstracts*, 1933, 27, 4533.

Fucitol (*Rhodeitol*)



$C_6H_{14}O_5$

MW, 166

Methylpentitol obtained from fucose by red. in dil. H_2SO_4 with NaHg .

d-.

Silvery leaflets from EtOH. M.p. 153–4°. $[\alpha]_D^{20} - 4.7^\circ$ in 10% aq. borax sol.

l-.

Leaflets from EtOH. M.p. 153–4°. $[\alpha]_D^{20} + 4.7^\circ$ in 10% aq. borax.

2 : 3 : 4 : 5-*Tetra-acetyl*: m.p. 92–4°. $[\alpha]_D^{25} - 15^\circ$ in CHCl_3 .

Penta-acetyl: m.p. 127°. $[\alpha]_D^{25} + 20.5^\circ$ in CHCl_3 .

1-*Benzoyl*: m.p. 177–8°. $[\alpha]_D^{20} + 4.30^\circ$ in Py.

Pentabenzoyl: m.p. 149–50°. $[\alpha]_D^{20} - 5.96^\circ$ in CHCl_3 .

2 : 3 : 4 : 5-*Diacetone deriv.*: m.p. 59–60°. $[\alpha]_D^{20} + 11.7^\circ$ in EtOH.

Dibenzylidene deriv.: m.p. 115–16°. $[\alpha]_D^{24} + 9.1^\circ$ in Me_2CO .

dl-.

M.p. 168–70°.

Votoček, Potměšil, *Ber.*, 1913, 46, 3653.

Votoček, Bulir, *Chem. Zentr.*, 1906, I, 1818.

Ness, Hann, Hudson, *J. Am. Chem. Soc.*, 1942, 64, 982.

Fucoidin

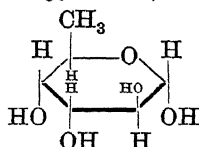
$(\text{C}_6\text{H}_9\text{O}_3)_2(\text{SO}_4)_2\text{Ca}$ _n
($\text{C}_{12}\text{H}_{18}\text{O}_{14}\text{S}_2\text{Ca}$)_n MW, 490_n

Polysaccharide sulphate ester of *Fucus* spp. and other seaweeds. $[\alpha]_D^{15} - 119^\circ$. Hyd. \rightarrow fucose + H_2SO_4 .

Percival, Ross, *J. Chem. Soc.*, 1950, 717.

Conchie, Percival, *ibid.*, 827.

Fucose (6-Deoxygalactose)



$\text{C}_6\text{H}_{12}\text{O}_5$ MW, 164

d-. (Rhodose).

Occurs in various glycosides, *e.g.* Jalapin. Needles from EtOH. M.p. 140–5°. Very sol. H_2O . $[\alpha]_D^{23} + 89.3^\circ$ initial, $+ 75.7^\circ$ final, in H_2O .

Phenylosazone: m.p. 177°.

Methylphenylosazone: m.p. 181°.

p-*Toluenesulphonylhydrazine*: m.p. 175°. $[\alpha]_D^{17} + 17.1^\circ$ in Py.

α -*Methylpyranoside*: syrup. $[\alpha]_D + 189.9^\circ$ in H_2O . 3 : 4-*Acetone deriv.*: b.p. 60°/0.01 mm. $[\alpha]_D^{25} + 116.8^\circ$ in CHCl_3 .

β -*Methylpyranoside*: m.p. 120°. $[\alpha]_D^{19} - 14.0^\circ$ in H_2O . *Triacetyl deriv.*: m.p. 98.5°. $[\alpha]_D^{20} - 5.9^\circ$. 2 : 3 : 4-*Trimethyl*: m.p. 93–8°. $[\alpha]_D^{21} - 11.2^\circ$ in H_2O .

3-*Me ether*: see Digitalose.

Di-acetone deriv.: m.p. 37°. B.p. 120°/13 mm. $[\alpha]_D^{19} - 52.4^\circ$.

Oxime: m.p. 188–9°. $[\alpha]_D + 13.2^\circ$ in H_2O . *Penta-acetyl*: m.p. 115–16°. $[\alpha]_D^{25} + 44.9^\circ$ in CHCl_3 .

l-.

Occurs as polymerised anhydride (Fucosan) in seatang, gum tragacanth, etc. Microscopic needles from EtOH. M.p. 145°. $[\alpha]_D^{22} - 93.6^\circ$ initial, $- 75.3^\circ$ final, in H_2O . Very sol. H_2O . Heat of comb. C_p 712.2 Cal., C_s 711.9 Cal. Dist. with conc. $\text{HCl} \rightarrow$ methylfurfural. Refluxing with Py \rightarrow *l*-tagatomethylene.

Phenylosazone: m.p. 178°.

Methylphenylhydrazine: m.p. 174°. $[\alpha]_D^{19} - 17.0^\circ$ in Py.

o-*Nitrophenylhydrazine*: yellow. M.p. 181° decomp.

p-*Tolylbenzylhydrazine*: m.p. 183°.

Phenylphenethylhydrazine: m.p. 179°.

α -*Methylpyranoside*: m.p. 157.5–158.5°. $[\alpha]_D^{20} - 197.45^\circ$ in H_2O . 2 : 3 : 4-*Trimethyl*: syrup. $[\alpha]_D^{18} - 111^\circ$ in H_2O . 3 : 4-*Acetone deriv.*: b.p. 88–92°/0.02 mm. M.p. 98–100°.

β -*Methylpyranoside*: m.p. 117–19°. $[\alpha]_D^{20} + 16.04^\circ$ in H_2O .

Tetra-acetyl deriv.: m.p. 40°. $[\alpha]_D - 46.5^\circ$.

Oxime: m.p. 188–9°. $[\alpha]_D - 12.7^\circ$ in H_2O .

Mono-acetone deriv.: m.p. 57°. $[\alpha]_D - 62.28^\circ$.

Di-acetone deriv.: m.p. 37°. $[\alpha]_D^{18} + 52.2^\circ$.

dl-.

Cryst. from EtOH. M.p. 161°. Optically inactive.

Osazone: m.p. 187°.

Di-acetone deriv.: m.p. 41°.

Minsas, *Rec. trav. chim.*, 1932, 51, 475.

Manske, *J. Biol. Chem.*, 1930, 86, 571.

Freudenberg, Raschig, *Ber.*, 1929, 62, 373; 1927, 60, 1633.

Tadokoro, Nakamura, *Chem. Zentr.*, 1924, I, 1507.

Votoček, *Ber.*, 1910, 43, 469; *Chem. Zentr.*, 1919, III, 812.

Votoček, Valentin, *Chem. Zentr.*, 1930, I, 1507.

Schlubach, Wagenitz, *Ber.*, 1932, 65, 307.

Fucostadienone

$\text{C}_{29}\text{H}_{46}\text{O}$ MW, 410

Plates from Me_2CO . M.p. 94–94.5°. $[\alpha]_D^{20} + 76^\circ$ (c, 1.5 in CHCl_3).

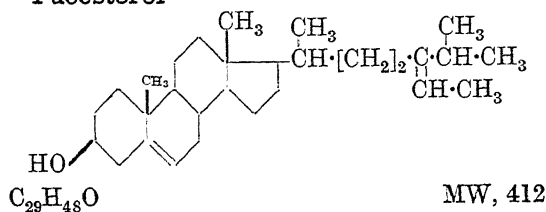
Oxime: cryst. from EtOH. M.p. 166–7°. Sublimes.

Semicarbazone: cryst. from EtOH- CHCl_3 . M.p. 238° decomp.

2 : 4-*Dinitrophenylhydrazine*: needles from C_6H_6 . M.p. 237°.

Jones, Wilkinson, Kerlogue, *J. Chem. Soc.*, 1942, 391.

Fucosterol



Characteristic sterol of seaweeds. Needles from MeOH. M.p. 124°. Sol. most org. solvents. $[\alpha]_D^{20} - 38.4^\circ$ in $CHCl_3$. $H \rightarrow$ stigmastanol. Adds 2 mols. Br. $SbCl_3$ in $CHCl_3 \rightarrow$ red col. on standing.

Acetyl deriv.: m.p. 119°. $[\alpha]_D - 45^\circ$. Tetra-bromo deriv., m.p. 133°.

Propionyl deriv.: m.p. 105-6°.

Benzoyl deriv.: m.p. 119-20°. $[\alpha]_D - 16^\circ$.

Tetrabromo deriv.: m.p. 106-10°. Unstable.

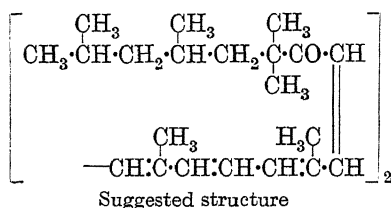
Digitonide: m.p. 233-5°. Insol. EtOH.

Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1572.

MacPhillamy, *J. Am. Chem. Soc.*, 1942, 64, 1732.

Hey, Honeyman, Peal, *J. Chem. Soc.*, 1950, 2881.

Fucoxanthin



$C_{40}H_{60}O_6$ MW, 636

Carotenoid colouring matter from brown algæ. Brownish-red prisms from Et_2O -pet. ether. Exists in three isomeric forms, λ_{max} . 452, 445, 446 m μ . M.p. 168° (160°). Sol. Et_2O , MeOH. Gives deep blue col. with conc. H_2SO_4 . Alkalis \rightarrow water soluble blue decomp. products. Adds $10H_2$ per mol. on treatment with $H(+Pt)$ black).

Hydrochloride: $C_{40}H_{56}O_6 \cdot 4HCl$. M.p. 215° (not sharp).

Iodide: violet-black prisms. M.p. 134-5°.

Karrer et al., *Helv. Chim. Acta*, 1931, 14, 622.

Heilbron, Phipers, *Biochem. J.*, 1935, 29, 1369.

Strain, Manning, *J. Am. Chem. Soc.*, 1942, 64, 1235.

Fuerstiaquinone

$C_{20}H_{26}O_3$ MW, 314

Occurs in *Fuerstia africana*, J. C. E. Fries. Red cryst. M.p. 108-15°.

Cu deriv.: green cryst. M.p. 162°. Sol. C_6H_6 , light petroleum.

Karrer, Eugster, *Helv. Chim. Acta*, 1952, 35, 1139.

Fukugenetin

$C_{19}H_{14}O_7$ MW, 354

One of the products of action of 50% KOH.Aq. on fukugetin in atmosphere of H. M.p. 205°. $Ac_2O \rightarrow$ triacetylanhydroisofukugenetin, m.p. 267°.

Acetyl deriv.: m.p. 265°.

Tetra-Me ether: $C_{23}H_{22}O_7$. MW, 410. M.p. 204°.

Penta-Me ether: $C_{24}H_{24}O_7$. MW, 424. M.p. 203°.

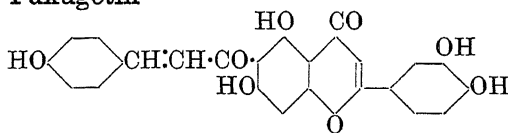
Hexa-Me ether: $C_{25}H_{26}O_7$. MW, 438. M.p. 208° (188°).

Tetra-Et ether: $C_{27}H_{30}O_7$. MW, 466. M.p. 171-2°.

Shinoda, *Chem. Zentr.*, 1933, I, 1453.

Muakami, Irie, *Bull. Chem. Soc. Japan*, 1936, 11, 288.

Fukugetin



$C_{24}H_{16}O_8$ MW, 432

Occurs in bark of *Garcinia spicata*. KOH fusion \rightarrow phloroglucinol.

Penta-Me ether: $C_{27}H_{26}O_8 + 1\frac{1}{2}H_2O$. MW, 505. Decomp. at 141-2°.

Murakami, *Chem. Zentr.*, 1934, II, 2394.

Murakami, Irie, *Brit. Chem. Abstracts*, 1935, 220A; *Bull. Chem. Soc. Japan*, 1936, 11, 288.

Fulminic Acid (Carbyloxime)

$C \equiv N \cdot OH$

CHON MW, 43

The free acid is stable for a time only in Et_2O sol. at low temps. It tends to polymerise very rapidly. Monomolecular esters cannot be prepared. The salts are explosive and some are powerful detonators.

Trimolecular Me ester: $[C \equiv NO \cdot CH_3]_3$. MW, 171. Needles from boiling H_2O . M.p. 149°.

Mercury fulminate: $Hg(O \cdot N \cdot C)_2$. Needles from H_2O or EtOH. Heat of decomp. 408 cal./gm.

Silver fulminate: $AgO \cdot N \cdot C$. Needles from hot H_2O . Is extraordinarily explosive.

Copper fulminate: $CuO \cdot N \cdot C$. Greenish-grey powder. Heat of decomp. 508 cal./gm.

Cadmium fulminate: $CdO \cdot N \cdot C$. Cryst. Sol. MeOH. Mod. sol. EtOH. Very sol. H_2O with rapid decomp. Heat of decomp. 470 cal./gm.

Thallium fulminate: $\text{TlO} \cdot \text{N} \cdot \text{C}$. Needles. Sol. H_2O with decomp. Heat of decomp. 223 cal./gm.

Sodium fulminate: $\text{NaO} \cdot \text{N} \cdot \text{C}$. Prisms from H_2O . Explodes on rubbing or heating.

Potassium fulminate: $\text{KO} \cdot \text{N} \cdot \text{C}$. Prisms from MeOH . More hygroscopic than Na salt.

Wieland, Hess, *Ber.*, 1909, 42, 1346.

Wieland, *Ber.*, 1910, 43, 3362.

Palazzo, *Gazz. chim. ital.*, 1913, 43, I, 563.

Pauling, Hendricks, *J. Am. Chem. Soc.*, 1926, 48, 645.

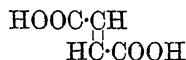
Wöhler, Weber, *Ber.*, 1929, 62, 2742.

Wöhler, Berthmann, *ibid.*, 2748.

Fulminuric Acid.

See under Nitrocyanoacetic Acid.

Fumaric Acid (trans-Ethylene-1 : 2-dicarboxylic acid)



$\text{C}_4\text{H}_4\text{O}_4$ MW, 116

Prisms or needles. M.p. $300-2^\circ$ ($286-7^\circ$, $282-4^\circ$) in sealed tube. Sublimes above 200° in open vessels: at $230^\circ \rightarrow$ maleic anhydride. Sol. 150 parts H_2O at 16° . Sol. EtOH. Spar. sol. Et_2O , Me_2CO . Insol. C_6H_6 . k (first) = 9.3×10^{-4} at 25° ; (second) = 2.9×10^{-5} at 25° . Heat of comb. C_p 320 Cal. Heat with H_2O at $150-70^\circ$ in sealed tube \rightarrow dl-maleic acid. Ox. \rightarrow racemic acid.

Mono-Me ester: $\text{C}_5\text{H}_6\text{O}_4$. MW, 130. Prisms from EtOH. M.p. 144.5° .

Di-Me ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. M.p. 102° . B.p. 192° , $88.5^\circ/12$ mm. $n_D^{10.7}$ 1.40625. Sublimes at ord. temp.

Mono-Et ester: $\text{C}_6\text{H}_8\text{O}_4$. MW, 144. Plates. M.p. 70° . B.p. $147^\circ/16$ mm.

Di-Et ester: $\text{C}_8\text{H}_{12}\text{O}_4$. MW, 172. B.p. $213-15^\circ$, $99^\circ/12$ mm. D_4^{25} 1.0472.

Mono-benzyl ester: $\text{C}_{11}\text{H}_{10}\text{O}_4$. MW, 206. M.p. 98° .

Di-benzyl ester: $\text{C}_{18}\text{H}_{16}\text{O}_4$. MW, 296. M.p. $60-1^\circ$.

p-Nitrobenzyl ester: m.p. 151° .

Mono-phenyl ester: $\text{C}_{10}\text{H}_8\text{O}_4$. MW, 192. Needles. M.p. 130° . Sol. hot H_2O , EtOH, Et_2O . At $200^\circ \rightarrow$ maleic anhydride + phenol.

Di-phenyl ester: $\text{C}_{16}\text{H}_{12}\text{O}_4$. MW, 268. Needles. M.p. $161-2^\circ$. B.p. $219^\circ/14$ mm. Spar. sol. EtOH.

Dibromide: $\text{C}_4\text{H}_2\text{O}_2\text{Br}_2$. MW, 242. B.p. $113-15^\circ/32$ mm.

Dichloride: $\text{C}_4\text{H}_2\text{O}_2\text{Cl}_2$. MW, 153. B.p. $158-60^\circ$. D_4^{17} 1.4117.

Diamide: $\text{C}_4\text{H}_6\text{O}_2\text{N}_2$. MW, 114. M.p. 267° decomp.

Di-nitrile: $\text{C}_4\text{H}_2\text{N}_2$. MW, 78. Needles. M.p. 96° . B.p. 186° . $D_4^{10.8}$ 0.9416. $n_D^{110.7}$ 1.43077. $n_D^{110.7}$ 1.43491. $n_D^{110.7}$ 1.44621. Sol. EtOH, Et_2O , C_6H_6 .

Mono-Me ester monochloride: $\text{C}_5\text{H}_5\text{O}_3\text{Cl}$. MW, 148.5. M.p. 16° . B.p. $69.5^\circ/14$ mm.

Mono-Et ester monochloride: $\text{C}_6\text{H}_7\text{O}_3\text{Cl}$. MW, 162.5. B.p. $84^\circ/17$ mm.

Milas, *Organic Syntheses*, 1931, XI, 46.

Challenger, *Industrial Chemist*, 1930, 6, 390 (*Bibl.*, Review).

Corson, Adams, Scott, *Organic Syntheses*, 1930, X, 48.

Anschütz, *Ann.*, 1928, 461, 155.

Wehmer, B.P., 146,411, (*Chem. Abstracts*, 1920, 14, 3749).

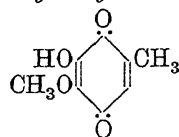
Fumarine.

See Protopine.

Fumigacin.

See Helvolic Acid.

Fumigatin (6-Hydroxy-5-methoxytoluquinone)



$\text{C}_8\text{H}_8\text{O}_4$ MW, 168

Constituent of *Aspergillus fumigatus*, Fresenius. Maroon coloured needles from pet. ether. M.p. 116° . Sol. EtOH, Et_2O , Me_2CO , AcOEt, C_6H_6 , CHCl_3 . Spar. sol. H_2O . Sol. NaOH.Aq. to purple sol. Alc. $\text{FeCl}_3 \rightarrow$ purple-black col. Sublimes in vacuo.

Me ether: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. Red needles from pet. ether. M.p. 59° .

Acetyl: yellow needles from pet. ether. M.p. $95-6^\circ$.

Raistrick, *Chemistry and Industry*, 1938, 293.

Anslow, Raistrick, *Biochem. J.*, 1938, 32, 687, 2288.

Baker, Raistrick, *J. Chem. Soc.*, 1941, 670.

Fungisterol (Δ^7 -Ergosterol)

$\text{C}_{28}\text{H}_{48}\text{O}$ MW, 400

Occurs, together with ergosterol, in ergot and other higher fungi. Leaflets from EtOH. M.p. $144-6^\circ$ (152°). Sol. Et_2O . More easily sol. than ergosterol in usual solvents. $[\alpha]_D -20^\circ$ in EtOH- CHCl_3 . $90\% \text{H}_2\text{SO}_4 \rightarrow$ ruby-red col.

Acetyl: $\text{C}_{30}\text{H}_{50}\text{O}_2$. MW, 442. M.p. 158.5° ($156-7^\circ$). $[\alpha]_D -16^\circ$ in CHCl_3 .

Hart, Heyl, *J. Am. Chem. Soc.*, 1930, 52, 2014.

Zellner, Zikmunda, *Monatsh.*, 1930, 56, 200.

Wieland, Coutelle, *Ann.*, 1941, 548, 270.

Wieland, Benend, *Ann.*, 1943, 554, 1.

Funiculosin

$\text{C}_{15}\text{H}_{10}\text{O}_5$ MW, 270

Isolated from *Penicillium funiculosum*, Thom. Dark red plates. M.p. 218° . Zn dust dist. \rightarrow anthracene + naphthalene.

Triacetyl deriv.: m.p. 205°.

Tribenzoyl deriv.: m.p. 277°.

Igarasi, *Journal of the Agricultural Chemical Society Japan*, 1939, **15**, 225, (*Chem. Abstracts*, 1939, **33**, 6296).

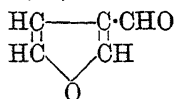
Furalacetone.

See Furfurylideneacetone.

α -Furaldehyde.

See Furfural.

β -Furaldehyde (3-Furaldehyde, 3-furyl aldehyde, 3-furoic aldehyde)



$C_5H_4O_2$

MW, 96

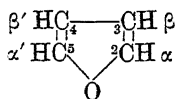
B.p. 144°/732 mm., 70–2°/43 mm. D_{20}^{25} 1.111. n_D^{20} 1.4945. Stable in the cold and in absence of light. Polymerises in direct sunlight. Gives no col. with aniline acetate test.

Diacetate: $C_4H_3O \cdot CH(O \cdot CO \cdot CH_3)_2$. M.p. 50°. B.p. 130°/15 mm.

Phenylhydrazone: m.p. 149–5°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 2908.

Furan (Furfuran)



C_4H_4O

MW, 68

B.p. 32°. D_0 0.9644. Easily sol. EtOH, Et₂O. Insol. H₂O. Heat of comb. C_p 500.1 Cal. Resinifies with min. acids. Unattacked by alkalis or Na. With pine-chip moistened with HCl \rightarrow emerald-green col. Anhydropyridine-sulphonic acid \rightarrow furan-2-sulphonic acid. $NH_3 + Al_2O_3$ at 350° \rightarrow pyrrole. Forms di-Na deriv. which, with CO₂ \rightarrow 2-furoic acid.

Gilman, Louisinian, *Rec. trav. chim.*, 1933, **52**, 156.

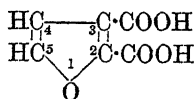
Hurd, Goldsby, Osborne, *J. Am. Chem. Soc.*, 1932, **54**, 2532.

Wilson, U.S.P., 1,636,030, (*Chem. Abstracts*, 1927, **21**, 2907).

Furan-carboxylic Acid.

See β -Furoic Acid and Pyromucic Acid.

Furan-2 : 3-dicarboxylic Acid (*Furan- $\alpha\beta$ '-dicarboxylic acid*)



$C_6H_4O_5$

MW, 156

M.p. 221° (226°). Does not form anhydride. Sublimes unchanged in vacuo.

Di-Me ester: $C_8H_8O_5$. MW, 184. M.p. 37° (39°).

Mono-anilide: m.p. 170°.

Asahina *et al.*, *Chem. Abstracts*, 1927, **21**, 2896.

Cf. Wessely, Dinjaski, *Monatsh.*, 1934, **64**, 131.

Furan-2 : 4-dicarboxylic Acid (*Furan- $\alpha\beta$ '-dicarboxylic acid*).

Leaflets + 1H₂O from H₂O. M.p. 266°. Sublimes. Sol. hot H₂O, EtOH, Me₂CO. Spar. sol. cold H₂O, CHCl₃, CS₂, AcOH. Pract. insol. Et₂O, ligroin.

4-Me ester: $C_7H_6O_5$. MW, 170. Plates from H₂O. M.p. 132–5°. *Chloride*: $C_7H_5O_4Cl$. MW, 188.5. M.p. 83–4°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Prisms from MeOH. M.p. 109–10°.

Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, **55**, 403, 2903.

Furan-2 : 5-dicarboxylic Acid (*Dehydro-mucic acid, furan- $\alpha\alpha'$ -dicarboxylic acid*).

Needles from H₂O. M.p. above 320°. Sublimes. Isatin + conc. H₂SO₄ at 145–55° \rightarrow violet-blue sol.

Mono-Me ester: $C_7H_6O_5$. MW, 170. Leaflets from H₂O. M.p. 201–2°.

Di-Me ester: $C_8H_8O_5$. MW, 184. Needles from H₂O. M.p. 112°. B.p. 154–6°/15 mm.

Mono-Et ester: $C_8H_8O_5$. MW, 184. Needles from H₂O. M.p. 148–9°.

Di-Et ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 47°. B.p. 167–8°/15 mm.

Dipropyl ester: $C_{12}H_{16}O_5$. MW, 240. M.p. 22°. B.p. 177°/15 mm.

Dichloride: $C_6H_2O_3Cl_2$. MW, 193. M.p. 80°. B.p. 245°.

Mono-amide: $C_6H_5O_4N$. MW, 155. M.p. 280–1°.

Diamide: $C_6H_6O_3N_2$. MW, 154. Needles from hot H₂O. M.p. above 240°.

Dianilide: long needles from 50% EtOH. M.p. 227–8°.

Phelps, Hale, *Am. Chem. J.*, 1901, **25**, 445.

Yoder, Tollens, *Ber.*, 1901, **34**, 3447.

Hill, *Ber.*, 1899, **32**, 1221.

Furan-3 : 4-dicarboxylic Acid (*Furan- $\beta\beta$ '-dicarboxylic acid*).

M.p. 217–18°. Heat with quinoline \rightarrow β -furoic acid.

Di-Me ester: $C_8H_8O_5$. MW, 184. M.p. 46°.

Reichstein *et al.*, *Helv. Chim. Acta*, 1933, **16**, 280.

Furanethene.

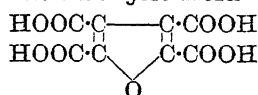
See α -Furylethylene.

Furanethyne.

See α -Furylacetylene.

Furanol.

See Hydroxyfuran.

Furan-tetracarboxylic Acid

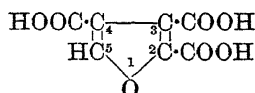
MW, 244

Cryst. from $Me_2CO-C_6H_6$. M.p. 247° decomp. Very sol. H_2O , Me_2CO , $EtOH$. Mod. sol. $AcOH$. Spar. sol. Et_2O , C_6H_6 . Insol. ligroin. Decarboxylation \rightarrow furan-3:4-dicarboxylic acid + 3-furoic acid.

Tetra-Me ester: $C_{12}H_{12}O_9$. MW, 300. Needles from $MeOH$. M.p. $107-8^\circ$.

Tetra-Et ester: $C_{16}H_{20}O_9$. MW, 356. Cryst. from $EtOH$. M.p. $34-5^\circ$. B.p. $175^\circ/0.2$ mm.

Reichstein *et al.*, *Helv. Chim. Acta*, 1933, 16, 280.

Furan-2:3:4-tricarboxylic Acid (*Furan- $\alpha\beta\beta'$ -tricarboxylic acid*)

MW, 200

Cryst. from $AcOH$. M.p. 273° decomp. Very sol. H_2O , $EtOH$. Spar. sol. Et_2O .

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. M.p. 108° .

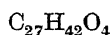
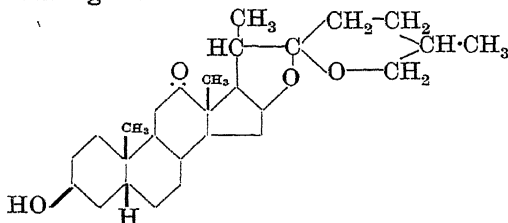
Tri-Et ester: $C_{14}H_{16}O_7$. MW, 284. M.p. 37° . B.p. $140^\circ/0.3$ mm.

Reichstein *et al.*, *Helv. Chim. Acta*, 1933, 16, 280.

Furan-2:3:5-tricarboxylic Acid.Cryst. from $AcOH$.

Tri-Me ester: $C_{10}H_{10}O_7$. MW, 242. B.p. $130-1^\circ/0.3$ mm.

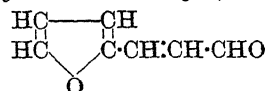
Reichstein, Grüssner, *Helv. Chim. Acta*, 1933, 16, 555.

Furcogenin

MW, 430

Sapogenin isolated from *Furcraea sellosa*. M.p. 225° . Wolff-Kishner red. \rightarrow smilagenin. *Acetyl*: m.p. 225° .

Marker *et al.*, *J. Am. Chem. Soc.*, 1943, 65, 1199.

Furfuracrolein (*Furanacrolein*, 2-furylacrolein, furfurylidene-acetaldehyde)

MW, 122

Needles with cinnamon-like odour. M.p. 54° . B.p. over 200° part. decomp., $97-112^\circ/16$ mm. Sol. $EtOH$, Et_2O , hot H_2O . Spar. sol. cold H_2O . Volatile in steam. Insecticide.

Semicarbazone: m.p. $215-19^\circ$.

Phenylhydrazone: cryst. from pet. ether. M.p. 132° .

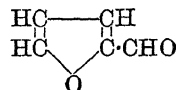
Anil: m.p. $65-5^\circ$.

p-Me-anil: m.p. $74-5-75^\circ$.

p-Methoxy-anil: m.p. 66° .

Bray, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2104.

König, *J. prakt. Chem.*, 1913, 88, 193.

Furfural (2-Formylfuran, α -furaldehyde, furfuraldehyde, furfurol, 2-furylaldehyde, 2-furoic aldehyde)

MW, 96

B.p. 162° (161.7°), $90^\circ/65$ mm. D_4^{20} 1.1594. n_D^{20} 1.52608. Heat of comb. C_p 560 Cal. Sol. 11 parts H_2O at 13° . Very sol. $EtOH$, Et_2O . Darkens and resinifies on keeping. Volatile in steam. $HNO_3 \rightarrow$ oxalic acid. $KMnO_4$ or $AgOH \rightarrow$ pyromucic acid.

Diacetate: $C_4H_3O \cdot CH(O \cdot CO \cdot CH_3)_2$. B.p. $143-4^\circ/20$ mm.

Oxime: *anti*-(α): m.p. $75-6^\circ$. *Syn*-(β): m.p. $91-2^\circ$.

Phenylhydrazone: leaflets. M.p. $97-8^\circ$.

p-Nitrophenylhydrazone: reddish-brown needles. M.p. 127° .

2:4-Dinitrophenylhydrazone: scarlet leaflets. M.p. 202° .

2:5-Dibromophenylhydrazone: m.p. 104° .

3:5-Dibromophenylhydrazone: m.p. 116° .

p-Tolylhydrazone: m.p. $105-6^\circ$.

p-Nitrobenzylhydrazone: m.p. $249-50^\circ$.

p-Chlorobenzylhydrazone: m.p. $210-12^\circ$.

2-Naphthylhydrazone: m.p. $134-5^\circ$.

Phenylsemicarbazone: m.p. $180-1^\circ$.

p-Tolylsemicarbazone: m.p. $156-7^\circ$.

Anil: see Furfurylideneaniline.

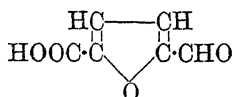
Hammer, *Chemistry and Industry*, 1933, 608.

Adams, Voorhees, *Organic Syntheses*, 1932, Collective Vol. I, 274.

Gilman, Wright, *Rec. trav. chim.*, 1931, 50, 833.

Brady, Goldstein, *J. Chem. Soc.*, 1927, 1959.

Wacek, *Angew. Chem.*, 1941, 54, 453 (Review).

Furfural-5-carboxylic Acid (*Aldehydopyromucic acid*)

$C_6H_4O_4$ MW, 140

Needles + $1H_2O$ from H_2O . M.p. anhyd. 202° . Sol. EtOH, hot H_2O . Spar. sol. Et₂O, $CHCl_3$, cold H_2O . Insol. C_6H_6 , ligroin, CS_2 . Alk. sol. + $Ag_2O \rightarrow$ furan-2:5-dicarboxylic acid.

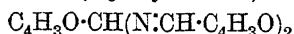
Oxime: m.p. $224-6^\circ$ decomp.

Phenylhydrazone: m.p. 176° decomp.

Hill, Sawyer, *Am. Chem. J.*, 1898, 20, 174.

Furfuraldehyde.

See Furfural.

Furfuramide (*Hydrofuramide*)

$C_{15}H_{12}O_3N_2$ MW, 268

Needles from EtOH. M.p. 117° . Sol. EtOH, Et₂O. Insol. cold H_2O . Heat of comb. C_p 1828 Cal. Decomp. by long boiling with H_2O , quickly by acids $\rightarrow NH_3$ + furfural. Hot dil. KOH \rightarrow the isomeric base "furfurine," m.p. 116° .

Hartley, Dobbie, *J. Chem. Soc.*, 1898, 73, 599.

Furfuran.

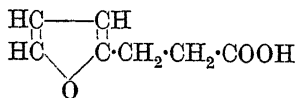
See Furan.

Furfurine.

See under Furfuramide.

Furfurol.

See Furfural.

Furfurylacetic Acid (2-[α -Furyl]-propionic acid)

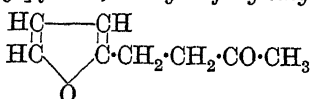
$C_7H_8O_3$ MW, 140

Cryst. from $CHCl_3$ -ligroin. M.p. 58° . B.p. $135^\circ/16$ mm., $108-10^\circ/10$ mm. Root growth accelerator.

Me ester: $C_8H_{10}O_3$. MW, 154. B.p. $89^\circ/15$ mm. D_4^{20} 1.088. n_D^{20} 1.4662.

Kirner, Richter, *J. Am. Chem. Soc.*, 1929, 51, 3133.

Amstutz, Plucker, *J. Am. Chem. Soc.*, 1941, 63, 313.

Furfurylacetone (1-[α -Furyl]-butanone-3, 2-[3-ketobutyl]-furan, methyl 2-furylethyl ketone)

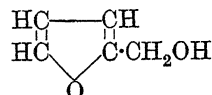
$C_8H_{10}O_2$ MW, 138

Oil with fruity odour. B.p. 203° , $101-2^\circ/21-2$ mm. D_4^{19} 1.0361. Forms cryst. comp. with $NaHSO_3$.

p-Bromophenylhydrazone: golden-yellow prisms from EtOH. M.p. $103-4^\circ$.

Semicarbazone: yellow leaflets. M.p. 143° .

Kirner, Richter, *J. Am. Chem. Soc.*, 1929, 51, 3133.

Furfuryl Alcohol (2-Furylcarbinol, 2-hydroxymethylfuran)

$C_5H_6O_2$ MW, 98

B.p. $170-1^\circ$, $75-7^\circ/15$ mm., $68-9^\circ/10$ mm. D_4^{25} 1.1282. n_D^{25} 1.48515. Heat of comb. C_p 612.8 Cal. (609). Misc. with H_2O in all proportions. Aq. sols. decompose on standing. Very sol. EtOH, Et₂O. Resinified by acids. Reduces cold $KMnO_4$, warm NH_3 , $AgNO_3$. Poisonous.

Formate: $C_6H_6O_3$. MW, 126. B.p. $166-3^\circ$, $66-2-66-5^\circ/16$ mm. D_4^{25} 1.1584. n_D^{25} 1.4662.

Acetate: $C_7H_8O_3$. MW, 140. B.p. $175-7^\circ$, $85^\circ/23$ mm. D_{20} 1.1175.

Propionate: $C_8H_{10}O_3$. MW, 154. B.p. $195-6^\circ$. D_{20} 1.1085.

Carbamate: $C_4H_3O \cdot CH_2O \cdot CO \cdot NH_2$. Needles from ligroin. M.p. 50° .

p-Nitrobenzoate: m.p. $75-7^\circ$.

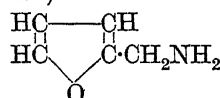
Acid phthalate: m.p. 85° .

Wilson, *Organic Syntheses*, 1932, Collective Vol. I, 270.

Zanetti, *J. Am. Chem. Soc.*, 1925, 47, 535.

Furfurylaldehyde.

See α -Furylacetaldehyde.

Furfurylamine (α -Furylmethylamine, 2-aminomethylfuran)

C_5H_7ON MW, 97

Colourless oil. B.p. $145-6^\circ$, $80^\circ/84$ mm. Misc. with H_2O . Absorbs CO_2 from the air \rightarrow cryst. comp., m.p. 75° .

N-Phenyl: α -furfurylaniline. B.p. $147^\circ/10$ mm. D_{20}^{20} 1.1119. N-Et: b.p. $147-147-5^\circ/11$ mm. D_{20}^{20} 1.0694.

B, HCl: m.p. 110° .

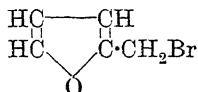
Oxalate: $C_5H_7ON \cdot C_2H_2O_4 \cdot \frac{1}{2}H_2O$. Leaflets from EtOH. Decomp. at 145° . Sol. H_2O .

Picrate: m.p. $183-4^\circ$.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, 50, 2032.

Schwoegler, Adkins, *J. Am. Chem. Soc.*, 1939, 61, 3499.

Robinson, Snyder, *Organic Syntheses*, 1943, XXIII, 68.

Furfuryl bromide C_5H_5OBr

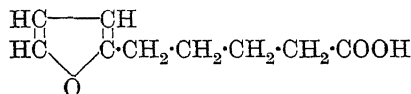
MW, 161

B.p. 32.5–4.5°/2 mm. D_{20}^{20} 1.560. n_D^{20} 1.5380. Unstable, decomp. with liberation of HBr.

Zanetti, Bashour, *J. Am. Chem. Soc.*, 1939, 61, 2249.

Woodward, *J. Am. Chem. Soc.*, 1940, 62, 1478.

Buu-Hoï, Lecocq, *Compt. rend.*, 1946, 222, 1441.

3-Furfurylbutyric Acid $C_9H_{12}O_3$

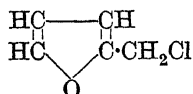
MW, 168

Cryst. from ligroin. M.p. 42–3°.

Et ester: b.p. 130–3°/16 mm.

Anilide: cryst. from Et_2O -ligroin. M.p. 75–6°. Sublimes.

Hofmann, *J. Am. Chem. Soc.*, 1944, 66, 51; 1945, 67, 421.

Furfuryl chloride (*Furylmethyl chloride*, 2-chloromethylfuran) C_5H_5OCl

MW, 116.5

B.p. 49°/26 mm., 37°/15 mm. D_4^{20} 1.1783. n_D^{20} 1.4941. Sol. ord. org. solvents. Insol. H_2O . Highly reactive. Readily resinifies in presence of moisture.

Reichstein, *Ber.*, 1930, 63, 751.

Furfurylformic Acid.

See Furylacetic Acid.

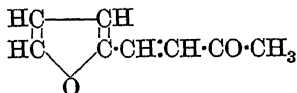
Furfurylidene-acetaldehyde.

See Furfuracrolein.

Furfurylideneacetic Acid.

See 2- α -Furylacrylic Acid.

Furfurylideneacetone (*Furfuralacetone*, 2-furalacetone, 2-[3-ketobutenyl]-furan, 1-furylbutenone-3)

 $C_8H_8O_2$

MW, 136

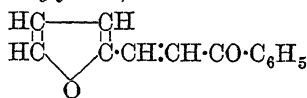
Needles. M.p. 39–40°. B.p. 135–7°/33–4 mm., 112–15°/10 mm. Sol. $EtOH$, Et_2O , $CHCl_3$. Spar. sol. pet. ether. Sol. conc. H_2SO_4 \rightarrow yellow col. turning to dark wine-red on warming.

Phenylhydrazone: needles from $EtOH$. M.p. 131–2°.

Leuck, Cejka, *Organic Syntheses*, 1927, VII, 42.

Auwers, Voss, *Ber.*, 1909, 42, 4426.

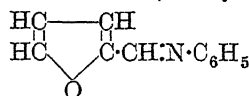
Furfurylideneacetophenone (*Phenyl furyl-vinyl ketone*, 1-benzoyl-2-furyl-ethylene, 2-phenacylidene-methylfuran)

 $C_{13}H_{10}O_2$

MW, 198

M.p. 47°. B.p. 317°, 181–2°/9 mm. D_4^{20} 1.150.

Semmler, Ascher, *Ber.*, 1909, 42, 2356.

Furfurylideneaniline (α -Furfuralanil) $C_{11}H_9ON$

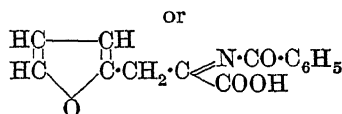
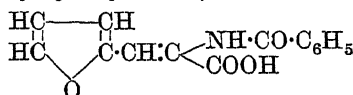
MW, 171

Cryst. M.p. 58°. B.p. 163–4°/19 mm., 122–3°/2 mm.

de Chalmot, *Ann.*, 1892, 271, 12.

West, *J. Soc. Chem. Ind.*, 1942, 61, 158.

Furfurylidenehippuric Acid (1-Benzoyl-amino-2- α -furylacrylic acid)

 $C_{14}H_{11}O_4N$

MW, 257

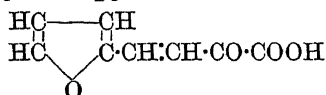
Leaflets from $EtOH$. Aq. M.p. 210°.

Me ester: $C_{15}H_{13}O_4N$. MW, 271. Leaflets. M.p. 141°.

Et ester: $C_{16}H_{15}O_4N$. MW, 285. Needles from dil. $EtOH$. M.p. 132–3°.

Amide: $C_{14}H_{12}O_3N_2$. MW, 256. Yellow needles from $EtOH$. M.p. 184°.

Posner, Siebert-Modrow, *Ber.*, 1930, 63, 3082.

Furfurylidenepyruvic Acid $C_8H_6O_4$

MW, 166

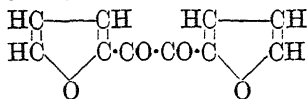
Yellow needles + $1H_2O$ from H_2O . M.p. anhyd. 112°. Sol. $EtOH$, Et_2O , Me_2CO , C_6H_6 . Ox. \rightarrow furylacrylic acid.

Et ester: $C_{10}H_{10}O_4$. MW, 194. Yellow needles from H_2O . M.p. 44–5°.

Phenylhydrazone: m.p. 164–5°.

Friedmann, *Helv. Chim. Acta*, 1931, 14, 786.

α -Furil (*Di- α -furoyl, di- α -furyl diketone, di-[α -furyl]-glyoxal*)



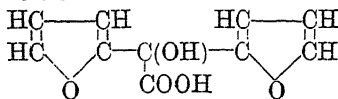
$C_{10}H_6O_4$ MW, 190

Yellow needles from C_6H_6 . M.p. 165–6°. Sol. EtOH. Heat of comb. C_p 1064 Cal. Forms heavy metal complexes.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, 55, 1228.

Corson, McAllister, *J. Am. Chem. Soc.*, 1929, 51, 2822.

Furilic Acid (α -Hydroxydi-[2-furyl]-acetic acid, difurylglcollic acid)



$C_{10}H_8O_5$ MW, 208

Fine needles. Decomp. at 100°. Very unstable in presence of H_2O . Sol. EtOH, Et_2O . Spar. sol. cold H_2O . Sol. conc. $H_2SO_4 \rightarrow$ dark brown col.

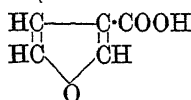
Fischer, *Ann.*, 1882, 211, 222.

Evans, Dehn, *J. Am. Chem. Soc.*, 1930, 52, 254.

α -Furoic Acid.

See Pyromucic Acid.

β -Furoic Acid (*Furan-3-carboxylic acid*)



$C_5H_4O_3$ MW, 112

Needles from H_2O . M.p. 122–3°. Spar. sol. H_2O . Aq. sol. gives no ppt. with $FeCl_3$.

Me ester: $C_6H_6O_3$. MW, 126. B.p. 160–1°.

Et ester: $C_7H_8O_3$. MW, 140. B.p. 172°, 65–7°/14 mm. $D_{20}^{25} 1.038$. $n_D^{20} 1.4592$.

Chloride: $C_5H_3O_2Cl$. MW, 130.5. M.p. 29°. B.p. 65°/47 mm.

Amide: $C_5H_5O_2N$. MW, 111. M.p. 169°.

Anilide: $C_{11}H_9O_2N$. MW, 187. M.p. 129–5°.

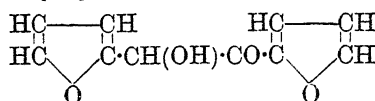
Gilman, Burtner, *J. Am. Chem. Soc.*, 1933, 55, 2903.

Kirkpatrick, *Chem. Abstracts*, 1937, 31, 1800.

Furoic Aldehyde.

See β -Furaldehyde and Furfural.

α -Furoin (*Furylfuroylcarbinol, 1-hydroxy-2-keto-1:2-difurylethane*)



$C_{10}H_8O_4$ MW, 192

Needles from hot EtOH. M.p. 138–9° (135°). Sol. MeOH. Heat of comb. C_p 1114 Cal. $PhNH_2 \rightarrow$ 2:3-difurylindole.

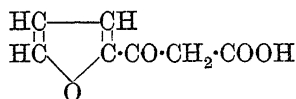
Benzoyl: m.p. 92–3°.

Hartman, Dickey, *J. Am. Chem. Soc.*, 1933, 55, 1228.

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, 51, 2163.

Klein, *J. Am. Chem. Soc.*, 1941, 63, 1474.

α -Furoylacetic Acid (*Pyromucylacetic acid*)



$C_7H_6O_4$ MW, 154

The free acid has not been isolated. The esters form cryst. Na, K and Cu salts and with $FeCl_3 \rightarrow$ wine-red col.

Me ester: $C_8H_8O_4$. MW, 168. B.p. 144–5°/20 mm., 96–8°/1 mm. *Oxime*: m.p. 124–5° decomp. *Semicarbazone*: m.p. 141–2° decomp.

Et ester: $C_9H_{10}O_4$. MW, 182. B.p. 143–5°/10 mm., 113–14°/1 mm. $n_D^{25} 1.5055$. *Oxime*: m.p. 131–2°. *Isonitroso-deriv.*: needles. M.p. 128–9°.

Propyl ester: $C_{10}H_{12}O_4$. MW, 196. B.p. 110–12°/1 mm. *Oxime*: m.p. 120–1°. *Semicarbazone*: m.p. 137–8°.

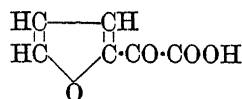
Butyl ester: $C_{11}H_{14}O_4$. MW, 210. Needles. M.p. 25°. B.p. 136–8°/3 mm. *Oxime*: m.p. 101–2°. *Semicarbazone*: m.p. 127–8°.

Zanetti, Beckmann, *J. Am. Chem. Soc.*, 1928, 50, 1438.

McElvain, Weber, *J. Am. Chem. Soc.*, 1941, 63, 2192.

Breslow, Baumgartner, Hauser, *J. Am. Chem. Soc.*, 1944, 66, 1286.

α -Furoylformic Acid (α -Furylgyoxylic acid, pyromucylformic acid)



$C_6H_4O_4$ MW, 140

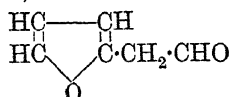
Colourless cryst. from ligroin. M.p. 98°. B.p. 105°/1 mm.

Chloride: $C_6H_3O_3Cl$. MW, 158.5. B.p. 65°/1 mm.

Anilide: leaflets from ligroin. M.p. 84–5°.

Reichstein, *Ber.*, 1930, 63, 752.

α -Furylacetaldehyde (2-Furanacetaldehyde, furfurylaldehyde)

 $C_6H_6O_2$

MW, 110

Colourless oil with strong hyacinth odour. B.p. $58^\circ/10$ mm. ($140-6^\circ/15$ mm.). D_4^{19} 1.0591. n_D^{19} 1.4772. Polymerises. Sensitive to atmospheric O, alkalis, acids, and heat.

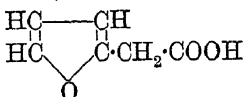
Oxime: m.p. 63° . Gradually resinifies.

Semicarbazone: m.p. $131-2^\circ$.

Reichstein, *Ber.*, 1930, **63**, 753.

Scheibler, Tutundzitsch, *Ber.*, 1931, **64**, 2919.

α -Furylacetic Acid (2-Furanacetic acid, α -furfurylformic acid)

 $C_6H_6O_3$

MW, 126

Leaflets from pet. ether. M.p. $68-9^\circ$. Sol. H_2O .

Me ester: $C_7H_8O_3$. MW, 140. B.p. $87-8^\circ/21$ mm. D_4^{25} 1.1250. n_D^{25} 1.4638.

Et ester: $C_8H_{10}O_3$. MW, 154. B.p. $88^\circ/15$ mm. D_4^{25} 1.0763. n_D^{25} 1.4571.

Propyl ester: $C_9H_{12}O_3$. MW, 168. B.p. $115-16^\circ/34$ mm. D_4^{25} 1.0436. n_D^{25} 1.4558.

Isopropyl ester: b.p. $92-13^\circ/17$ mm. D_4^{25} 1.0338. n_D^{25} 1.4511.

Butyl ester: $C_{10}H_{14}O_3$. MW, 182. B.p. $110-11^\circ/13$ mm. D_4^{25} 1.0232. n_D^{25} 1.4558.

Isobutyl ester: b.p. $112-13^\circ/21$ mm. D_4^{25} 1.0168. n_D^{25} 1.4518.

Chloride: $C_6H_5O_2Cl$. MW, 144.5. B.p. $65^\circ/1$ mm.

Nitrile: C_6H_5ON . MW, 107. B.p. $78-80^\circ/20$ mm., $69-73^\circ/10$ mm. D_4^{25} 1.0854. n_D^{25} 1.4715 (1.4691).

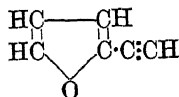
Anilide: leaflets from ligroin. M.p. $84-5^\circ$ ($79-80^\circ$).

Runde, Scott, Johnson, *J. Am. Chem. Soc.*, 1930, **52**, 1287.

Plucker, Amstutz, *J. Am. Chem. Soc.*, 1940, **62**, 1512.

Reichstein, *Ber.*, 1930, **63**, 753.

α -Furylacetylene (2-Furanethyne, 2-acetylenylfuran)

 C_6H_4O

MW, 92

B.p. $105-6^\circ$, $54-5^\circ/120$ mm. D_4^{20} 0.9919. n_D^{20} 1.5055. Forms Ag and Cu derivs.

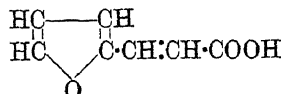
Hg deriv.: m.p. $118-19^\circ$.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, **7**, 28.

Furylacrolein.

See Furfuracrolein.

2- α -Furylacrylic Acid (Furfurylideneacetic acid)

 $C_7H_6O_3$

MW, 138

(i) *Stable form.*

Needles from H_2O . M.p. 141° . Sublimes in high vacuum at 112° . Sol. EtOH, Et₂O, AcOH, C_6H_6 . Mod. sol. hot H_2O . Spar. sol. cold H_2O . Insol. CS₂, ligroin. Heat of comb. C_7 757.3 Cal. $k = 3.25 \times 10^{-5}$ at 25° . Volatile in steam. Slow dist. \rightarrow α -furylethylene.

Me ester: $C_8H_8O_3$. MW, 152. M.p. 27.5° . B.p. $112^\circ/15$ mm.

Et ester: $C_9H_{10}O_3$. MW, 166. M.p. 24.5° . B.p. $230-3^\circ$, $120-1^\circ/17$ mm.

Propyl ester: $C_{10}H_{12}O_3$. MW, 180. B.p. $91-4^\circ/3$ mm. n_D^{24} 1.5392.

Isobutyl ester: $C_{11}H_{14}O_3$. MW, 194. B.p. $94-5^\circ/2$ mm. n_D^{24} 1.5277.

n-Amyl ester: $C_{12}H_{16}O_3$. MW, 208. B.p. $116.5-118^\circ/2$ mm. n_D^{24} 1.5289.

Isoamyl ester: b.p. $123-4^\circ/5$ mm. n_D^{25} 1.5253.

Benzyl ester: $C_{14}H_{12}O_3$. MW, 228. B.p. $155-6^\circ/3$ mm. n_D^{25} 1.5872.

Cyclohexyl ester: $C_{12}H_{16}O_3$. MW, 220. B.p. $121-4^\circ/3$ mm. M.p. $52-3^\circ$.

Methoxymethyl ester: $C_9H_{10}O_4$. MW, 182. B.p. $118-20^\circ/3$ mm. M.p. $33-4^\circ$.

2-Ethoxyethyl ester: $C_{11}H_{14}O_4$. MW, 210. B.p. $124-6^\circ/3$ mm. n_D^{25} 1.5398.

Amide: $C_7H_7O_2N$. MW, 137. M.p. $168-9^\circ$.

(ii) *Labile form.*

Prisms or plates. M.p. $103-4^\circ$. Sublimes in high vacuum at 95° . Sol. hot H_2O . Spar. sol. cold H_2O , C_6H_6 . Changes slowly, on boiling, into the stable form with part. decomp. \rightarrow α -furylethylene. In C_6H_6 sol. with I in sunlight \rightarrow stable form.

Gilman, Hewlett, *Chem. Abstracts*, 1930, **24**, 1640.

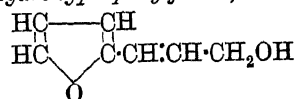
Posner, Sichert-Modrow, *Ber.*, 1930, **63**, 3084.

Liebermann, *Ber.*, 1894, **27**, 284.

Furyl Aldehyde.

See β -Furaldehyde and Furfural.

3- α -Furylallyl Alcohol (Furfurylidene-ethyl alcohol, ω -hydroxypropenylfuran)

 $C_7H_8O_2$

MW, 124

B.p. 108–10°/4 mm. (slight decomp.). D_{20}^{20} 1.1439. n_D^{27} 1.5520. Unstable.

1-Naphthylurethane: rosettes from ligroin. M.p. 93.5°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2101.

Furylbutanone.

See Furfurylacetonone.

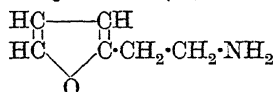
Furylbutenone.

See Furfurylideneacetone.

2-Furylcarbinol.

See Furfuryl Alcohol.

2- α -Furylethylamine (2- β -Aminoethylfuran)



C_6H_9ON MW, 111

Pale yellow liq. B.p. 159°. Rapidly absorbs CO_2 .

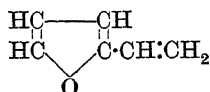
N-Benzoyl: needles from EtOH.Aq. M.p. 81°.

Carbamate: m.p. 84°.

Picrolonate: m.p. 204° decomp.

Windaus, Dalmer, *Ber.*, 1920, 53, 2306.

α -Furylethylene (α -Furanethene, 2-vinylfuran)



C_6H_6O MW, 94

B.p. 99–100°, 49–50°/130 mm., 19°/17 mm. D_4^{19} 0.9445. n_D^{19} 1.4992. Polymerises rapidly in presence of O and sunlight.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, 7, 17.

Furylfuroylcarbinol.

See α -Furoin.

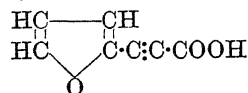
Furylglyoxylic Acid.

See Furoylformic Acid.

Furylmethylamine.

See Furfurylamine.

α -Furylpropionic Acid (2-Furanacetylene-carboxylic acid)



$C_7H_4O_3$

MW, 136

Cryst. from pet. ether. M.p. 113–14° decomp.

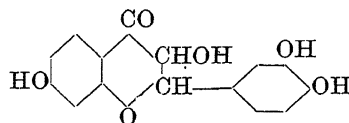
Gilman, Hewlett, Wright, *J. Am. Chem. Soc.*, 1931, 53, 4195.

Moureu, Dufraisse, Johnson, *Ann. chim.*, 1927, 7, 40.

Furylpropionic Acid.

See Furfurylacetic Acid.

Fustin (Dihydrofisetin, 7:3':4'-trihydroxyflavonol)



$C_{15}H_{12}O_6$

MW, 288

Constituent of *Rhus cotinus* L., *Rhus succedanea* L., and *Rhus rhodanthema*. Colourless cryst. from H_2O . M.p. 216–18°. Sol. Et_2O , C_6H_6 , $CHCl_3$. Sol. alkalis to red sols. $FeCl_3$ \rightarrow green col. Reduces $NH_3.AgNO_3$, and hot Fehlings.

7:3':4'-Tri-Me ether: $C_{18}H_{18}O_6$. MW, 330. Needles from MeOH. M.p. 143–4°. Acetyl: prisms. M.p. 142–3°.

Tetra-acetyl: needles from EtOH. M.p. 150–51°.

Oyamada, *Ann.*, 1939, 538, 44.

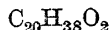
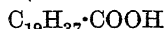
G

G-Acid.

See 2-Naphthol-6 : 8-disulphonic Acid.

Gadelaïdic Acid.

See under Gadoleic Acid.

Gadoleic Acid (Eicosenic Acid)

MW, 310

Occurs in cod-liver and other oils.

Cis:

M.p. about 20°.

Amide: $\text{C}_{20}\text{H}_{39}\text{ON}$. MW, 309. M.p. 78–9°.

Trans: Gadelaïdic Acid.

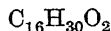
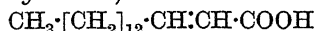
M.p. 53–4°.

Amide: m.p. 90–1°.

Bull, *Ber.*, 1906, 39, 3574.

Vesely, Chudožilov, *Chem. Abstracts*, 1930, 24, 2428.

Gaidic Acid (1-Pentadecylene-1-carboxylic acid, 1-hexadecenoic acid, $\Delta^{1,2}$ -hexadecylenic acid, 2-tridecylacrylic acid)



MW, 254

Cryst. M.p. 39°. Sol. EtOH.

Et ester: $\text{C}_{18}\text{H}_{34}\text{O}_2$. MW, 282. F.p. 9–10°.

Schröder, *Ann.*, 1867, 143, 38.

Galacticol.

See Dulcitol.

Galactite.

See under Galactose.

Galactobiose (Galactosidogalactose)

MW, 342

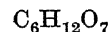
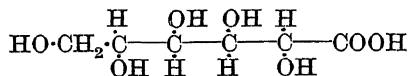
(1) Cryst. from MeOH. $[\alpha]_D^{16} + 53.05^\circ$ in H_2O . *Osazone*: m.p. 126–7°.

(2) Stereoisomer of (1). Cryst. from MeOH. Sinters at 78°, softens at 147.5°, m.p. 180°. $[\alpha]_D + 35.01^\circ$. *Osazone*: m.p. 194°.

Bourquelot, *Ann. chim.*, 1920, 13, 22.

Bourquelot, Aubry, *Compt. rend.*, 1917, 164, 521; 1917, 165, 60.

See also Fischer, Armstrong, *Ber.*, 1902, 35, 3149.

Galactonic Acid

MW, 196

d·

Needles from EtOH. M.p. 145–6° \rightarrow lactone. $[\alpha]_D^{20} - 12.23^\circ$.

Et ester: *penta-acetyl*, cryst. from EtOH. M.p. 101–2° (110–11°). $[\alpha]_D^{27} + 9.5^\circ$ in CHCl_3 .

Amide: $\text{C}_6\text{H}_{13}\text{O}_6\text{N}$. MW, 195. M.p. 172–

Diet. of Org. Comp.—II.

172.5°. $[\alpha]_D^{20} + 30.2^\circ$. $[\alpha]_D^{18} + 35.05^\circ$ in H_2O . *Penta-acetyl*: m.p. 177–7.5° (166–7°). $[\alpha]_D^{18} + 26.8^\circ$ in CHCl_3 .

Nitrile: *penta-acetyl*, m.p. 134.5–135°.

Chloride: *penta-acetyl*, m.p. 80–1°. $[\alpha]_D^{21} + 3^\circ$ in CHCl_3 .

Phenylhydrazide: m.p. 220°. $[\alpha]_D^{25} + 23.6^\circ$. *Penta-acetyl*: m.p. 136.5–137°. $[\alpha]_D^{21} + 36^\circ$ in CHCl_3 .

p-Bromophenylhydrazide: m.p. 125° decomp.

o-Tolylhydrazide: m.p. 191° decomp.

m-Tolylhydrazide: m.p. 174°.

p-Tolylhydrazide: m.p. 212°.

o-Toluidide: m.p. 204°.

m-Toluidide: m.p. 212°.

p-Toluidide: m.p. 224° decomp.

6-Acetyl deriv.: m.p. 160°.

Penta-acetyl: anhyd., m.p. 131–2°. $[\alpha]_D^{25} + 12^\circ$ in CHCl_3 ; $+1\text{H}_2\text{O}$, m.p. 100–1°. $[\alpha]_D^{25} + 15^\circ$ in CHCl_3 .

6-Me ether: $\text{C}_7\text{H}_{14}\text{O}_7$. MW, 210. M.p. 156°.

γ -Lactone: $\text{C}_6\text{H}_{10}\text{O}_6$. MW, 178. Needles $+1\text{H}_2\text{O}$. M.p. 66° (90–2°, 108–11° anhyd.). $[\alpha]_D - 65.5^\circ$ in H_2O . *Semicarbazone*: m.p. 189°.

l·

$[\alpha]_D + 65^\circ$.

Phenylhydrazide: m.p. 202–3°. $[\alpha]_D - 14^\circ$.

dl·

γ -Lactone: m.p. 122–5°.

Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, 41, 1146.

Black, U.S.P., 1,864,229, (*Chem. Abstracts*, 1932, 26, 4346).

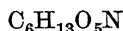
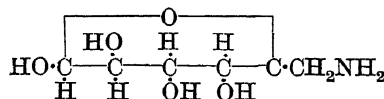
Levene, Meyer, *J. Biol. Chem.*, 1921, 46, 307.

Hönig, Ruzicka, *Ber.*, 1929, 62, 1434.

Brackenbush, Upson, *J. Am. Chem. Soc.*, 1933, 55, 2512.

Killiani, *Ber.*, 1933, 66, 119.

Fukunaga, *J. Chem. Soc. Japan*, 1936, 57, 551.

Galactosamine

MW, 179

N-Benzoyl: m.p. 132.5°. *Phenylhydrazone*: m.p. 201°.

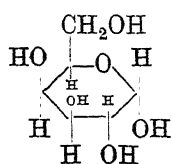
Perchlorate: m.p. 223° decomp.

Di-acetone deriv.: b.p. 122–6°/0.5–1.0 mm.

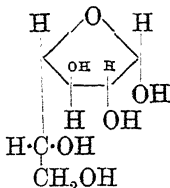
Hydrochloride: decomp. at 229°.

Freudenberg, Doser, *Ber.*, 1925, 58, 298.

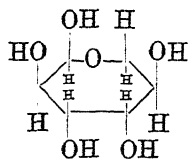
Galactose



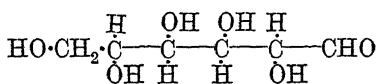
(I) Pyranose



(II) Furanose



(III) Septanose



(IV) Aldehyde

 $C_6H_{12}O_6$

MW, 180

d. Pyranose form, (I).

Hydrolysis product of lactose, raffinose, stachyose, and galactan. Occurs as a component of pectins, gums and mucilages and of some flavone and anthocyanin glycosides, etc. Prisms or needles + $1H_2O$ from H_2O , m.p. $118-20^\circ$; plates from EtOH, m.p. 170° . $[\alpha]_D^{20} + 83.3^\circ$ in H_2O . α -Form: m.p. 168° . $[\alpha]_D^{20} + 144^\circ$ (initial) in H_2O . β -Form: $[\alpha]_D^{20} + 52^\circ$ (initial) in H_2O .

Osazone: yellow needles. M.p. 186° . $[\alpha]_D + 0.46^\circ$ in Py-EtOH. Tetra-acetyl: m.p. $178-9^\circ$ decomp. $[\alpha]_D^{25} + 87^\circ$ in $CHCl_3$.

p-Tolyllosazone: m.p. 193° .

o-Tolyllosazone: m.p. 165° .

Phenylhydrazone: needles from EtOH. M.p. $160-2^\circ$. $[\alpha]_D + 20.54^\circ$ in Py.

o-Tolylhydrazone: m.p. $176-7^\circ$.

m-Tolylhydrazone: m.p. $153-4^\circ$.

p-Tolylhydrazone: m.p. 156° .

p-Thiocyanophenylhydrazone: m.p. 181.5° .

p-Tolylbenzylhydrazone: m.p. $160.5-1.5^\circ$.

Methylgalactoside: $C_7H_{14}O_6$. MW, 194.

α -. Cryst. from AcOEt. M.p. $111-12^\circ$. $[\alpha]_D^{20} + 178.8^\circ$ in H_2O . Heat of comb. C_7 839.4 Cal.

β -. Cryst. from hot EtOH. M.p. $178-80^\circ$. $[\alpha]_D^{20} + 2.6^\circ$ in saturated borax sol. Tetra-acetyl deriv.: cryst. from EtOH. M.p. $93-4^\circ$. $[\alpha]_D + 25.5^\circ$ in C_6H_6 . Tetra-Me ether: m.p. $44-5^\circ$. B.p. $135-40^\circ/11$ mm. $[\alpha]_D^{20} + 30.7^\circ$ in H_2O .

Ethylgalactoside: $C_8H_{16}O_6$. MW, 208.

α -. Galactite. Occurs in lupins. Cryst. Sinters at 138° , m.p. 142° (140°). $[\alpha]_D + 185.52^\circ$ in H_2O .

β -. M.p. $153-5^\circ$. $[\alpha]_D^{20} - 4.0^\circ$ in H_2O . Tetra-acetyl deriv.: cryst. from EtOH. M.p. 88° . $[\alpha]_D^{20} - 29.8^\circ$ in C_6H_6 .

2:3:4:6-Tetra-Me ether: $C_{10}H_{20}O_6$. MW, 236. Cryst. from Et₂O. M.p. $71-2^\circ$. B.p. $172^\circ/13$ mm. $[\alpha]_D^{25} + 118^\circ$ in H_2O .

1:2:3:4:6-Penta-acetyl deriv.:

α -. Cryst. from EtOH. M.p. 96° . $[\alpha]_D^{20} + 107^\circ$ in $CHCl_3$.

β -. Cryst. from EtOH. M.p. 142° . $[\alpha]_D^{20} + 23^\circ$ in $CHCl_3$.

Tetra-propionyl: b.p. $210^\circ/0.008$ mm. $[\alpha]_D^{20} + 54^\circ$.

Tetra-benzoyl: cryst. + MeOH. M.p. $112-13^\circ$. $[\alpha]_D^{20} + 6.5^\circ$ in $CHCl_3$.

1:2:3:4:6-Pentabenzoyl: α , m.p. 128° . $[\alpha]_D^{20} + 197^\circ$ in $CHCl_3$.

Haworth, Hirst, Jones, *J. Chem. Soc.*, 1927, 2428 (Bibl.).

Deulofeu, Wolfrom, Cattaneo, Christman, Georges, *J. Am. Chem. Soc.*, 1933, 55, 3488.

Verschuur, *Rec. trav. chim.*, 1928, 47, 442 (Bibl.).

Herissey, Aubry, *Chem. Zentr.*, 1914, I, 1661.

Fischer, *Ber.*, 1914, 47, 456.

d. Furanose form, (II).

Methylgalactoside: tetra-Me ether, b.p. $112^\circ/0.015$ mm. $n_D 1.4405$. $[\alpha]_D - 45.2^\circ$ in H_2O .

2:3:5:6-Tetra-Me ether: b.p. $136^\circ/0.05$ mm. $n_D 1.4540$. $[\alpha]_D - 21.2^\circ$ in H_2O .

Ethylgalactoside:

β -. M.p. 86° . $[\alpha]_D - 97.2^\circ$ in H_2O . Tetra-acetyl deriv.: m.p. 59° . $[\alpha]_D^{20} - 50.5^\circ$ in $CHCl_3$.

1:2:3:5:6-Penta-acetyl deriv.: (α -. Cryst. from EtOH. M.p. 87° . $[\alpha]_D^{20} + 61^\circ$ in $CHCl_3$. (β -. Cryst. from EtOH. M.p. 98° . $[\alpha]_D^{20} - 42^\circ$ in $CHCl_3$.

Schlubach, Meisenheimer, *Ber.*, 1934, 67, 430.

d. Septanose form, (III).

Methylgalactoside: α -. Syrup. $[\alpha]_D^{20} + 26^\circ$ in H_2O . Tetra-Me ether: b.p. $86^\circ/0.005$ mm.

1:2:3:4:5-Penta-acetyl deriv.: (α -. Cryst. from Et₂O. M.p. 128° . $[\alpha]_D^{20} - 11.0^\circ$ in $CHCl_3$. (β -. Cryst. from Et₂O. M.p. 101° . $[\alpha]_D^{18} - 78.3^\circ$ in $CHCl_3$.

Micheel, Suckfüll, *Ann.*, 1933, 507, 138.

d. Aldehyde form, (IV).

Di-Et mercaptal: cryst. from hot H_2O . M.p. $140-2^\circ$. Penta-acetyl deriv.: needles from MeOH.Aq. M.p. $77.5-78.5^\circ$. $[\alpha]_D^{20} + 9.7^\circ$ in $CHCl_3$.

Penta-acetyl deriv.: m.p. 121° . $[\alpha]_D^{25} - 25^\circ$ in $CHCl_3$.

Oxime: m.p. $162-3^\circ$. Hexa-acetyl deriv.: (i) m.p. 146° . (ii) M.p. 106° .

Wolfrom, *J. Am. Chem. Soc.*, 1930, 52, 2464.

l-.

M.p. 162–3°. $[\alpha]_D - 74^\circ$ in H_2O .

dl-.

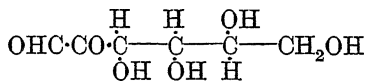
M.p. 143–4°.

Osazone: m.p. 206–8°. Tetra-acetyl: m.p. 111°.

Hepta-acetyl: m.p. 132°.

Fischer, Hertz, *Ber.*, 1892, **25**, 1247.Anderson, *J. Biol. Chem.*, 1933, **100**, 249.Pizarello, Freudenberg, *J. Am. Chem. Soc.*, 1939, **61**, 611.Reber, Reichstein, *Helv. Chim. Acta*, 1945, **28**, 1164.

Galactosone

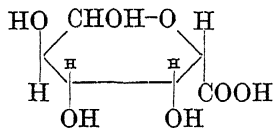
 $C_6H_{10}O_6$

MW, 178

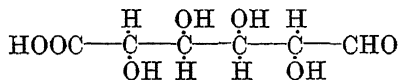
Tetra-acetyl deriv. of hydrate: m.p. 96°.

Maurer, Müller, *Ber.*, 1930, **63**, 2070.

Galacturonic Acid



Pyranose form



Aldehyde form

 $C_6H_{10}O_7$

MW, 194

d-. Pyranose form.

Decomp. product of pectin. Ox. \rightarrow mucic acid.(α) Needles + $1H_2O$. Sinters at 110°. M.p. 156–9° decomp. $[\alpha]_D + 97.29^\circ$ (initial) in H_2O . (β) M.p. 160° decomp. $[\alpha]_D^{20} + 27.0^\circ$ (initial).Me ester: $C_7H_{12}O_7$. MW, 208°. M.p. 146–8°. $[\alpha]_D^{25} + 75.5^\circ$.Methylglycoside: $C_7H_{12}O_7$. MW, 208. (α) Cryst. + $2H_2O$ from H_2O . Sinters at 109°. M.p. 112–14° decomp. $[\alpha]_D^{20} + 129.9^\circ$ in H_2O . Me ester: $C_8H_{14}O_7$. MW, 222. Cryst. + $1H_2O$ from MeOH.Aq. M.p. 140–1°. $[\alpha]_D^{20} + 125.0^\circ$ in H_2O . (β) Sinters at 126°. M.p. 134° (163–5°) decomp. $[\alpha]_D^{20} + 39.2^\circ$ in H_2O . Me ester: m.p. 193–4°. $[\alpha]_D^{20} - 45.6^\circ$ in H_2O .

Brucine salt: m.p. 180° decomp.

Cinchonine salt: m.p. 178° decomp.

Morphine salt: m.p. 162–3° decomp.

d-. Aldehyde form.

Phenylhydrazone: m.p. 140–1°.

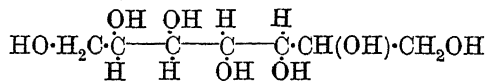
p-Bromophenylhydrazone: m.p. 150–1°.

p-Nitrophenylhydrazone: m.p. 170–5° decomp.

2:4-Dinitrophenylhydrazone: m.p. 158° decomp.

Thiosemicarbazone: cryst. + $1H_2O$. M.p. 147°.Di-Et mercaptal: m.p. 132.5°. $[\alpha]_D^{25} + 17^\circ$ in MeOH.Ehrlich, *Cellulose-Chemie*, 1930, **11**, 149 (Review).Niemann, Link, *J. Biol. Chem.*, 1932, **95**, 203; 1934, **104**, 743.Morell, Link, *J. Biol. Chem.*, 1933, **100**, 385.Smolenski, Cichocki, *Chem. Abstracts*, 1933, **27**, 1618.Ehrlich, Guttman, *Biochem. Z.*, 1933, **259**, 100; *Ber.*, 1933, **66**, 220 (*Bibl.*).

d-Galaheptitol

 $C_7H_{16}O_7$

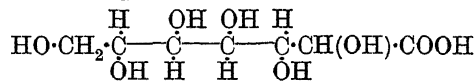
MW, 212

(α) l-α-Mannoheptitol. M.p. 187–8°. Sol. H_2O . Spar. sol. EtOH.

(β) Needles. Softens at 138°. M.p. 141–4°.

Peirce, *J. Biol. Chem.*, 1915, **23**, 327.

d-Galaheptonic Acid

 $C_7H_{14}O_8$

MW, 226

α-.

M.p. 206°. Sol. H_2O . Insol. EtOH.Amide: m.p. 206°. $[\alpha]_D^{20} + 14.5^\circ$. Hepta-acetyl deriv.: m.p. 125.5–126°. Hexa-acetyl: m.p. 185–7°. $[\alpha]_D^{25} + 2.1^\circ$.

Phenylhydrazide: m.p. 220°.

γ-Lactone: $C_7H_{12}O_7$. MW, 208. M.p. 145–7° (151°). $[\alpha]_D - 51^\circ$. Penta-acetyl: m.p. 123–4°. $[\alpha]_D^{25} - 16.9^\circ$.Hexa-acetyl: m.p. 176–7°. $[\alpha]_D^{25} + 15.3^\circ$.

β-.

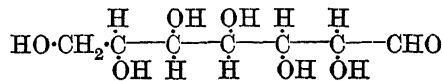
M.p. 145°.

Amide: m.p. 170–1°. $[\alpha] - 20^\circ$ in H_2O .

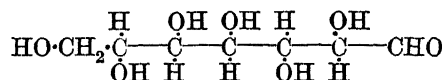
Phenylhydrazide: m.p. 185°.

Miksic, *Chem. Abstracts*, 1929, **23**, 2942.Killiani, *Ber.*, 1922, **55**, 96.Hudson, Komatsu, *J. Am. Chem. Soc.*, 1919, **41**, 1141.

d-Galaheptose



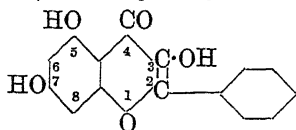
α-.



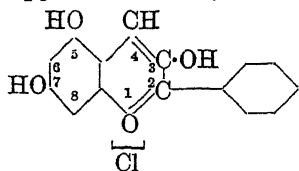
β-.

 $C_7H_{14}O_7$

MW, 210

α -.Syrup. Sol. H_2O . Spar. sol. EtOH. $[\alpha]_D^{20}$ -22.5° in H_2O .Osazone: m.p. 222° .Oxime: m.p. 179° decomp. $[\alpha]_D^{20}$ -5° in H_2O .Semicarbazone: m.p. $136-7^\circ$. $[\alpha]_D^{20}$ -22° in H_2O .Di-Et mercaptal: m.p. $204-5^\circ$. $[\alpha]_D^{20}$ -9.7° in Py.Di-benzyl mercaptal: m.p. 191° . $[\alpha]_D^{20}$ $+30.3^\circ$ in Py. β -.Cryst. from EtOH.Aq. Sublimes at $195-9^\circ$ (rapid heat.) decomp.Di-Et mercaptal: m.p. 133° . $[\alpha]_D^{20}$ $+37.8^\circ$ in H_2O .Fischer, *Ann.*, 1895, **288**, 144.Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.Peirce, *J. Biol. Chem.*, 1915, **23**, 328.**Galangin (5:7-Dihydroxyflavonol)** $\text{C}_{15}\text{H}_{10}\text{O}_5$

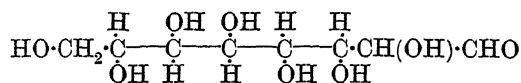
MW, 270

Constituent of galanga root (*Alpinia officinarum*, Hance). Yellowish needles from EtOH. M.p. $214-15^\circ$ ($219-21^\circ$). Mod. sol. EtOH, Et_2O . Yellow sols. in aq. alkalis. Sublimes.Triacetyl deriv.: m.p. $142.5-143.5^\circ$.Tribenzoyl deriv.: m.p. 177° .3-Me ether: $\text{C}_{16}\text{H}_{12}\text{O}_5$. MW, 284. Occurs with galangin. M.p. 299° . Diacetyl deriv.: m.p. $175-6^\circ$.5:7-Di-Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_5$. MW, 298. M.p. $177-8^\circ$. Acetyl deriv.: m.p. $192-3^\circ$.Chavan, Robinson, *J. Chem. Soc.*, 1933, 368.Kimura, Hoshi, *J. Pharm. Soc. Japan*, 1935, **55**, 229.**Galanginidin chloride (3:5:7-Trihydroxy-2-phenylbenzpyrilium chloride)** $\text{C}_{15}\text{H}_{11}\text{O}_4\text{Cl}$

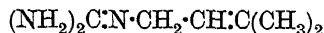
MW, 290.5

Red prisms from EtOH. Darkens at 160° . M.p. above 300° . Sol. EtOH, CHCl_3 . Sols. are red.3-Me ether: $\text{C}_{16}\text{H}_{13}\text{O}_4\text{Cl}$. MW, 304.5. Brownish-red cryst. + $1\text{H}_2\text{O}$. Red sol. in amylalcohol, col. discharged by Na_2CO_3 . Perchlorate: chars at $255-60^\circ$. M.p. above 300° .Tri-Me ether: $\text{C}_{18}\text{H}_{17}\text{O}_4\text{Cl}$. MW, 332.5. Orange-red needles. Ferrichloride: yellowish-brown prisms. M.p. 174° . Sol. CHCl_3 to red sol.5-Benzyl ether: m.p. 222° decomp.Kondo, *Chem. Abstracts*, 1932, **26**, 4333.Malkin, Robinson, *J. Chem. Soc.*, 1925, 1190.**Galantidine** $\text{C}_{14}\text{H}_{17}\text{O}_3\text{N}$

MW, 247

Alkaloid of *Galanthus woronovi*. Cryst. from EtOH. M.p. $235-8^\circ$. Spar. sol. H_2O , Et_2O , CHCl_3 .B,HCl: m.p. $197-9^\circ$.B,HBr: m.p. $213-213.5^\circ$. $[\alpha]_D + 32.3^\circ$.Methiodide: m.p. $232-3^\circ$.Areshkina, *J. Gen. Chem. U.S.S.R.*, 1947, 17, 1216.**d- α -Gala-octose** $\text{C}_8\text{H}_{16}\text{O}_8$

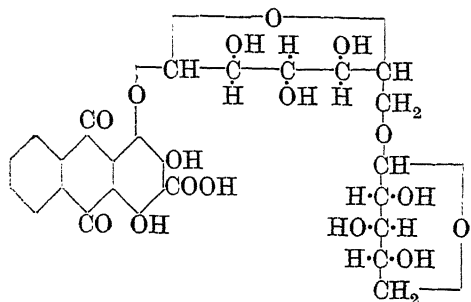
MW, 240

Leaflets + $1\text{H}_2\text{O}$ from hot EtOH.Aq. M.p. $109-11^\circ$ ($167-9^\circ$). $[\alpha]_D^{20}$ -40° in H_2O . Anhyd: m.p. $167-9^\circ$. $[\alpha]_D^{20}$ -44.9° .Phenylhydrazone: plates from H_2O . M.p. $200-205^\circ$.Osazone: m.p. $220-25^\circ$ decomp.Hepta-acetyl: m.p. $88-90^\circ$. $[\alpha]_D^{20}$ -0.9° in CHCl_3 .Di-Et mercaptal: m.p. 214° . $[\alpha]_D^{20}$ -3.2° in Py.Di-benzyl mercaptal: m.p. $208-9^\circ$. $[\alpha]_D^{20}$ $+18.5^\circ$ in Py.Fischer, *Ann.*, 1895, **288**, 150.Anderson, *J. Am. Chem. Soc.*, 1911, **33**, 1514.**Galegine (2-[2-Methyl- β -butenyl]-guanidine, 2-[isopropylidene-ethyl]-guanidine)** $\text{C}_6\text{H}_{13}\text{N}_3$

MW, 127

Alkaloid obtained from *Galega officinalis*, Linn. M.p. $60-5^\circ$. Hygroscopic. Insol. Et_2O , CHCl_3 , pet. ether.Nitrate: m.p. 108° .Sulphate: m.p. 227° .Bicarbonate: m.p. 138° . $\text{B}_2(\text{COOH})_2$: m.p. $192-5^\circ$.N-Benzoyl: m.p. $95-6^\circ$.N:N'-Di-m-nitrobenzoyl: m.p. $163-4^\circ$. $\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 123° .Picrate: m.p. $180-1^\circ$.Späth, Spitzzy, *Ber.*, 1925, **58**, 2273.Braun, *Chem. Abstracts*, 1932, **26**, 1391.

Galiosin

 $C_{26}H_{26}O_{16}$

MW, 594

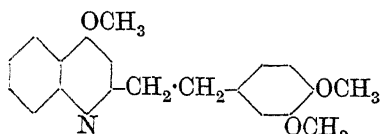
From *Rubia tinctorum* (fresh madder root). Bright yellow needles + $6H_2O$ from H_2O . Decomp. above 100° .

Hill, Richter, *J. Chem. Soc.*, 1936, 1714.

Galipidine.

See Galipine.

Galipine (Galipoline methyl ether, galipidine, 1-[4-methoxy-2-quinolyl]-2-[3:4-dimethoxyphenylethyl]-ethane, 4-methoxy-2-[3:4-dimethoxyphenylethyl]-quinoline)

 $C_{20}H_{21}O_3N$

MW, 323

Occurs in bark of *Cusparia febrifuga*, Humb. (angostura bark). Cryst. from Et_2O . M.p. $113-5^\circ$.

B, HCl : m.p. 165° .

B, HI : m.p. 178° .

Picrate: m.p. 194° .

Späth, Papaioanou, *Monatsh.*, 1929, 52, 134.

Galipoidine

 $C_{19}H_{15}O_4N$

MW, 321

Occurs in bark of *Cusparia trifoliata*, Engler (angostura bark). M.p. 231° .

Tröger, Runne, *Chem. Abstracts*, 1911, 5, 3044.

Späth, Pikel, *Monatsh.*, 1930, 55, 352.

Galipol

 $C_{15}H_{26}O$

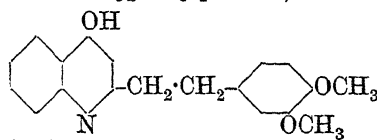
MW, 222

Constituent of angostura oil. Yellow oil. B.p. $264-5^\circ$. D^{20}_D 0.9270.

Beckurts, Tröger, *Chem. Zentr.*, 1898, II, 786.

Galipoline (4-Hydroxy-2-[3:4-dimethoxy-

phenylethyl]-quinoline, 1-[4-hydroxy-2-quinolyl]-2-[3:4-dimethoxyphenyl]-ethane)

 $C_{19}H_{19}O_3N$

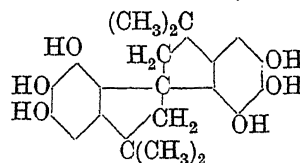
MW, 309

Occurs in bark of angostura (*Cusparia febrifuga*, Humb.). Cryst. from Et_2O . M.p. 193° .

Späth, Papaioanou, *Monatsh.*, 1929, 52, 129.

Gallacetoniin

(Note: this name has been applied to the two compounds described below)

 $C_{21}H_{24}O_6$

MW, 372

Cryst. from AcOH. Darkens at 240° . M.p. $260-5^\circ$.

Hexa-Me ether: pale yellow needles from EtOH. M.p. $135-7^\circ$.

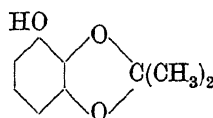
Hexa-acetyl: cryst. from EtOH or AcOH. M.p. 247° (rapid heat.).

Hexabenzoyl: m.p. $287-8^\circ$.

Hexabenzenesulphonyl: m.p. $213-16^\circ$.

Baker, Besly, *J. Chem. Soc.*, 1939, 199.

Wacek, Kratzl, *Oesterreichische Chemiker-Zeitung*, 1939, 42, 286, (*Chem. Abstracts*, 1940, 34, 1636).

 $C_9H_{10}O_3$

MW, 166

Leaflets from H_2O . M.p. $89-90^\circ$. Very sol. EtOH, Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin. Sol. alkalis.

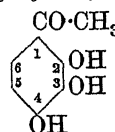
Acetyl: prisms from pet. ether. M.p. $47-8^\circ$.

Benzoyl: cryst. from EtOH. M.p. 78° .

Benzenesulphonyl: cryst. from EtOH. M.p. 84° .

Wacek, Kratzl, *Oesterreichische Chemiker-Zeitung*, 1939, 42, 286, (*Chem. Abstracts*, 1940, 34, 1636).

Gallacetophenone (2:3:4-Trihydroxyacetophenone, 4-acetopyrogallol, Alizarin Yellow C)

 $C_8H_8O_4$

MW, 168

Needles or leaflets from H_2O . M.p. 173° ($192\text{--}25^\circ$). Sol. EtOH , hot H_2O . Spar. sol. C_6H_6 . $\text{FeCl}_3 \rightarrow$ brown col. FeCl_3 in $\text{EtOH} \rightarrow$ purple-brown col.

2-(or 4-) *Me ether*: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. M.p. 175° .

3-*Me ether*: m.p. $134\text{--}5^\circ$. 2:4-*Diacetyl*: m.p. $150\text{--}1^\circ$.

4-*Me ether*: 2:3-*diacetyl*, m.p. $146\text{--}8^\circ$.

2:3-*Di-Me ether*: *oxime*, m.p. 112° .

2:4-*Di-Me ether*: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. M.p. $79\text{--}80^\circ$. *Phenylhydrazone*: m.p. $108\text{--}10^\circ$.

3-*Acetyl*: m.p. $110\text{--}11^\circ$.

3:4-*Di-Me ether*: m.p. 83° .

Tri-Me ether: 2:3:4-trimethoxyacetophenone. $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. M.p. $15\text{--}17^\circ$. B.p. $295\text{--}7^\circ$, $165^\circ/12\text{ mm}$.

3-(or 4-) *Et ether*: $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. M.p. 102° .

2:4-*Diacetyl*: m.p. $107\text{--}8^\circ$.

3:4-*Diacetyl*: m.p. $78\text{--}81^\circ$.

Triacetyl: m.p. 85° .

Oxime: m.p. $162\text{--}3^\circ$.

Semicarbazone: m.p. 225° (rapid heat.).

Picrate: m.p. 133° .

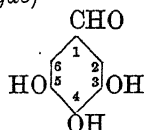
Perkin, Storey, *J. Chem. Soc.*, 1928, 232.

Perkin, *J. Chem. Soc.*, 1895, 67, 997.

Brand, Collischonn, *J. prakt. Chem.*, 1922, 103, 338.

Einhorn, Hollandt, *Ann.*, 1898, 301, 107.

Gallaldehyde (3:4:5-*Trihydroxybenzaldehyde*, *gallic aldehyde*)



$\text{C}_7\text{H}_6\text{O}_4$

MW, 154

Cryst. $+1\text{H}_2\text{O}$ from H_2O . M.p. 212° (rapid heat.) decomp. Sol. EtOH , C_6H_6 , CHCl_3 , Me_2CO , hot H_2O . Spar. sol. Et_2O .

3-*Me ether*: $\text{C}_8\text{H}_8\text{O}_4$. MW, 168. Needles from C_6H_6 . M.p. $130\text{--}1^\circ$. Sol. EtOH , Et_2O . $\text{FeCl}_3 \rightarrow$ green col.

4-*Me ether*: m.p. $139\text{--}40^\circ$. *p-Nitrophenylhydrazone*: m.p. $222\text{--}3^\circ$.

3:5-*Di-Me ether*: see *Syringa-aldehyde*.

Tri-Me ether: 3:4:5-trimethoxybenzaldehyde. $\text{C}_{10}\text{H}_{12}\text{O}_4$. MW, 196. Needles from H_2O . M.p. 78° ($74\text{--}5^\circ$). B.p. $163\text{--}5^\circ/10\text{ mm}$. *p-Nitrophenylhydrazone*: m.p. $201\text{--}2^\circ$. *Oxime*: m.p. $83\text{--}4^\circ$. B.p. $198\text{--}200^\circ/10\text{ mm}$. *Semicarbazone*: m.p. $219\text{--}20^\circ$.

Tribenzyl ether: $\text{C}_{28}\text{H}_{24}\text{O}_4$. MW, 324. M.p. $104\text{--}104.5^\circ$. *Oxime*: m.p. $140\text{--}140.5^\circ$. 2:4-*Dinitrophenylhydrazone*: m.p. $214\text{--}214.5^\circ$.

Triacetyl: m.p. $107\text{--}8^\circ$. *p-Nitrophenylhydrazone*: m.p. $207\text{--}8^\circ$.

Tricarbomethoxyl: m.p. $81\text{--}2^\circ$. *p-Nitrophenylhydrazone*: m.p. $206\text{--}7^\circ$.

Tribenzoyl: *p-nitrophenylhydrazone*, decomp. at $232\text{--}3^\circ$.

Oxime: decomp. at $195\text{--}200^\circ$. *Acetyl deriv.*: m.p. $126\text{--}7^\circ$.

p-Nitrophenylhydrazone: m.p. 226° (slow heat.), $234\text{--}6^\circ$ decomp. (rapid heat.).

Cyanhydrin: decomp. at $150\text{--}60^\circ$ (rapid heat.). *Tetra-acetyl deriv.*: m.p. 135° .

Rosenmund, Pfannkuch, *Ber.*, 1922, 55, 2357.

Rosenmund, Zetzsche, *Ber.*, 1918, 51, 594.

Nierenstein, *J. prakt. Chem.*, 1932, 132, 200, (*Bibl.*).

Buchanan, Cook, Loudon, *J. Chem. Soc.*, 1944, 322.

Gallamide.

See under *Gallic Acid*.

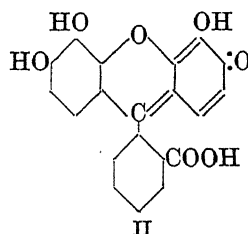
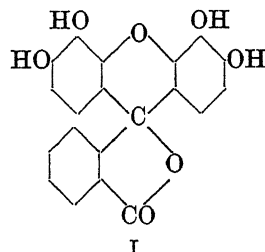
Gallanilide.

See under *Gallic Acid*.

Gallanol.

See under *Gallic Acid*.

Gallein (4:5-Dihydroxyfluorescein)



$\text{C}_{20}\text{H}_{12}\text{O}_7$

MW, 364

Brownish-red powder or fine cryst. with green, metallic lustre. Blackens above 180° . Sol. EtOH . Spar. sol. Et_2O , AcOH , Me_2CO . Insol. C_6H_6 , CHCl_3 . Forms Sb complex containing 14.41% Sb.

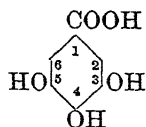
Me ester: (structure II). $\text{C}_{21}\text{H}_{14}\text{O}_7$. MW, 378. Amorphous. M.p. above 280° . *Tri-Me ether*: $\text{C}_{24}\text{H}_{20}\text{O}_7$. MW, 420. M.p. 199° .

Et ester tri-Et ether: (structure II). $\text{C}_{28}\text{H}_{28}\text{O}_7$. MW, 476. M.p. 155° .

Tetra-acetyl (structure I): m.p. $241\text{--}2^\circ$.

Orndorff, Delbridge, *Am. Chem. J.*, 1909, 42, 185 (*Bibl.*).

Naito, *J. Pharm. Soc. Japan*, 1938, 58, 690.

Gallic Acid (3 : 4 : 5-Trihydroxybenzoic acid) $C_7H_6O_5$

MW, 170

Occurs in many tannins. Cryst. $+1H_2O$ from H_2O . M.p. 253° decomp. (225° decomp., $235-40^\circ$). Sol. Me_2CO . Mod. sol. EtOH. Spar. sol. H_2O , Et_2O . Insol. C_6H_6 , $CHCl_3$. Heat of comb. C_p 634.1 Cal., C_v 634.7 Cal.

Me ester: gallicin. $C_8H_8O_5$. MW, 184. M.p. 157° . *Triacetyl*: m.p. $120-2^\circ$. *Tribenzoyl*: m.p. 139° . *3 : 4-Diacetyl-5-benzoyl*: m.p. $110-11^\circ$. *3 : 5-Diacetyl-4-benzoyl*: m.p. $138-9^\circ$.

Et ester: $C_9H_{10}O_5$. MW, 198. M.p. 158° , anhyd. 160° . $k = 9 \times 10^{-8}$ at 25° . *Triacetyl*: m.p. 138° . *Tribenzoyl*: m.p. $126-8^\circ$.

Propyl ester: $C_{10}H_{12}O_5$. MW, 212. M.p. 150° .

Isopropyl ester: m.p. $123-124.5^\circ$.

Butyl ester: $C_{11}H_{14}O_5$. MW, 226. M.p. $143-4^\circ$ ($133-4^\circ$).

Isobutyl ester: m.p. $130-1^\circ$.

n-Hexyl ester: m.p. $93-5^\circ$.

n-Octyl ester: m.p. $94-5^\circ$.

n-Dodecyl ester: m.p. $96.5-97^\circ$.

n-Tetradecyl ester: m.p. $98.5-99.2^\circ$.

n-Hexadecyl ester: m.p. $99.5-100^\circ$.

n-Octadecyl ester: m.p. 104.5° .

Amide: gallamide. $C_7H_7O_4N$. MW, 169. Leaflets $+1\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. $244-5^\circ$. *N-Acetyl*: m.p. 210° . *3 : 4 : 5-Triacetyl*: m.p. 163° . *N : N-Di-Et*: m.p. 137° .

Nitrile: gallonitrile, gallanol. $C_7H_5O_3N$. MW, 151. M.p. 223° . *Triacetyl*: m.p. $129-30^\circ$.

Anilide: gallanilide. $C_{13}H_{11}O_4N$. MW, 245. Leaflets $+2H_2O$ from EtOH.Aq. M.p. 207° (205°). *Triacetyl*: m.p. $161-2^\circ$. *Tribenzoyl*: m.p. 181° .

3-Acetyl: m.p. 225° decomp.

3 : 5-Diacetyl: m.p. $174-5^\circ$.

Triacetyl: m.p. $171-2^\circ$.

3-Benzoyl: m.p. $224-7^\circ$ ($240-2^\circ$).

3 : 5-Dibenzoyl: m.p. $218-21^\circ$.

Tribenzoyl: m.p. $191-2^\circ$.

3 : 4-Diacetyl-5-benzoyl: m.p. $178-9^\circ$.

3 : 5-Diacetyl-4-benzoyl: m.p. $183-4^\circ$.

3-Me ether: 4 : 5-dihydroxy-3-methoxybenzoic acid. $C_8H_8O_5$. MW, 184. M.p. 220° ($131-2^\circ$). *Me ester*: $C_9H_{10}O_5$. MW, 198. M.p. $112-13^\circ$. *Chloride*: $C_8H_7O_4Cl$. MW, 202.5. M.p. $101-2^\circ$. *Diacetyl*: m.p. $170-1^\circ$ ($102-3^\circ$).

4-Me ether: 3 : 5-dihydroxy-4-methoxybenzoic acid. M.p. 246° . *Diacetyl*: m.p. $120-1^\circ$. *Me ester*: m.p. 147° , *diacetyl*, m.p. $68-9^\circ$.

3 : 4-Di-Me ether: 3-hydroxy-4 : 5-dimethoxybenzoic acid. $C_9H_{10}O_5$. MW, 198. M.p. $197-$

8° . *Me ester*: $C_{10}H_{12}O_5$. MW, 212. M.p. 84° , *5-benzoyl*, m.p. $91-2^\circ$.

3 : 5-Di-Me ether: see Syringic Acid.

Tri-Me ether: 3 : 4 : 5-trimethoxybenzoic acid. $C_{10}H_{12}O_5$. MW, 212. M.p. 166° . *Me ester*: $C_{11}H_{14}O_5$. MW, 226. M.p. $82-5^\circ$, b.p. $274-5^\circ$, $166-7^\circ/10$ mm. *Et ester*: $C_{12}H_{16}O_5$. MW, 240. M.p. $53-5^\circ$. *Phenylester*: $C_{16}H_{16}O_5$. MW, 288. M.p. 103° . *Chloride*: $C_{10}H_{11}O_4Cl$. MW, 230.5. M.p. $77-8^\circ$, b.p. $185^\circ/18$ mm., $168-70^\circ/14$ mm. *Amide*: $C_{10}H_{13}O_4N$. MW, 211. M.p. $176-7^\circ$. *Nitrile*: $C_{10}H_{11}O_3N$. MW, 193. M.p. 95° , b.p. $180-5^\circ/10$ mm.

Tri-Et ether: 3 : 4 : 5-triethoxybenzoic acid. $C_{13}H_{18}O_5$. MW, 254. M.p. 112° . *Et ester*: $C_{15}H_{22}O_5$. MW, 282. M.p. 51° .

Tribenzyl ether: $C_{28}H_{24}O_5$. MW, 340. M.p. 187° .

Glucoside: see Glucogallic Acid.

Schiff, *Ann.*, 1893, 272, 234.

Grehm, Gansser, *J. prakt. Chem.*, 1901, 63, 82.

Fischer, Nouri, *Ber.*, 1917, 50, 621.

Heffter, Capellmann, *Ber.*, 1905, 38, 3636.

Manning, Nierenstein, *Ber.*, 1912, 45, 1550.

Zimmermann, U.S.P., 1,222,345, (*Chem. Abstracts*, 1917, 11, 1886).

Christiansen, *J. Am. Chem. Soc.*, 1926, 48, 1360.

Mauthner, *Organic Syntheses*, 1926, VI, 96.

Yakimov, Tatarskaya, Russian Ps., 24,075, 28,280, (*Chem. Abstracts*, 1933, 27, 3851).

Hepner, Zyto, *Chem. Abstracts*, 1933, 27, 280.

Takino, *Chem. Abstracts*, 1929, 23, 2707.

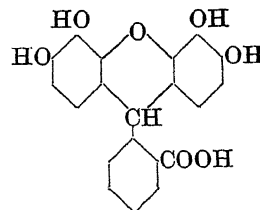
Shriner, McCutchan, *J. Am. Chem. Soc.*, 1929, 51, 2193.

Gallic Aldehyde.

See Gallaldehyde.

Gallicin.

See under Gallic Acid.

Gallin (4 : 5-Dihydroxyfluorescin) $C_{20}H_{14}O_7$

MW, 366

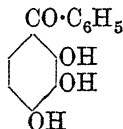
Needles from Et_2O . Sol. EtOH, AcOH, Me_2CO .

Tetra-Me ether Me ester: $C_{25}H_{24}O_7$. MW, 436. M.p. 127° .

Tetra-acetyl: m.p. 220°.

Orndorff, Delbridge, *Am. Chem. J.*, 1909, 42, 186.

Gallobenzophenone (4-Benzoylpyrogallol, 2:3:4-trihydroxybenzophenone, Alizarin Yellow A)



$C_{13}H_{10}O_4$

MW, 230

Yellow needles from EtOH.Aq. M.p. 140-1° (138-9°). Sol. EtOH, Et₂O, AcOH, Me₂CO, hot H₂O. Spar. sol. C₆H₆.

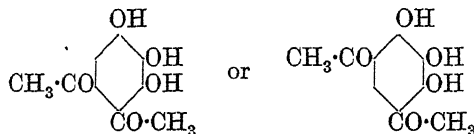
3-(or 4)-*Me ether*: $C_{14}H_{12}O_4$. MW, 244. M.p. 165°.

3:4-*Di-Me ether*: $C_{15}H_{14}O_4$. MW, 258. M.p. 131° (120-1°). *Acetyl deriv.*: m.p. 98°.

Triacetyl: m.p. 117-18°. *Oxime*: m.p. 135°. *Phenylhydrazone*: m.p. 130°.

Fischer, Rapaport, *Ber.*, 1913, 46, 2393. Motylewski, *Ber.*, 1909, 42, 3151.

Gallodiacetophenone (4:5-(or 4:6)-*Di-acetylpyrogallol*, trihydroxydiacetylbenzene)



$C_{10}H_{10}O_5$

MW, 210

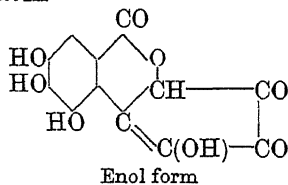
Yellow needles from H₂O. M.p. 190-1°.

Mono-acetyl deriv.: m.p. 207-9°.

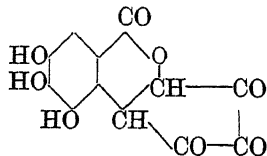
Tribenzoyl: m.p. 189°.

Heller, *Ber.*, 1912, 45, 2391.

Galloflavin



Enol form



Keto form

$C_{12}H_6O_8$

MW, 278

Greenish-yellow leaflets. Blackens without melting. Sol. aniline. Spar. sol. H₂O, EtOH, Et₂O.

Tetra-Me ether: $C_{16}H_{14}O_8$. MW, 334. M.p. 236-9°.

Tetra-acetyl: m.p. 230-3°.

Herzig, *Ann.*, 1920, 421, 247.

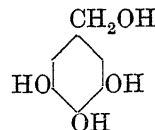
Gallonitrile.

See under Gallic Acid.

4-Galloylpyrogallol.

See 2:3:4:3':4':5'-Hexahydroxybenzophenone.

Gallyl Alcohol (3:4:5-Trihydroxybenzyl alcohol)



$C_7H_8O_4$

MW, 156

3:5-*Di-Me ether*: see Syringyl Alcohol.

3:4:5-*Tri-Me ether*: 3:4:5-trimethoxybenzyl alcohol. $C_{10}H_{14}O_4$. MW, 198. B.p. 228°/25 mm.

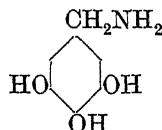
3:4:5-*Tricarboethoxyl*: m.p. 67-8°. *Naphthylurethane*: m.p. 131-2°. *Ethyl-p-nitrobenzoate*: m.p. 147-8°.

3:4:5-*Tricarboethoxyl*: m.p. 58-9°. *Naphthylurethane*: m.p. 87-8°.

Rosenmund, Pfannkuch, *Ber.*, 1922, 55, 2369.

Rosenmund, Boehm, *Chem. Abstracts*, 1927, 21, 2886.

Gallylamine (3:4:5-Trihydroxybenzylamine)



$C_7H_9O_3N$

MW, 155

B,HCl: m.p. 225-6° decomp. (rapid heat.). *Triacetyl deriv.*: m.p. 196-7°.

Tri-Me ether: 3:4:5-trimethoxybenzylamine. $C_{10}H_{15}O_3N$. MW, 197. Oil. Sol. H₂O, EtOH, Et₂O. *B₂H₂PtCl₆*: m.p. 197°.

Heffter, Capellmann, *Ber.*, 1905, 38, 3639. Rosenmund, Pfannkuch, *Ber.*, 1922, 55, 2367.

d-Galtose

HO-CH₂·CH(OH)·CH(OH)·CO·CH(OH)·CH₂OH

$C_6H_{12}O_6$

MW, 180

Syrup. Mixture of α- and β-forms.

Osazone: m.p. 175-82°.

Nef, *Ann.*, 1914, 403, 239, 347.

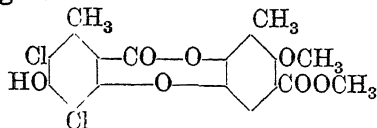
Gamma Acid.

See 2-Amino-8-naphthol-6-sulphonic Acid.

Gammexane.

See Benzene hexachloride.

Gangaleoidin



Suggested structure

$C_{18}H_{14}O_7Cl_2$ MW, 413

Depside present in *Lecanora gangaleoides*. Needles from EtOH-Me₂CO. M.p. 214-15°. Sol. Me₂CO, warm C₆H₆. Spar. sol. MeOH, EtOH, CHCl₃, Et₂O. No. col. with FeCl₃.

Acetyl deriv.: prisms from CHCl₃-EtOH. M.p. 244-5°.

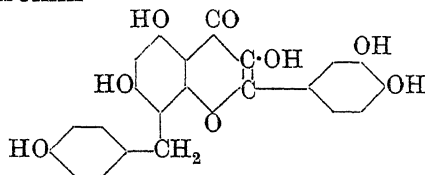
Hardiman, Keane, Nolan, *Scientific Proceedings, Royal Dublin Society*, 1935, 21, 141.

Davidson, Keane, Nolan, *Chem. Abstracts*, 1944, 38, 1221.

Gansil.

See Chloramine-T.

Garcinin



Suggested structure

$C_{22}H_{16}O_8(+2H_2O)$ MW, 408 (444)

Occurs in bark of *Garcinia spicata*.

Penta-Me ether: $C_{27}H_{26}O_8, 1H_2O$. MW, 496. Decomp. at 141-2°.

Murakami, *Chem. Zentr.*, 1934, II, 2394.

Gardenal.

See Luminal.

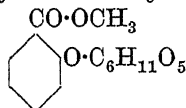
Gardenin.

See Crocetin.

Gaultherin.

There are two compounds of this name.

(i) Methyl β -glucosidosalicylate



$C_{14}H_{18}O_8$ MW, 314

Occurs in *Betula lenta*, Linn. Prisms from EtOH. M.p. 90-2° (105° solvent-free). Sol. H₂O, EtOH, AcOH. Insol. Et₂O, CHCl₃, Me₂CO, C₆H₆.

Tetra-acetyl deriv.: m.p. 154°.

Schneegens, Gerock, *Ber.*, 1894, 27B, 883.

Karrer, Weidmann, *Helv. Chim. Acta*, 1920, 3, 252.

(ii) $C_{19}H_{26}O_6$. MW, 350. Occurs in *Gaultheria cumingiana*. Cryst. M.p. 181°. $[\alpha]_D^{20} -58-80^\circ$ in H₂O. 3% H₂SO₄ \rightarrow salicylic acid + glucose + xylose.

Yasue, *J. Pharm. Soc. Japan*, 1938, 58, 774.

Gazaniaxanthin

$C_{40}H_{56}O$ MW, 552

Carotenoid pigment from flowers of *Gazania rigens*. Brownish red cryst. + MeOH from MeOH-pet. ether. Loses MeOH at 80° in high vacuum. Deep red rectangular cryst. from C₆H₆-MeOH (1:4). M.p. 136-7°. Absorption maxima at 5300, 4955, and 4630 Å in CS₂.

Acetyl: clusters of orange needles from C₆H₆-MeOH. M.p. 83-5°. Absorption maxima at 5300 and 4940 Å in CS₂.

Schön, *Biochem. J.*, 1938, 32, 1566.

Geijerene

$C_{12}H_{18}$ MW, 162

Oil present in *Geijera parviflora*. B.p. 85°/17 mm. $D_{20}^{25} 0.8720$. $n_D^{20} 1.4888$.

Hexahydro deriv.: b.p. 96°/20 mm. $D_{25}^{25} 0.8373$. $n_D^{25} 1.4577$.

Penfold, Simonsen, *Chem. Abstracts*, 1933, 27, 2684.

Geissospermine

$C_{40}H_{50}O_3N_4$ MW, 634

Alkaloid from bark of *Geissospermum velosii*, Allem. (Peruvian bark). (1) Cryst. + 2H₂O. Sinters at 160°. M.p. 210-12° decomp. Sol. MeOH, EtOH, C₆H₆, AcOEt, Py. Spar. sol. H₂O, Et₂O, CCl₄. $[\alpha]_D -108.2^\circ$ in EtOH. Zn dust dist. \rightarrow 2-methyl-4-ethylpyridine. (2) Cryst. + 1½H₂O. Decomp. at 145-7°. $[\alpha]_D -101.9^\circ$ in EtOH.

Di-methiodide: B₂, 2CH₃I, 4H₂O. Decomp. at 261-2°.

B₁(COOH)₂: decomp. at 193°.

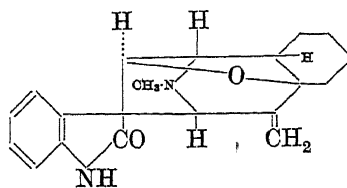
Bertho, Moog, *Ann.*, 1934, 509, 241 (Bibl.).

Gelsemicine.

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Prisms from Me₂CO. M.p. 171°.

Chou, *Chem. Abstracts*, 1931, 25, 4085.

Gelsemine



Suggested structure

$C_{20}H_{22}O_2N_2$ MW, 322

Occurs in rhizome of *Gelsemium sempervirens*, Ait. Cryst. from Me₂CO. M.p. 178°. $[\alpha]_D +15.9^\circ$ in CHCl₃. Se \rightarrow 2:3-dimethylindole. B.HCl: m.p. about 300°. $[\alpha]_D +2.6^\circ$ in H₂O.

B.HNO₃: m.p. 288°.

Acetyl deriv.: m.p. 106-8°. Hydrochloride: m.p. 290°.

Benzoyl deriv.: hydrochloride, m.p. 303°.

Picrate: m.p. 203°.

Methiodide: m.p. 284°.

Dibromo deriv.: m.p. 309°.

Chou, *Chem. Abstracts*, 1931, 25, 4085.

Sayre, *Chem. Abstracts*, 1919, 13, 2972.

Moore, *J. Chem. Soc.*, 1911, 99, 1231.

Kates, Marion, *J. Am. Chem. Soc.*, 1950, 72, 2308.

Witkop, *J. Am. Chem. Soc.*, 1948, 70, 1424.

Gibson, Robinson, *Chemistry and Industry*, 1951, 93.

Prelog *et al.*, *Helv. Chim. Acta*, 1951, 34, 1962.

Gelseminic Acid.

See Scopoletin.

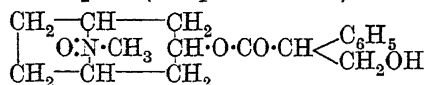
Gemmatein

$C_{17}H_{12}O_7$ MW, 328

Pigment from *Lycoperdon gemmatum*, Batsch. Brown needles. Sol. EtOH. Spar. sol. H_2O . Insol. Et_2O . $H_2O_2 + HCl \rightarrow$ homogentisic anhydride. KOH fusion \rightarrow *p*-hydroxyphenylacetic acid.

Kotake, Naito, *Z. physiol. Chem.*, 1914, 90, 254.

Genatropine (Atropine N-oxide)



$C_{17}H_{23}O_4N$ MW, 305

M.p. 127–8°, decomp. at 135°.

Hydrochloride: m.p. 192–3°.

$(B_4, SiO_2, 12WO_3, 2H_2O) \cdot nH_2O$: m.p. 187°.

Glucoside: $C_{23}H_{35}O_9N$. MW, 467. *d-Tartrate*: m.p. 111°. *Picrate*: m.p. 117–18°.

Polonowski, *Chem. Abstracts*, 1931, 25, 1289 (Review).

Polonowski, Polonowski, *Bull. soc. chim.*, 1926, 39, 1147.

Geneserethol (Geneseroline ethyl ether)

$C_{15}H_{22}O_2N_2$ MW, 262

Leaflets. M.p. 83°. $[\alpha]_D -182^\circ$ in EtOH.

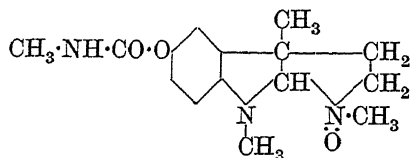
Hydrochloride: m.p. 120–4°.

Hydriodide: m.p. 108°.

Picrate: m.p. 156–7°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 249.

Geneserine (*Physostigmine oxide*, *eserine oxide*)



$C_{15}H_{21}O_3N_3$ MW, 291

Alkaloid of calabar bean. M.p. 128–9°.

$[\alpha]_D -175^\circ$ in EtOH.

Salicylate: m.p. 89–90°.

Picrate: m.p. 175°.

Methiodide: m.p. 215°.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 244; 1916, 19, 27.

ψ -Geneserolene.

See Hydroxyeserolene.

Geneseroline

$C_{13}H_{18}O_2N_2$ MW, 234

Cryst. M.p. 150°. Sol. EtOH. Spar. sol. Et_2O , pet. ether. Oxidises rapidly in air. $[\alpha]_D -176^\circ$ in EtOH.

Hydrochloride: m.p. 154°.

Hydrobromide: m.p. 208°.

Picrate: m.p. 175°.

Et ether: see Geneserethol.

Polonowski, Nitzberg, *Bull. soc. chim.*, 1915, 17, 248.

Genin

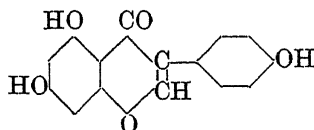
$C_{22}H_{32}O_6$ MW, 392

Occurs in digitalis species. M.p. 205–6°.

Dibenzoyl deriv.: sinters about 190°.

Kilian, *Ber.*, 1915, 48, 334.

Genistein (*Prunetol*, 5 : 7 : 4'-trihydroxyisoflavone, *sophoricol*)



$C_{15}H_{10}O_5$ MW, 270

Occurs as the glucoside genistin, *q.v.* Prisms from EtOH.Aq. M.p. 296–8° decomp.

(?)4'-*Me ether*: $C_{16}H_{12}O_5$. MW, 284. M.p. 189–91°.

(?)7'-*Me ether*: prunetin. M.p. 242°.

5 : 4'-*Di-Me ether*: $C_{17}H_{14}O_5$. MW, 298. M.p. 290–3°.

7 : 4'-*Di-Me ether*: m.p. 140–2°. *Acetyl deriv.*: m.p. 202–4°.

Tri-Me ether: $C_{18}H_{16}O_5$. MW, 312. M.p. 162–3°.

7 : 4'-*Di-Et ether*: $C_{19}H_{18}O_5$. MW, 326. M.p. 132–4°. *Acetyl deriv.*: m.p. 168–70°.

Triacetyl deriv.: m.p. 200–2°.

Tribenzoyl deriv.: m.p. 239°.

β -*Glucoside*: see Sophoricoside.

Walz, *Ann.*, 1931, 489, 124.

Baker, Robinson, *J. Chem. Soc.*, 1928, 3115.

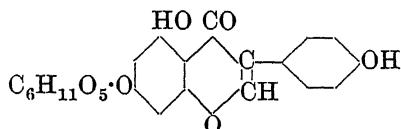
Shriner, Hull, *J. Org. Chem.*, 1945, 10, 288.

GenisteineC₁₆H₂₈N₂ MW, 248

Alkaloid from broom. M.p. 60.5°. B.p. 177-8°/22 mm., 139.5-140.5°/5 mm.

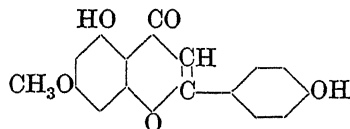
B₂.2HCl.3AuCl₃: m.p. 188°.B₂.H₂PtCl₆. $\frac{1}{3}$ H₂O: decomp. at 235°.

Dipicrate: m.p. 215° decomp.

Valeur, *Compt. rend.*, 1918, 167, 163.**Genistin** (*Genistein glucoside*)C₂₁H₂₀O₁₀ MW, 432Glucoside of Soya bean and *Genista tinctoria*, Linn. (dyer's broom). Leaflets from EtOH. M.p. 254-6° decomp. $[\alpha]_D^{25}$ -27.7° in MeOH.Aq.Tri-Me ether: C₂₄H₂₆O₁₀. MW, 474. M.p. 200-5° decomp.

Hexa-acetyl deriv.: m.p. 198°.

Hexa-benzoyl deriv.: m.p. 132°.

Walz, *Ann.*, 1931, 489, 121.Zemplén, Farkas, *Ber.*, 1943, 76, 1110.**Genkwanin** (5:4'-Dihydroxy-7-methoxyflavone, apigenin 7-methyl ether)C₁₆H₁₂O₅ MW, 284Isolated from *Daphne genkwa* and from the Chinese drug "yuen-hua." Yellow needles from MeOH. M.p. 286°.5-Me ether: C₁₇H₁₄O₅. MW, 298. Pale yellow needles from EtOH. M.p. 298°. Acetyl: needles from EtOH. M.p. 220°.

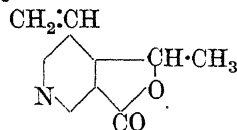
4'-Benzyl ether: m.p. 203°.

Diacetyl: needles from EtOH. M.p. 196°.

Dibenzoyl: needles from EtOH. M.p. 207-8°.

Mahal, Venkataraman, *J. Chem. Soc.*, 1936, 569.Tseng, *J. Pharm. Soc. Japan*, 1935, 55, 30.Nakano, Tseng, *J. Pharm. Soc. Japan*, 1932, 52, 148.**Gentiamarin**C₁₆H₂₂O₁₀ (C₁₆H₂₀O₁₀) MW, 374 (372)Glucoside occurring in root of "enzian." Amorphous. Sol. H₂O, EtOH. $[\alpha]_D$ -80° to -90°. FeCl₃ → black col. Reduces Fehling's. Hyd. → glucose.Tanret, *Bull. soc. chim.*, 1905, 33, 1071.**Gentianin.**

See Gentisin.

GentianineC₁₀H₉O₂N MW, 175Present in *Gentiana kirilowi*. Cryst. from EtOH. M.p. 79-80°. NaOH → Na salt of gentianic acid. This salt has m.p. 132° and reverts to gentianine on acidification. Zn dust dist. → pyridine.

B.HCl: m.p. 171-2°.

B.HBr: m.p. 177-8°.

B.HNO₃: m.p. 238-40°.B₂.(COOH)₂: m.p. 152-3°.

Methiodide: m.p. 190-1°.

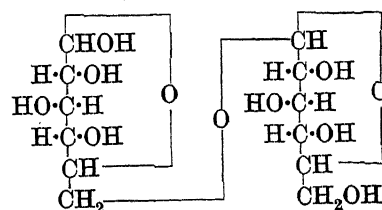
Dihydro deriv: m.p. 75-6°.

Proskurnina, *J. Gen. Chem. U.S.S.R.*, 1944, 14, 1148, (*Chem. Abstracts*, 1946, 40, 7213).Proskurnina, Shpanov, Konovalova, *Chem. Abstracts*, 1950, 44, 159.**Gentianose**C₁₈H₃₂O₆ MW, 344Trisaccharide occurring in roots of various species of gentian. Cryst. from 95% EtOH. M.p. 209°. Hyd. by gentianase → sucrose + glucose; by invertase → gentiobiose + fructose; by emulsin → sucrose + glucose. $[\alpha]_D^{25}$ +31.25°. Does not reduce Fehling's.Sivadjan, *J. pharm. chim.*, 1929, 9, 434.Bridel, *J. pharm. chim.*, 1930, 10, 62.**Gentienin**C₁₄H₁₀O₅ MW, 258

Occurs as glycoside gentiin in gentian. Yellow needles from EtOH. M.p. 225°.

Tanret, *Compt. rend.*, 1905, 141, 263.**Gentiin**C₂₅H₂₈O₁₄ MW, 552

Glycoside from gentian root. Yellow needles from EtOH.Aq. M.p. 274°. Hyd. → gentienin + glucose + xylose.

Tanret, *Compt. rend.*, 1905, 141, 263; *Bull. soc. chim.*, 1905, 33, 1073.**Gentiobiose** (6-β-Glucosidoglucose)C₁₂H₂₂O₁₁ MW, 342

Disaccharide formed by hyd. of gentianose, α -crocin, and amygdalin.

α -Form:

Cryst. + 2CH₃OH from MeOH. M.p. 85.5–86°, anhyd. 189–195°. $[\alpha]_D^{20} + 31^\circ \rightarrow + 9.6^\circ$ in H₂O.

β -Form:

Cryst. from EtOH. M.p. 190–5°. $[\alpha]_D^{20} - 11^\circ \rightarrow + 9.6^\circ$ in H₂O.

Osazone: m.p. 162–7° decomp. $[\alpha]_D^{20} - 14.8^\circ$ in Py.

Methylglycoside: C₁₃H₂₄O₁₁. MW, 356. (α). Cryst. + 1EtOH. M.p. 102°. $[\alpha]_D^{20}$ (anhyd.) + 61.8° in H₂O. (β). M.p. 98°. $[\alpha]_D^{20} - 36.0^\circ$ in CHCl₃. Hepta-acetyl: m.p. 82°. $[\alpha]_D^{20} - 18.8^\circ$ in CHCl₃. Hepta-Me ether: m.p. 109° (106°). $[\alpha]_D^{18.5} - 20.89^\circ$ in EtOH.

Hepta-acetyl: m.p. 178°. $[\alpha]_D^{20} + 35.1^\circ \rightarrow + 31.6^\circ$ in Py. Chloro: (α). M.p. 136.5–137° (148°). $[\alpha]_D^{20} + 82.8^\circ$ (+ 80.57°) in CHCl₃. Bromo: (α). M.p. 144°. $[\alpha]_D^{20} + 101.08^\circ$ in CHCl₃.

Octa-acetyl: (α). M.p. 188–9°. $[\alpha]_D^{20} + 52.3^\circ$ in CHCl₃. (β). M.p. 192–3° (196°). $[\alpha]_D^{20} - 5.3^\circ$ in CHCl₃. Heat with TiCl₄ \rightarrow β -isomaltose octa-acetate, m.p. 142–4°. $[\alpha]_D^{20} + 98^\circ$ in CHCl₃.

Octapropionyl: m.p. 151–2°. $[\alpha]_D^{20} - 3.3^\circ$ in CHCl₃.

Zemplén, Gerecs, *Ber.*, 1931, 64, 1545.

Hudson, Johnson, *J. Am. Chem. Soc.*, 1917, 39, 1272.

Brauns, *J. Am. Chem. Soc.*, 1927, 49, 3170.

Haworth, Wylam, *J. Chem. Soc.*, 1923, 123, 3120.

Taylor, Lipschitz, *J. Am. Chem. Soc.*, 1932, 54, 1054.

Brigl, Widmaier, *Ber.*, 1936, 69, 1219.

Lindberg, *Nature*, 1949, 164, 706.

Reynolds, Evans, *J. Am. Chem. Soc.*, 1938, 60, 2559.

Helferich, Leete, *Organic Syntheses*, 1942, XXII, 53.

Gentiogenin

C₁₀H₁₆O₄ MW, 194

Occurs in gentian root as glucoside gentiopicroin. Needles. M.p. 185°. Sol. MeOH, hot EtOH.

Tetra-acetyl deriv.: m.p. 207–10°.

Mono-acetone deriv.: m.p. 228°.

Tanret, *Bull. soc. chim.*, 1905, 33, 1059.

Gentiopicroin

C₁₆H₂₀O₉ (C₂₀H₃₀O₁₂) MW, 356 (462)

Glucoside from root of *Gentiana lutea*, Linn., and other species, and *Chlora perfoliata*, Linn. Cryst. from H₂O. M.p. 122°, anhyd. 191°. Spar. sol. EtOH. Insol. Et₂O. Reduces Tollen's reagent. $[\alpha]_D^{20} - 196.3^\circ$ in H₂O. Hyd by emulsion \rightarrow eugentiogenin + glucose.

p-Nitrophenylhydrazide: m.p. 199° decomp.

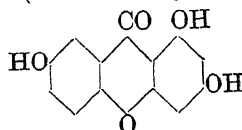
Penta-acetyl deriv.: m.p. 139°. $[\alpha] - 164^\circ$.

Kromayer, *Jahresbericht über die Fortschritte der Chemie*, 1862, 483.

Tanret, *Compt. rend.*, 1905, 141, 207; *Bull. soc. chim.*, 1905, 33, 1059.

Bridel, *J. pharm. chim.*, 1913, 6, 481; 1913, 7, 486; 1914, 10, 62.

Gentisein (2 : 4 : 7-Trihydroxyxanthone)



C₁₃H₈O₅

MW, 244

Orange-yellow needles from MeOH. M.p. 318°. Sol. EtOH.

2-Me ether: see Gentisin.

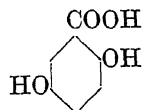
7-Me ether: isogentisin. C₁₄H₁₀O₅. MW, 258. M.p. 241°. Acetyl deriv.: m.p. 211–12°.

2 : 7-Di-Me ether: C₁₅H₁₂O₅. MW, 272. M.p. 167°. Acetyl deriv.: m.p. 189°.

2 : 4 : 7-Triacetyl: m.p. 226°.

Shinoda, *J. Chem. Soc.*, 1927, 1985.

Gentisic Acid (2 : 5-Dihydroxybenzoic acid, hydroquinonecarboxylic acid, 5-hydroxysalicylic acid)



C₇H₆O₄

MW, 154

Cryst. from H₂O. M.p. 200°. Sol. H₂O, EtOH, Et₂O. Insol. CHCl₃, C₆H₆, CS₂. $k = 1.3 (1.1) \times 10^{-3}$ at 25°. FeCl₃ \rightarrow blue col. Reduces Fehling's and Tollen's reagent. Heat \rightarrow hydroquinone.

Me ester: C₈H₈O₄. MW, 168. M.p. 88°. Diacetyl: m.p. 62–63.5° in sealed tube.

Et ester: C₉H₁₀O₄. MW, 182. M.p. 77°.

Nitrile: C₇H₅O₂N. MW, 135. M.p. 151°.

2-Acetyl: m.p. 171–2°.

5-Acetyl: m.p. 131–2°.

Diacetyl: m.p. 118–19°.

2-Benzoyl: m.p. 211–12°.

5-Benzoyl: m.p. 178–9°.

2-Acetyl-5-benzoyl: m.p. 166–7°.

2-Me ether: 5-hydroxy-2-methoxybenzoic acid. C₈H₈O₄. MW, 168. M.p. 155–6°. Me ester, 5-benzoyl deriv., m.p. 83–4°.

5-Me ether: 5-methoxysalicylic acid. M.p. 145–6°. Me ester: C₉H₁₀O₄. MW, 182. B.p. 255°, 146–7°/17 mm.; 2-acetyl deriv., m.p. 45–6°, b.p. 183–4°/16 mm.; 2-benzoyl deriv., m.p. 106–7°.

Di-Me ether: see 2 : 5-Dimethoxybenzoic Acid. 5-Et ether: 2-hydroxy-5-ethoxybenzoic acid, 5-ethoxysalicylic acid. C₉H₁₀O₄. MW, 182. M.p. 164°.

5-Me-2-phenyl ether: 5-methoxy-2-phenoxy-

benzoic acid, 4-methoxydiphenyl ether 2-carboxylic acid. $C_{14}H_{12}O_4$. MW, 244. M.p. 156°.

Fichter, Grisard, *Helv. Chim. Acta*, 1921, 4, 930.

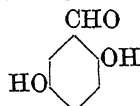
Pukkedu, *Gazz. chim. ital.*, 1929, 59, 13.

Raistrick, Simonart, *Biochem. J.*, 1933, 27, 628.

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Mauthner, *J. prakt. Chem.*, 1915, 91, 180.

Gentisic Aldehyde (2:5-Dihydroxybenzaldehyde, 5-hydroxysalicylaldehyde)



$C_7H_6O_3$ MW, 138

Yellow needles from hot C_6H_6 . M.p. 99°. Sol. H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. ligroin.

5-Me ether: 2-hydroxy-5-methoxybenzaldehyde, 5-methoxysalicylaldehyde. $C_8H_8O_3$. MW, 152. M.p. 4°. B.p. 247-8° (in CO_2). Sol. EtOH, Et_2O . 2-Acetyl: m.p. 63°.

Di-Me ether: 2:5-dimethoxybenzaldehyde. $C_9H_{10}O_3$. MW, 166. Needles. M.p. 53°. Turns green on standing or on melting. B.p. 270° (in CO_2), 146°/10 mm. Sol. EtOH, Et_2O . Semicarbazone: m.p. 208°.

5-Et ether: 2-hydroxy-5-ethoxybenzaldehyde 5-ethoxysalicylaldehyde. $C_9H_{10}O_3$. MW, 166. Yellow prisms. M.p. 51-2°. B.p. 230°. Sol. EtOH, Et_2O , $CHCl_3$. Volatile in steam. 2-Acetyl: m.p. 69°.

Di-Et ether: 2:5-diethoxybenzaldehyde. $C_{11}H_{14}O_3$. MW, 194. Colourless needles. M.p. 62-5°. B.p. 280-5°.

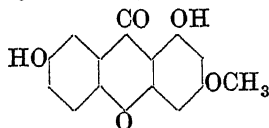
5-Benzoyl: m.p. 108°.

Semicarbazone: m.p. 249°.

Neubauer, Flatow, *Z. physiol. Chem.*, 1907, 52, 380.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Gentisin (Gentianin, gentisein 2-methyl ether, 4:7-dihydroxy-2-methoxyxanthone)



$C_{14}H_{10}O_5$ MW, 258

Yellow pigment from root of *Gentiana lutea*, Linn. Yellow needles. M.p. 266-7°.

Diacetyl: m.p. 196-196.5°.

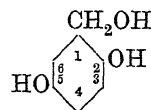
Dibenzoyl: m.p. 192°.

Tunmann, *Chem. Zentr.*, 1916, II, 65.

Shinoda, *J. Chem. Soc.*, 1927, 1983 (Bibl.).

Binaghi, Falqui, *Chem. Abstracts*, 1926, 20, 645 (Bibl.).

Gentisyl Alcohol (2:5-Dihydroxybenzyl alcohol, saleripol)



$C_7H_8O_3$ MW, 140

The free alcohol has not been isolated, oxidizing very rapidly in the presence of acid and alkali.

2:5-Dibenzoyl- ω -acetyl: m.p. 115-5°.

2-Glucoside: hexa-acetyl, m.p. 117°. $[\alpha]_D^{27}$ -25.5° in $CHCl_3$.

5-Glucoside: hexa-acetyl, m.p. 100°. $[\alpha]_D^{23}$ -15° in $CHCl_3$.

Zemplén, Morvay, *Ber.*, 1943, 76, 1165.

Geodin

$C_{17}H_{12}O_7Cl_2$ MW, 399

Metabolic product of *Aspergillus terreus*, Thom. Pale yellow needles from $CHCl_3$ - Et_2O . M.p. 235°. Sol. EtOH, AcOEt, Me_2CO , dioxan. Spar. sol. C_6H_6 . Insol. H_2O , pet. ether. $[\alpha]_D^{24.61}$ +179° in $CHCl_3$. Alc. $FeCl_3$ → dirty green → brown col. Heat. at 260° → 2:6-dichloro-orcinol.

Tetra-Me ether: (of geodin + $1H_2O$) needles from MeOH. M.p. 150°.

Tetra-acetyl: (of geodin + $1H_2O$) plates from AcOH + 1% Ac_2O . M.p. 209-10°.

Calam, Clutterbuck, Oxford, Raistrick, *Biochem. J.*, 1939, 33, 579.

Clutterbuck, Koerler, Raistrick, *Biochem. J.*, 1937, 31, 1089.

Raistrick, Smith, *Biochem. J.*, 1936, 30, 1315.

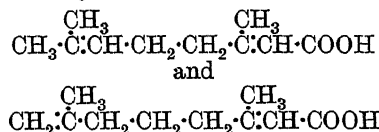
Geoffroyin.

See Surinamine.

Geranial.

See Citral.

Geranic Acid (2:6-Dimethyl-1:5-heptadiene-1-carboxylic acid and 2:6-dimethyl-1:6-heptadiene-1-carboxylic acid)



$C_{10}H_{16}O_2$ MW, 168

A mixture of the above isomers. B.p. 158°/14 mm., 153°/11 mm. $D_4^{19.4}$ 0.9518. $n_D^{20.2}$ 1.48695.

Me ester: $C_{11}H_{18}O_2$. MW, 182. B.p. 117°/14 mm. D_4^{20} 0.9220. $n_D^{19.1}$ 1.47143.

Et ester: $C_{12}H_{20}O_2$. MW, 196. B.p. 110-20°.

n-Heptyl ester: $C_{17}H_{30}O_2$. MW, 266. B.p. 150°/3 mm. D_4^{15} 0.8985. n_D^{20} 1.4669.

p-Phenylphenacyl ester: m.p. 79-80°.

p-Bromophenacyl ester: m.p. 67°.

Nitrile: $C_{10}H_{15}N$. MW, 149. B.p. 138–40°/15 mm., 110°/10 mm. D^{20}_D 0.8709. n^{20}_D 1.4759.

Tiemann, *Ber.*, 1898, 31, 827.

Verley, *Bull. soc. chim.*, 1919, 25, 70.

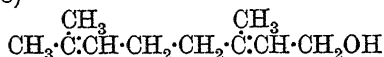
Geraniene

$C_{10}H_{16}$ MW, 136

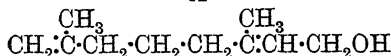
B.p. 162–4°. D^{20}_D 0.8425.

Jacobsen, *Ann.*, 1871, 157, 239.

Geraniol (2:6-Dimethyl-2:6(or 2:7)-octadienol-8)



or



$C_{10}H_{18}O$ MW, 154

Occurs in oils of *Andropogon schoenanthus*, Linn., *Pelargonium odoratissimum*, Ait., rose, palmarosa, etc. Liq. at –15°. B.p. 230°, 129°/25 mm., 122°/29 mm., 121°/18 mm., 120.5–122.5°/17 mm., 110.5–111°/10 mm., 107–107.6°/8 mm., 94°/3 mm. D^{20}_D 0.8894. n^{20}_D 1.4766. Sol. EtOH, Et₂O. Insol. H₂O.

Et ether: $C_{12}H_{22}O$. MW, 182. B.p. 218°, 115°/19 mm. D^{25}_D 0.864.

Formyl: geranyl formate. B.p. 113–14°/15 mm., 104.5°/10–11 mm.

Acetyl: geranyl acetate. Occurs in citronella, orange flower and other volatile oils. B.p. 242–5°/764 mm. decomp., 130–2°/22 mm., 127.8–129.2°/16 mm., 129–130.5°/14.5 mm., 110–15°/10–11 mm. D^{15}_D 0.9174. n^{15}_D 1.4628.

Butyryl: geranyl butyrate. B.p. 151–3°/18 mm., 142–3°/13 mm. D^{17}_D 0.9008.

Isobutyryl: geranyl isobutyrate. B.p. 135–7°/13 mm.

Benzoyl deriv.: geranyl benzoate. B.p. 198–200°/15 mm., 194–5°/12 mm.

Acrylyl: geranyl acrylate. B.p. 116°/6.2 mm. D^{20}_D 0.9121. n^{20}_D 1.4690.

Acetoacetyl: geranyl acetoacetate. B.p. 79–80°/0.006 mm. D^{25}_D 0.9625. n^{25}_D 1.4670.

Allophanate: m.p. 124–4.5°.

Diphenylurethane: m.p. 82°.

Valli-Douau, *Revue de Parfumerie*, 1925, 5, 10 (Review).

Kötz, Steche, *J. prakt. Chem.*, 1924, 107, 193.

Labo, *Chimie et Industrie*, 1923, 10, 931.

Forster, Cardwell, *J. Chem. Soc.*, 1913, 103, 1342.

Sachs, *Perfumer's Journal*, 1926, 7, iii, 11, 32; iv, 11.

Dubosc, *Parfumerie moderne*, 1925, 18, 98, 196.

Verley, *Bull. soc. chim.*, 1919, 25, 73.

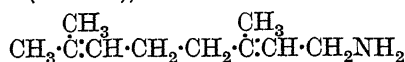
Geraniolene.

See 2:6-Dimethyl-1:5-heptadiene.

Geranyl acetate.

See under Geraniol.

Geranylamine (3:7-Dimethyl-2:6(or 2:7)-octadienylamine, 1-amino-3:7-dimethyloctadiene-2:6(or 2:7))



$C_{10}H_{19}N$ MW, 153

Liq. B.p. 90–6°/11 mm.

B,HCl: m.p. 142–4° (145–6°).

N-Acetyl: b.p. 191°/18 mm.

N-Benzylidene: b.p. 220°/20 mm.

Picrate: m.p. 117–19°.

Forster, Cardwell, *J. Chem. Soc.*, 1913, 103, 1343.

Geranyl benzoate.

See under Geraniol.

Geranyl butyrate.

See under Geraniol.

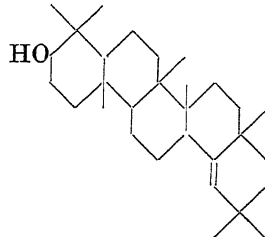
Geranyl formate.

See under Geraniol.

Geranyl isobutyrate.

See under Geraniol.

Germanicol



$C_{30}H_{50}O$

MW, 426

Triterpene present in *Lactucarium germanicum* and *Euphorbia balsamifera*. M.p. 176–7°. $[\alpha]^{17}_D$ +5.8°. Probably identical with γ -allolupeol, *q.v.*

Acetyl: m.p. 274–6°. $[\alpha]^{20}_D$ +18.1°.

Benzoyl: m.p. 269–70°. $[\alpha]^{19}_D$ +39°.

Simpson, *J. Chem. Soc.*, 1944, 283.

Dupont, Kopaczewski, Brodski, *Bull. soc. chim.*, 1947, 1068.

David, *Bull. soc. chim.*, 1949, 155, 427; 1950, 169.

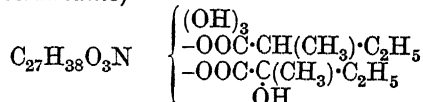
Barton, Brooks, *J. Chem. Soc.*, 1951, 257.

Ames, Davy, Halsall, Jones, Meakins, *Chemistry and Industry*, 1951, 741.

Germanin.

See Bayer 205.

Germerine (Methylethylglycollic acid ester of protoveratridine)



$C_{37}H_{59}O_{11}N$ MW, 693

Alkaloid isolated from *Veratrum album*. Leaf-lets + 1H₂O from C₆H₆. M.p. 193–5° (corr.)

decomp. Very sol. MeOH, CHCl_3 . Sol. EtOH, Me_2CO , AcOEt. Spar. sol. Et_2O . $[\alpha]_D^{25} + 10.8^\circ$ in CHCl_3 . Very hygroscopic when anhydrous.

B.HCl: cryst. + $2\text{H}_2\text{O}$ from CHCl_3 . M.p. 215° (corr.) decomp.

B.HBr: cryst. + $2\text{H}_2\text{O}$ from H_2O . M.p. $212-13^\circ$ (corr.) decomp.

B.HSCN: plates + H_2O from EtOH.Aq. M.p. $221-3^\circ$ (corr.) decomp.

Monopicate: yellow cryst. + H_2O from $\text{Me}_2\text{CO}-\text{Et}_2\text{O}$. M.p. $186-7^\circ$ (corr.) decomp.

Poethke, *Arch. Pharm.*, 1937, 275, 571.

Germinine

$\text{C}_{34}\text{H}_{53}\text{O}_{10}\text{N}$ MW, 635

Alkaloid of *Veratrum viride*. Cryst. from MeOH.Aq. M.p. $220-3^\circ$. $[\alpha]_D^{25} + 13^\circ$ in CHCl_3 . Hyd. \rightarrow germinine + acetic acid + *l*-1-methylbutyric acid. Blood pressure depressant.

Fried, White, Wintersteiner, *J. Am. Chem. Soc.*, 1949, 71, 3260.

Germinine

$\text{C}_{27}\text{H}_{43}\text{O}_8\text{N}$ MW, 509

Alkaloid of *Veratrum album*. Cryst. from MeOH with 2 mols. MeOH. M.p. 220° (effervesces at $163-73^\circ$). $[\alpha]_D^{25} + 5.0^\circ$ in 95% EtOH. $\text{NaOH}-\text{MeOH}-\text{H}_2\text{O} \rightarrow$ isogermine. Se \rightarrow 5-methyl-2-ethyl-pyridine.

Dihydro deriv.: m.p. 265° . $[\alpha]_D^{25} - 57^\circ$ in Py. *Hydrochloride*: m.p. 250° decomp.

Acetone deriv.: m.p. $235-9^\circ$. *Hydrochloride*: m.p. 275° decomp.

Craig, Jacobs, *J. Biol. Chem.*, 1943, 148, 57; 149, 451.

Heubner, Jacobs, *J. Biol. Chem.*, 1947, 170, 181.

Jacobs, Sato, *J. Biol. Chem.*, 1947, 175, 57.

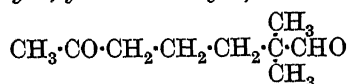
Germitrine

$\text{C}_{42}\text{H}_{67}\text{O}_{13}\text{N}$ MW, 793

Alkaloid of *Veratrum viride*. Cryst. from EtOH.Aq. M.p. $197-9^\circ$. $[\alpha]_D^{25} + 11^\circ$ in CHCl_3 . Hyd. \rightarrow germinine + *l*-1-methylbutyric acid + *d*-1-hydroxy-1-methylbutyric acid. Blood pressure depressant.

Fried, White, Wintersteiner, *J. Am. Chem. Soc.*, 1949, 71, 3260.

Geronaldehyde (1:1-Dimethyl-4-aceto-*n*-valeraldehyde, geronic aldehyde)

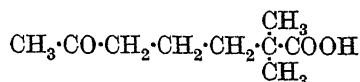


$\text{C}_9\text{H}_{16}\text{O}_2$ MW, 156

B.p. $48-50^\circ/3$ mm.

Pummerer, Rebmann, Reindel, *Ber.*, 1931, 64, 497.

Geronic Acid (1:1-Dimethyl-4-aceto-*n*-valeric acid)



$\text{C}_9\text{H}_{16}\text{O}_3$ MW, 172

B.p. $275-80^\circ/740$ mm., $190-1^\circ/31$ mm., $169^\circ/12$ mm., $132^\circ/2$ mm. Sol. EtOH, Et_2O . D_4^{20} 1.0211. n_D^{20} 1.44883. $\text{HNO}_3 \rightarrow$ 1:1-dimethylglutaric acid.

Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_3$. MW, 200. B.p. $121-2^\circ/12$ mm.

Oxime: m.p. $93-4^\circ$.

Semicarbazone: m.p. 164° .

2:4-Dinitrophenylhydrazones: m.p. $135-5-137^\circ$.

Masson, *Compt. rend.*, 1912, 154, 518.

Pummerer, Rebmann, Reindel, *Ber.*, 1931, 64, 494.

Strain, *J. Biol. Chem.*, 1933, 102, 137.

Geronic Aldehyde.

See Geronaldehyde.

Gheddic Acid

$\text{C}_{34}\text{H}_{68}\text{O}_2$ MW, 508

Constituent of Ghedda or East Indian Wax from *Apis dorsata*, *A. florea* and *A. indica*. Needles from AcOEt. M.p. $94.5-95^\circ$. Spar. sol. Et_2O .

Lipp, Casimir, *J. prakt. Chem.*, 1919, 99, 263.

Giberellin A

$\text{C}_{22}\text{H}_{26}\text{O}_7$ MW, 402

Constituent of bakanae fungus. Colourless cryst. Decomp. at $242-4^\circ$. $[\alpha]_D + 36.1^\circ$. Hot NH_3 . EtOH.Aq. or hot acids \rightarrow giberellin B. $\text{H}_2\text{SO}_4 \rightarrow$ blood-red \rightarrow blue col.

Me ether: $\text{C}_{23}\text{H}_{28}\text{O}_7$. MW, 416. Cryst. M.p. $185-7^\circ$.

Acetyl deriv.: cryst. M.p. $233-8^\circ$.

Me ester: $\text{C}_{23}\text{H}_{28}\text{O}_7$. MW, 416. M.p. $220-1^\circ$. *p*-Bromophenacyl ester: m.p. $188-90^\circ$.

Yabuta et al., *Journal of the Agricultural Chemical Society of Japan*, 1950, 16, 1157, (*Chem. Abstracts*, 1950, 44, 10814).

Giberellin B

$\text{C}_{19}\text{H}_{22}\text{O}_3$ MW, 298

Cryst. M.p. $197-9^\circ$. Sol. MeOH, EtOH. Spar. sol. aromatic solvents. $[\alpha]_D - 82.3^\circ$. No col. with H_2SO_4 .

Yabuta et al., *Journal of the Agricultural Chemical Society of Japan*, 1950, 16, 1157, (*Chem. Abstracts*, 1950, 44, 10814).

Giberellin C

$\text{C}_{22}\text{H}_{28}\text{O}_8$ MW, 420

Obtained by hyd. of giberellin A. Cryst. M.p. 251-2° decomp. $[\alpha]_D^{25} + 49.9^\circ$.

Yabuta *et al.*, *Journal of the Agricultural Chemical Society of Japan*, 1950, 16, 1157, (*Chem. Abstracts*, 1950, 44, 10814).

Giganteol

$C_{30}H_{50}O_2$ MW, 442

Present in *Calotropis gigantea*. Rods and plates. M.p. 224°. $[\alpha]_D^{25} + 110.9^\circ$.

Acetyl: cryst. from AcOEt. M.p. 252-3°. $[\alpha]_D^{25} + 103.8^\circ$ in C_6H_6 .

Murti, Seshadri, *Proc. Indian Acad. Sci.*, 1945, 22A, 138.

Gigantic Acid.

See *n*-Amylpenicillin.

Gigantin

$C_{24}H_{36}O_9$ MW, 468

Highly poisonous constituent of juice of madar (*Calotropis gigantea*). Amorphous. M.p. 232° decomp.

Pitchandi, *Chem. Abstracts*, 1948, 42, 6894.

Giloin

$C_{23}H_{32}O_{10}$ MW, 468

Occurs in stems of *Tinospora cordifolia*. Cryst. + $5\frac{1}{2}H_2O$. M.p. 226-8°. $[\alpha]_D^{25} + 69.5^\circ$ in EtOH. Reduces Fehling's. $H_2SO_4 \rightarrow$ dark red sol.

Kidwai, Salooja, Sharms, Siddiqui, *Journal of Scientific and Industrial Research (India)*, 1949, 8B, No. 7, 115, (*Chem. Abstracts*, 1950, 44, 1520).

Giloinin

$C_{17}H_{18}O_5$ MW, 302

Occurs in stems of *Tinospora cordifolia*. Needles. M.p. 210-11°. $[\alpha]_D^{25} + 40^\circ$ in Me_2CO .

Kidwai, Salooja, Sharms, Siddiqui, *Journal of Scientific and Industrial Research (India)*, 1949, 8B, No. 7, 115, (*Chem. Abstracts*, 1950, 44, 1520).

Gilonisterol

$C_{28}H_{48}O$ MW, 400

Occurs in stems of *Tinospora cordifolia*. Needles from light petroleum- Me_2CO . M.p. 190-2°. $[\alpha]_D^{25} + 92.8^\circ$ in EtOH.

Acetyl deriv.: m.p. 234°.

Kidwai, Salooja, Sharms, Siddiqui, *Journal of Scientific and Industrial Research (India)*, 1949, 8B, No. 7, 115, (*Chem. Abstracts*, 1950, 44, 1520).

Gingerol

$C_6H_3(OH)(OCH_3) \cdot CH_2 \cdot CH_2 \cdot CO \cdot CH_2 \cdot CH(OH) \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot CH_2$

$C_{17}H_{26}O_4$ MW, 294

Occurs in rhizome of *Zingiber officinale*, Rosc. Not obtained pure. B.p. 235-40°/18 mm., 227-9°/6 mm. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Mod. sol. hot pet. ether. $D_{20}^{20} 1.0713$. $n_D^{20} 1.5212$. $[\alpha]_D^{25} + 12.9^\circ$.

Me ether: $C_{18}H_{28}O_4$. MW, 308. M.p. 63-5-64°. $[\alpha]_D^{25} + 9.04^\circ$ in EtOH. Oxime: m.p. 85.5-86.5°.

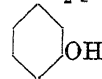
Nomura, Iwamoto, *Science Reports Tokyo Imperial University*, 1928, 17, 973; 1929, 18, 661.

Redgrove, *Pharm. J.*, 1930, 125, 54 (*Bibl., Review*).

Lapworth, Pearson, Royle, *J. Chem. Soc.*, 1917, 111, 777.

Ginkgol (*m*-Hydroxypentadecenylbenzene, 15-*m*-hydroxyphenylpentadecylene-7)

$CH_2 \cdot [CH_2]_6 \cdot CH:CH \cdot [CH_2]_5 \cdot CH_3$



$C_{21}H_{34}O$ MW, 302

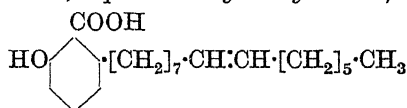
B.p. 221-3°/4 mm. Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{22}H_{36}O$. MW, 316. B.p. 224-8°/7 mm.

Kawamura, *Japan J. Chem.*, 1928, 3, 89.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 24, 304.

Ginkgolic Acid (6-Hydroxy-2-pentadecenylbenzoic acid, 6-pentadecenylsalicylic acid)



$C_{22}H_{34}O_3$ MW, 346

Constituent of *Ginkgo biloba*, Linn. Needles from pet. ether. M.p. 42-3°. Alc. $FeCl_3 \rightarrow$ violet col. Conc. $H_2SO_4 \rightarrow$ yellow sol. with green fluor. Heat \rightarrow ginkgol + CO_2 .

Me ether: $C_{23}H_{36}O_3$. MW, 360. Me ester: $C_{24}H_{38}O_3$. MW, 374. B.p. 230-3°/2 mm. No col. with alc. $FeCl_3$.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, 26, 178.

Kawamura, *Japan J. Chem.*, 1928, 3, 89.

Ginnol

$C_{27}H_{56}O$ MW, 396

Constituent of *Ginkgo biloba*, Linn. Cryst. from EtOH or Me_2CO . M.p. 82.5°. Sol. Et_2O , C_6H_6 , $CHCl_3$, pet. ether. Spar. sol. EtOH, MeOH.

Acetyl deriv.: plates from Me_2CO . M.p. 43-43.5°.

Kawamura, *Japan J. Chem.*, 1928, 3, 100.

Ginnone

$C_{27}H_{54}O$ MW, 394
Cryst. from EtOH.Aq. M.p. 74–5°.
Oxime : needles from EtOH. M.p. 49–50°.
Semicarbazone : cryst. from EtOH.Aq. M.p. 45–6°.

Kawamura, *Japan J. Chem.*, 1928, 3, 101.

Gitaligenin

$C_{11}H_{18}O_3$ MW, 198
Hydrolysis product of gitalin. Needles. M.p. 222°.

Cloetta, *Chem. Abstracts*, 1926, 20, 2724.

Gitalin (ψ -Digitonin)

$C_{17}H_{28}O_6$ MW, 328
Glucoside obtained from *Digitalis purpurea*, Linn. (foxglove). M.p. 245°. Sol. EtOH, $CHCl_3$, Me_2CO . $[\alpha]_D^{15} -25.2^\circ$ in $CHCl_3$.

Steppun, *Chem. Abstracts*, 1929, 23, 1213.
Windaus, *Chem. Abstracts*, 1930, 24, 4789.

Maneli, *Giorn. chim. ind. applicata*, 1922, 4, 355.

Cloetta, *Chem. Abstracts*, 1926, 20, 2724.

Githagenin

$C_{28}H_{44}O_4$ MW, 456
Occurs in *Lychnis githago*, Scop., (corn cockle seed). M.p. 286–7° decomp. $[\alpha]_D +77.3^\circ$.
Diacetyl deriv. : m.p. 187–8°.
Oxime : m.p. 155–7° decomp.
Semicarbazone : m.p. 292° decomp.

Wedekind, Schicke, *Z. physiol. Chem.*, 1929, 182, 72; 1930, 190, 1.

Githagic Acid

$C_{28}H_{42}O_6$ MW, 486
M.p. 223–4°.
Dioxime : m.p. 225° decomp.

Wedekind, Schicke, *Z. physiol. Chem.*, 1929, 182, 72; 1930, 190, 1.

Githagoic Acid

$C_{28}H_{44}O_5$ MW, 460
M.p. 359°. $[\alpha]_D +91.6^\circ$.
Di-Me ester : $C_{30}H_{48}O_5$. MW, 488. M.p. 247°. $[\alpha]_D +77^\circ$.

Wedekind, Schicke, *Z. physiol. Chem.*, 1930, 190, 1.

Githagonolic Acid

$C_{25}H_{38}O_4$ MW, 402
Cryst. + $1H_2O$. M.p. 364°.
Me ester : $C_{26}H_{40}O_4$. MW, 416. M.p. 234–5°. Mono-acetyl deriv. : m.p. 171°.
Mono-acetyl deriv. : m.p. 321°.

Wedekind, Schicke, *Z. physiol. Chem.*, 1930, 190, 1.

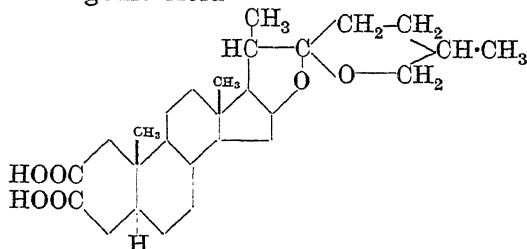
Dict. of Org. Comp.—II.

Gitin

$C_{55}H_{94}O_{28}$ MW, 1202
Glycoside from digitalis leaves. M.p. 265°.
Hyd. \rightarrow galactose + digitogenin.

Kraft, *Chem. Zentr.*, 1912, I, 1576.

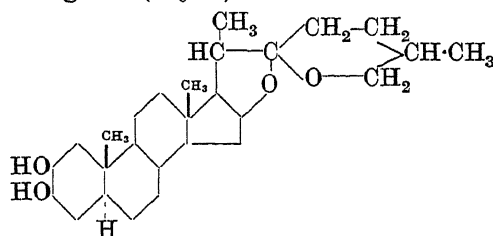
Kobert, *ibid.*, II, 947.

Gitogenic Acid

$C_{27}H_{42}O_6$ MW, 462
Leaflets. M.p. 242–3°.

Windaus, Linsert, *Z. physiol. Chem.*, 1925, 147, 275.

Tschesche, Hagedorn, *Ber.*, 1936, 69, 797.
Noller, *J. Am. Chem. Soc.*, 1937, 59, 1092.

Gitogenin (Digine)

$C_{27}H_{44}O_4$ MW, 432
Leaflets. M.p. 271–2°. Se \rightarrow γ -methylcyclopentenophenanthrene.

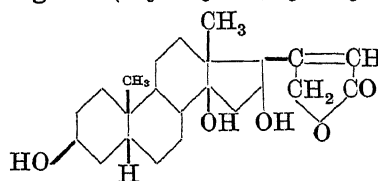
Diacetyl deriv. : m.p. 243–4° (266–8°).

Dipropionyl deriv. : m.p. 195–6°.

Jacobs, Simpson, *J. Am. Chem. Soc.*, 1934, 56, 1424; *J. Biol. Chem.*, 1935, 110, 429.

Windaus, Linsert, *Z. physiol. Chem.*, 1925, 147, 275.

Tschesche, Hagedorn, *Ber.*, 1936, 69, 797.

Gitoxigenin (Bigitaligenin, hydroxydigitoxin)

$C_{23}H_{34}O_5$ MW, 390
Leaflets from MeOH. M.p. 231–2° (224–5° decomp.).

(3?)-Acetyl : m.p. 236–8°.

16-Acetyl: oleandrigenin. Needles from EtOH.Aq. M.p. 110–15°. $[\alpha]_D^{25} - 8.5^\circ$.

Diacetyl deriv.: m.p. 249–50°.

Dibenzoyl deriv.: m.p. 262°.

Dinicotinate: m.p. 250–1°. $[\alpha]_D^{25} + 30.7^\circ$ in CHCl_3 .

Jacobs, Elderfield, *J. Biol. Chem.*, 1935, 108, 497.

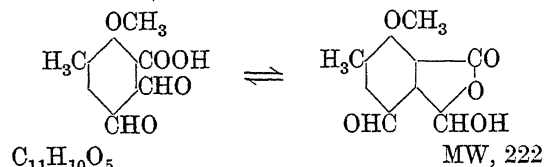
Gitoxin (*Anhydrogitalin, bigitalin*)

$\text{C}_{41}\text{H}_{64}\text{O}_{14}$ MW, 780

Glycoside from digitalis leaves. M.p. 266–9° (varies with rate of heating). Spar. sol. H_2O , EtOH, CHCl_3 . Hyd. \rightarrow gitoxigenin + 3 mols. digitoxose.

Windaus, Westphal, Stein, *Ber.*, 1928, 61, 1847.

Gladiolic Acid (2-Methoxy-4:5-dialdehydo-m-toluic acid)



Antifungal metabolic product of *Penicillium gladioli*. Needles from H_2O . M.p. 160°. Sol. hot H_2O , Me_2CO , EtOH, dioxan, AcOH. Spar. sol. cold H_2O , CHCl_3 , Et_2O . Very spar. sol. CCl_4 , C_6H_6 , light petroleum. Yellow sols. in alkalis.

Me ester: $\text{C}_{12}\text{H}_{12}\text{O}_5$. MW, 236. Needles from MeOH. M.p. 140°. Insol. H_2O . Phenylhydrazone: prisms. M.p. 160°. 2:4-Dinitrophenylhydrazone: m.p. 245–50° decomp.

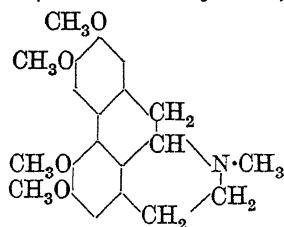
Et ester: $\text{C}_{13}\text{H}_{14}\text{O}_5$. MW, 250. Needles from EtOH. M.p. 105°. Semicarbazone: m.p. 190°.

Grove, *Biochem. J.*, 1952, 50, 648.

Brian *et al.*, *Nature*, 1946, 157, 697.

Brian, Curtis, Hemming, *J. gen. Microbiol.*, 1948, 2, 341.

Glaucine (*Boldine dimethyl ether*)



$\text{C}_{21}\text{H}_{25}\text{O}_4\text{N}$ MW, 355

Alkaloid from *Glaucium flavum*, Crants, and *Corydalis tuberosa*, D.C. Yellow prisms.

dl.

M.p. 119–20°. $[\alpha]_D + 115.4^\circ$ in EtOH.Aq.

l.

M.p. 124–5° (119–20°). $[\alpha]_D - 115.4^\circ$ in EtOH.Aq. Sol. ord. org. solvents. Insol. H_2O , pet. ether.

$\text{B, HCl, 3H}_2\text{O}$: decomp. at 243–6°. $[\alpha]_D^{25} - 57.10^\circ$.

B, HBr : decomp. at 241°. $[\alpha]_D^{17} - 98.04^\circ$.

d-Hydrogen tartrate: m.p. 216–17°. $[\alpha]_D^{18} - 44.12^\circ$.

l-Hydrogen tartrate: m.p. 165°.

Methiodide: m.p. 224–5°. $[\alpha]_D^{17} - 72.46^\circ$.

dl.

M.p. 137–9°.

Gorter, *Chem. Zentr.*, 1921, III, 345.

Girardet, *J. Chem. Soc.*, 1931, 2630.

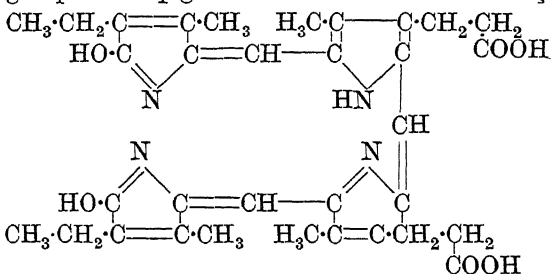
Go, *Chem. Abstracts*, 1931, 25, 518.

Warmut, *Ber.*, 1926, 59, 85.

Gadamer, *Chem. Zentr.*, 1912, I, 151.

Glucobilin III α

[Note. The term glucobilin applies to a group of bile pigments derived from bilitriene.]

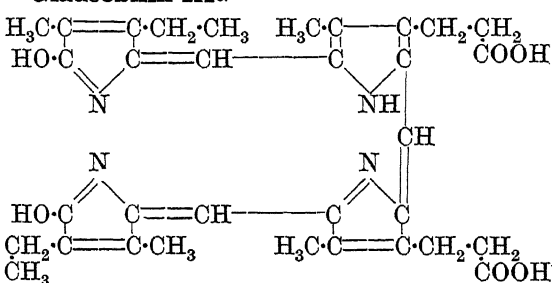


$\text{C}_{33}\text{H}_{38}\text{O}_6\text{N}_4$ MW, 586

Di-Me ester: $\text{C}_{35}\text{H}_{42}\text{O}_6\text{N}_4$. MW, 614. Violet. M.p. 237.5–8.5°.

Siedel, *Z. physiol. Chem.*, 1935, 237, 8.

Glucobilin IX α



$\text{C}_{33}\text{H}_{38}\text{O}_6\text{N}_4$ MW, 586

Greenish-blue prisms from MeOH. Sinters at 205–20°. M.p. 304° (316°) decomp.

Di-Me ester: violet iridescent needles. M.p. 216° (232°).

Ferrichloride: ferrobilin IX α . $\text{C}_{33}\text{H}_{38}\text{O}_6\text{N}_4$, FeCl_3 , HCl. MW, 785. Blue needles. M.p. 260° (265°) decomp. Sol. EtOH, MeOH. Spar. sol. AcOH, CHCl_3 . Sols. green. *Di-Me ester*: $\text{C}_{35}\text{H}_{42}\text{O}_6\text{N}_4$, FeCl_3 , HCl. MW, 813. (a) M.p. 255° (263–4°): (b) m.p. 244°.

Zn deriv.: $C_{35}H_{40}O_6N_4Zn$. MW, 677. M.p. 305°.

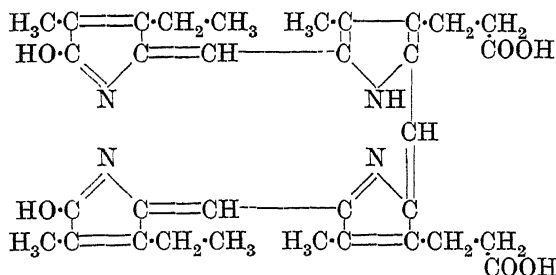
Fischer, Baumgartner, Hess, *Z. physiol. Chem.*, 1932, 206, 201.

Stier, *Z. physiol. Chem.*, 1942, 273, 47.

Siedel, Grams, *Z. physiol. Chem.*, 1940, 267, 37.

Siedel, *Z. physiol. Chem.*, 1935, 237, 8.

Glaucobilin XIII α



$C_{33}H_{38}O_6N_4$ MW, 586

Di-Me ester: violet needles. M.p. 246-7°.

Ferrichloride: ferrobilin XIII α . M.p. 275°.

Di-Me ester: m.p. 282.5°.

Siedel, *Z. physiol. Chem.*, 1935, 237, 8.

Glauconic Acid.

There are two acids of this name.

(i) $C_{18}H_{20}O_7$. MW, 348. Prisms from AcOH. M.p. 202°. $[\alpha]_D^{20} -42.6^\circ$. Sol. AcOH, AcOEt, Py. Spar. sol. EtOH, Et₂O, C₆H₆, pet. ether.

Di-Me ester: $C_{20}H_{24}O_7$. MW, 376. M.p. 77°.

Di-Et ester: $C_{22}H_{28}O_7$. MW, 404. M.p. 153-4°.

Kraft, *Ann.*, 1937, 530, 20.

(ii) $C_{18}H_{20}O_6$. MW, 332. Cryst. from EtOH. M.p. 186°. $[\alpha]_D^{20} +189.6^\circ$ in CHCl₃.

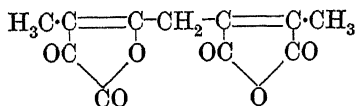
Di-Me ester: $C_{20}H_{24}O_6$. MW, 360. M.p. 145°.

Mono-acetyl deriv.: m.p. 175°.

Mono-benzoyl deriv.: m.p. 170°.

Wijkman, *Ann.*, 1931, 485, 61.

Glaucenin



Suggested structure

$C_{11}H_8O_6$ MW, 236

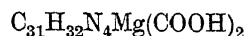
Obtained by pyrolysis of glauconic acid ($C_{18}H_{20}O_7$). Opening of the anhydride ring gives following "esters":

"*Di-Me ester*": m.p. 77°.

"*Di-Et ester*": oil. 2:4-Dinitrophenylhydrazine: m.p. 153-4°.

Kraft, *Ann.*, 1937, 530, 20.

Glaucophyllin

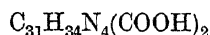


$C_{33}H_{34}O_4N_4Mg$ MW, 574

Prisms with blue sheen from Et₂O. Sol. Me₂CO, Py. Mod. sol. EtOH. Insol. H₂O, CHCl₃, C₆H₆, CS₂, pet. ether. Sols. have intense red col.

Willstätter, *Ber.*, 1914, 47, 2854; *Ann.*, 1909, 371, 61.

Glaucoporphyryn



$C_{33}H_{36}O_4N_4$ MW, 552

Reddish-violet needles from Py-AcOEt. Begins to melt at 270°, m.p. 290-5° decomp. Sol. Py, formic acid. Spar. sol. EtOH, Et₂O. Insol. CHCl₃.

Willstätter, *Ber.*, 1914, 47, 2843, 2854; *Ann.*, 1909, 371, 87.

Glaucorigenin

$C_{23}H_{32}O_6$ MW, 404

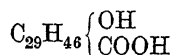
Aglycone from *Coronilla glauca*. M.p. 228°. $[\alpha]_D^{20} -86.3^\circ$.

Diacetyl deriv.: m.p. 295-6°. $[\alpha]_D^{25} -193^\circ$.

Oxime: m.p. 251°.

Stoll, Pereira, Renz, *Helv. Chim. Acta*, 1949, 32, 293.

Gledigenin



$C_{30}H_{48}O_3$ MW, 456

Mono-unsaturated sapogenin obtained from fruits of Chinese *Gleditsia*. Plates. M.p. 310° (corr.) decomp.

Et ester: needles. M.p. 203° corr. *Acetyl*: tablets. M.p. 184° corr.

Acetyl: rods. M.p. 264° corr.

Benzoyl: scales. M.p. 217° corr.

Bromolactone: needles. M.p. 235° (corr.) decomp.

Fujii, Matsukawa, *J. Pharm. Soc. Japan*, 1935, 55, 1322.

Globulol

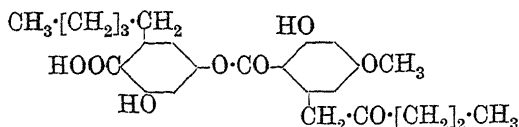
$C_{15}H_{26}O$ MW, 222

Occurs in oil of *Eucalyptus globulus*. B.p. 283°/755 mm. $[\alpha]_D^{20} -35.29^\circ$ in CHCl₃.

Burke, Scalione, *Ind. Eng. Chem.*, 1915, 7, 206.

Semmler, Tobias, *Ber.*, 1913, 46, 2026.

Glomelliferic Acid



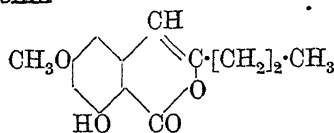
Suggested structure

 $\text{C}_{25}\text{H}_{30}\text{O}_8$

MW, 458

Depside present in *Parmelia glomellifera*, Nyl.Asahina, Nogami, *Ber.*, 1937, 70, 1498.Zopf, *Ann.*, 1902, 321, 49.

Glomellin



Suggested structure

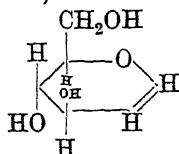
 $\text{C}_{13}\text{H}_{14}\text{O}_4$

MW, 234

Obtained by the action of alkali on glomelliferic acid. M.p. 123–4°.

Asahina, Nogami, *Ber.*, 1937, 70, 1498.

Glucal (Mannal)

 $\text{C}_6\text{H}_{10}\text{O}_4$

MW, 146

Hygroscopic needles. M.p. 60°. $[\alpha]_D^{19} - 7.2^\circ$ in H_2O . Very sol. H_2O .3:4:6-Tri-Me ether: $\text{C}_9\text{H}_{16}\text{O}_4$. MW, 188. B.p. 45°/0.03 mm. n_D^{20} 1.4558. $[\alpha]_D^{18} + 19.6^\circ$ in H_2O .3:4:6-Triacetyl: m.p. 54.5°. $[\alpha]_D - 15.5^\circ$ in EtOH.3:4-Diacetyl-6-benzoyl: m.p. 92–3°. $[\alpha]_D^{25} + 37.7^\circ$ in CHCl_3 .Hirst, Woolvin, *J. Chem. Soc.*, 1931, 1131.Brigl, Grüner, *Ann.*, 1932, 495, 75.Gehre, Obst, *Ber.*, 1931, 64, 1728.Glucamine (*Pentahydroxy-1-amino-hexane, pentahydroxyhexylamine*) $\text{C}_6\text{H}_{15}\text{O}_5\text{N}$

MW, 181

d.-

Amorphous solid from MeOH. M.p. 127–8°. Sol. H_2O . Spar. sol. EtOH. Insol. Et₂O. $[\alpha]_D^{25} - 7.5^\circ$ in H_2O . Sweet taste. Strong base. Absorbs CO_2 from air and liberates NH_3 from ammonium salts. Does not reduce Fehling's. $\text{NaOBr} \rightarrow$ glucose. $\text{HI} + \text{red P}$ at 130° \rightarrow 1-amino-hexane. Stable to HCl at 125° or boiling conc. KOH.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: orange yellow prisms. M.p. 116–18°.

$\text{B}_2, (\text{COOH})_2$: plates from EtOH.Aq. M.p. about 180°.

O-Penta-acetyl: needles. M.p. 170°.

Hexa-acetyl: plates. M.p. 70°. B.p. 250°.

N-2:4-Dinitrophenyl: m.p. 151–2°.

N-2:4:6-Trinitrophenyl: yellow needles. M.p. 183°.

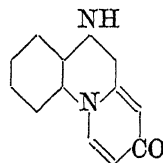
N-2:4-Dinitronaphthyl: orange red needles. M.p. 189°.

Flint, Salzberg, U.S.P. 2,016,962, (*Chem. Abstracts*, 1935, 29, 8007).

Wayne, Adkins, *J. Am. Chem. Soc.*, 1940, 62, 3314.

Roux, *Ann. chim. phys.*, 1904, 1, 77.

Glucazidone

 $\text{C}_{12}\text{H}_{10}\text{ON}_2$

MW, 198

Cryst. M.p. 104°. Sublimes.

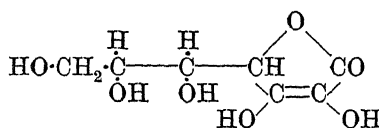
Hydrochloride: greenish-yellow. M.p. 184°.

Maurer, Schiedt, *Ber.*, 1934, 67, 1980.

Glucoacetovanillone.

See Androsin.

Gluco-ascorbic Acid

 $\text{C}_7\text{H}_{10}\text{O}_7$

MW, 206

Cryst. + $1\text{H}_2\text{O}$. M.p. 140°. $[\alpha]_D^{22} + 24^\circ$ in H_2O . Reduces Fehling's. $\text{FeCl}_3 \rightarrow$ deep bluish-violet col.

3-Me ether: m.p. 142°. $[\alpha]_D^{20} - 25^\circ$ in H_2O .

2:3-Di-Me ether: cryst. + $1\text{H}_2\text{O}$. M.p. 94°. $[\alpha]_D^{20} - 22^\circ$ in H_2O ; -7° in MeOH.

Penta-Me ether: m.p. 80°. $[\alpha]_D^{21} - 5^\circ$ in MeOH, $+21^\circ$ in CCl_4 .

Reichstein, Grüssner, Oppenauer, *Helv. Chim. Acta*, 1934, 17, 510.

Haworth, Hirst, Jones, *J. Chem. Soc.*, 1937, 549.

Glucobutein

 $\text{C}_{21}\text{H}_{22}\text{O}_{10}$

MW, 434

Pale yellow needles. M.p. 185–6°.

Tetra-acetyl: brownish-red needles. M.p. 193–4°.

Mauthner, *J. prakt. Chem.*, 1943, 161, 280.

α -Glucochloralose $C_8H_{11}O_6Cl_3$

MW, 309.5

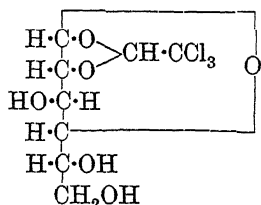
M.p. 187°.

Penta-acetyl deriv.: (1) m.p. 174°. $[\alpha]_D^{20} - 11.5^\circ$ in $CHCl_3$. (2) M.p. 151.5°. $[\alpha]_D^{20} + 66.2^\circ$ in $CHCl_3$.

White, Hixon, *J. Am. Chem. Soc.*, 1933, 55, 2438.

Pictet, Reichel, *Helv. Chim. Acta*, 1923, 6, 621.

β -Glucochloralose (*Parachloralose*, *anhydroglucochloral*)



Suggested structure

 $C_8H_{11}O_6Cl_3$

MW, 309.5

M.p. 227-9°.

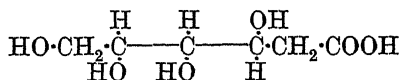
Triacetyl deriv.: m.p. 108°. $[\alpha]_D^{27} + 22.7^\circ$ in $CHCl_3$.

Penta-acetyl deriv.: m.p. 151°. $[\alpha]_D^{27} + 46.1^\circ$ in $CHCl_3$.

Tri-Me ether: $C_{11}H_{17}O_6Cl_3$. MW, 351.5. M.p. 109°.

Hixon *et al.*, *J. Am. Chem. Soc.*, 1933, 55, 2438; 1930, 52, 3191; 1929, 51, 519.

Glucodesonic Acid (2-Deoxygluconic acid)

 $C_6H_{12}O_6$

MW, 180

Cryst. M.p. 145°. $[\alpha]_D^{18} + 4.99^\circ$.

Lactone: $C_6H_{10}O_5$. MW, 162. M.p. 93-5°. $[\alpha]_D^{19} + 67.3-68.5^\circ$. *Tri-Me ether*: m.p. 62°. $[\alpha]_D^{18} + 20.45^\circ$.

Tetra-Me ether: m.p. 92-4°. *Me ester*: m.p. 81.5°. $[\alpha]_D^{18} + 84.2^\circ$. *Phenylhydrazide*: m.p. 113°.

Tetra-acetyl: m.p. 110°. *Phenylhydrazide*: m.p. 143°.

Phenylhydrazide: m.p. 176°.

Danilov, Gakhokidz, *J. Gen. Chem. U.S.S.R.*, 1936, 6, 704, (*Chem. Abstracts*, 1937, 31, 95).

Glucofrangulin (*Frangulin glucoside*) $C_{27}H_{30}O_{14}$

MW, 578

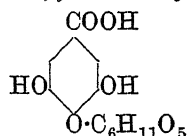
Occurs in frangula bark. Amorphous yellow solid + $1H_2O$. M.p. 215°. Sol. H_2O , MeOH, EtOH, AcOH, Py. Insol. C_6H_6 , $CHCl_3$, CS_2 ,

Et_2O . H_2SO_4 . Aq. \rightarrow frangula-emodin + glucose + rhamnose. Rhamnodiasase \rightarrow frangulin monohydrate (m.p. 232°) + glucose.

Octa-acetyl: m.p. 226-7°. $[\alpha]_D^{20} - 140^\circ \pm 5^\circ$ in Me_2CO .

Casparis, Maeder, *Bull. soc. chim. biol.*, 1927, 9, 324; *Chem. Abstracts*, 1927, 21, 2169.

Glucogallic Acid (β -4-Glucosido-3:4:5-trihydroxybenzoic acid, gallic acid glucoside)

 $C_{13}H_{16}O_{10}$

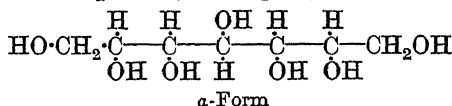
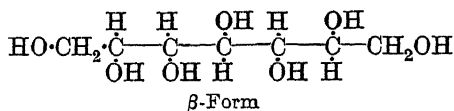
MW, 332

Occurs in galls. Grey prisms from Me_2CO . M.p. 233°. Sol. H_2O , EtOH. Reduces Fehling's.

Et ester: *tetra-acetyl deriv.*, m.p. 180-1°. $[\alpha]_D^{20} - 10.66^\circ$ in $C_2H_2Cl_4$. *Hexa-acetyl deriv.*, m.p. 176-7°. $[\alpha]_D^{18} - 19^\circ$ in $C_2H_2Cl_4$.

Me ether: $C_{14}H_{18}O_{10}$. MW, 346. M.p. 79°.

Fischer, *Ber.*, 1919, 52, 820 (*Bibl.*).

Glucoheptitol (*Glucoheptite*) α -Form β -Form $C_7H_{16}O_7$

MW, 212

 α -Form:

Prisms from MeOH. M.p. 134-5°. Sol. H_2O . Spar. sol. EtOH. Heat of comb. 841.2 Cal. Optically inactive.

Hepta-acetyl: plates from H_2O . M.p. 113°.

 β -Form:

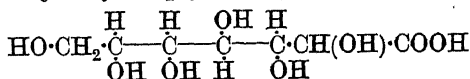
Plates from EtOH. M.p. 130-1°. Sol. H_2O . Spar. sol. EtOH. $[\alpha]_D^{10} + 0.48^\circ$ in H_2O .

Hepta-benzoyl: m.p. 182°.

Phillippe, *Compt. rend.*, 1909, 147, 1481.

Pictet, Barbier, *Helv. Chim. Acta*, 1921, 4, 924.

***d*-Glucoheptonic Acid** (1:2:3:4:5:6-Hexahydroxy-n-heptylic acid)

 $C_7H_{14}O_8$

MW, 226

 α -Form:

γ -Lactone: $C_7H_{12}O_7$. MW, 208. Prisms from H_2O . M.p. 156-7°. $[\alpha]_D^{20} + 41^\circ$ in H_2O .

Tetra-acetyl: m.p. 128°. $[\alpha]_D^{20}$ - 23.83°. 1:2:4:5:6-*Penta-Me ether*: $C_{12}H_{22}O_7$. MW, 278. M.p. 104°. $[\alpha]_D^{20}$ - 13.2° initial, in H_2O .

Amide: $C_7H_{15}O_7N$. MW, 225. M.p. 134-5° (129°). $[\alpha]_D^{20}$ + 10.6° in H_2O . *Hexa-acetyl*: m.p. 163°. $[\alpha]_D^{20}$ + 17.4° in $CHCl_3$.

Nitrile: *hexa-acetyl*, m.p. 112.5-113.5°. $[\alpha]_D^{21}$ + 24.6° in $CHCl_3$.

δ -*Lactone*: 1:2:3:5:6-*Penta-Me ether*: m.p. 83°. $[\alpha]_D^{17}$ + 40° initial, + 9° final, in H_2O .

Hexa-acetyl: *hemihydrate*, m.p. 94°. $[\alpha]_D^{25}$ + 10.7° in $CHCl_3$. *Monohydrate*, m.p. 88-90°. $[\alpha]_D^{25}$ + 6° in $CHCl_3$.

β -*Form*:

M.p. 134-5°.

γ -*Lactone*: $[\alpha]_D^{20}$ + 1.4°.

Amide: m.p. 158°.

Zemplén, Kiss, *Ber.*, 1927, 60, 169.

Rehorst, *Ann.*, 1933, 503, 163.

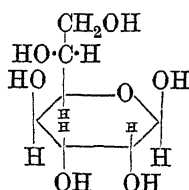
Philippe, *Ann. chim. phys.*, 1912, 26, 328.

Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1932, 2483.

Levene, Meyer, *J. Biol. Chem.*, 1925, 66, 173.

Liebrecht, B.P. 8,503, (*Chem. Abstracts*, 1913, 7, 3196).

d- α -Glucoheptose



$C_7H_{14}O_7$

MW, 210

Cryst. from H_2O . M.p. 193°. $[\alpha]_D^{20}$ - 20° in H_2O .

Methylglycoside: β -methyl- α -glucoheptoside. $C_8H_{16}O_7$. MW, 224. M.p. 169°. $[\alpha]_D$ - 75° in H_2O . *Penta-acetyl*: (α). M.p. 169°. $[\alpha]_D^{19}$ + 91° in $CHCl_3$. (β). M.p. 150°. $[\alpha]_D^{21}$ - 16° in $CHCl_3$.

2:3:4:6:7-*Penta-Me ether*: $C_{12}H_{24}O_7$. MW, 280. (β). M.p. 84°. $[\alpha]_D^{18}$ - 62.5°. *Methylglycoside*: methylglucoheptoside. $C_{13}H_{26}O_7$. MW, 294. B.p. 140°/0.08 mm. n_D^{25} 1.4487. $[\alpha]_D^{21}$ - 97° in H_2O .

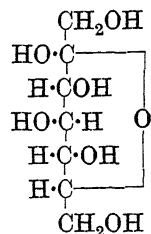
1:2:3:4:6:7-*Hexa-acetyl*: (α). M.p. 164°. $[\alpha]_D^{20}$ + 87° in $CHCl_3$. (β). M.p. 135°. $[\alpha]_D^{20}$ + 4.8° in $CHCl_3$.

Osazone: m.p. 194-5° decomp.

Hudson, Yanovsky, *J. Am. Chem. Soc.*, 1916, 38, 1575.

Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1931, 2864 (*Bibl.*).

Glucoheptulose



$C_7H_{14}O_7$

MW, 210

d-.

M.p. 171.4°. $[\alpha]_D^{20}$ + 67.4° in H_2O . Reduces Fehling's.

α -*Methylglycoside*: $C_8H_{16}O_7$. MW, 224. M.p. 138-40°. $[\alpha]_D^{22}$ + 108.5° in H_2O . *Penta-acetyl*: m.p. 110°. $[\alpha]_D^{22}$ + 78.5° in $CHCl_3$.

1:2:3:4:5:7-*Hexa-acetyl*: m.p. 112°. $[\alpha]_D^{22}$ + 87.0°.

Osazone: m.p. 209-10°.

Diacetone deriv.: m.p. 154°. $[\alpha]_D^{18}$ + 11° in EtOH.

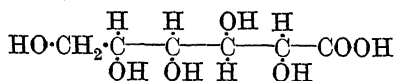
l-.

M.p. 173°. $[\alpha]_D$ - 67.8° in H_2O .

Austin, *J. Am. Chem. Soc.*, 1932, 54, 1925, 1933.

Bertrand, Nitzberg, *Bull. soc. chim.*, 1928, 43, 1019.

Gluconic Acid (1:2:3:4:5-Pentahydroxycaproic acid)



$C_6H_{12}O_7$

MW, 196

d-.

Syrup, readily converted to the lactone.

Et ester: $C_8H_{16}O_7$. MW, 224. M.p. 62-3°.

Penta-acetyl deriv.: m.p. 103.5°.

γ -*Lactone*: $C_6H_{10}O_6$. MW, 178. M.p. 134-6°. $[\alpha]_D$ + 67.5° initial, + 6.2° final, in H_2O .

Tetra-acetyl: m.p. 103°. $[\alpha]_D^{20}$ + 13.5°. 2:3:6-*Tri-Me ether*: $C_9H_{16}O_6$. MW, 220. M.p. 29-30°. B.p. 130°/0.05 mm. $[\alpha]_D^{18}$ + 55° initial, + 37.5° final. *Tetra-Me ether*: $C_{10}H_{18}O_6$. MW, 234. M.p. 26-27.5°. n_D^{20} 1.4770. $[\alpha]_D^{20}$ + 72° initial, + 38.8° final, in H_2O .

δ -*Lactone*: m.p. 153°. $[\alpha]_D$ + 63.5° initial, + 6.2° final. *Tetra-Me ether*: b.p. 101°/0.06 mm. n_D^{14} 1.4565. $[\alpha]_D^{22}$ + 101° initial, + 29.6° final, in H_2O .

Amide: $C_6H_{12}O_6N$. MW, 195. M.p. 143-4°. $[\alpha]_D^{20}$ + 31.2° in H_2O .

Methylamide: $C_7H_{15}O_6N$. MW, 209. M.p. 127°.

Nitrile: $C_6H_{11}O_5N$. MW, 177. M.p. 146°. *Penta-acetyl deriv.*: m.p. 83-4°. $[\alpha]_D^{22}$ + 46.2° in $CHCl_3$.

2:3:4:6-*Tetra-acetyl*: *monohydrate*, m.p. 114-15°. $[\alpha]_D^{20}$ - 5° in EtOH.

Penta-acetyl: *monohydrate*, m.p. 69-71°.

Triacetone deriv.: m.p. 111°. $[\alpha]_D^{25} + 31^\circ$.
Penta-Me ether: $C_{11}H_{22}O_7$. MW, 266. B.p. 155°/1 mm. $[\alpha]_D^{20} + 22.5^\circ$ in H_2O . *Me ester*: $C_{12}H_{24}O_7$. MW, 280. B.p. 100°/1 mm. $n_D^{15} 1.4412$.

l.
γ-Lactone: m.p. 134–5°. $[\alpha]_D - 68.7^\circ$ initial, –13.7° final in H_2O .

Carrington, Haworth, Hirst, *J. Am. Chem. Soc.*, 1933, 55, 1084.

Auricchio, *Industria chimica*, 1933, 8, 836.

Wohl, Wollenberg, *Ann.*, 1933, 500, 281.

Brackenbury, Upson, *J. Am. Chem. Soc.*, 1933, 55, 2512 (*Bibl.*).

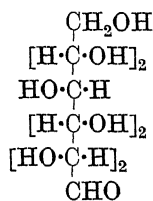
Haworth, Hirst, Miller, *J. Chem. Soc.*, 1927, 2439.

Upson, Sands, Whitnah, *J. Am. Chem. Soc.*, 1928, 56, 519.

Gluconolactone.

See Lactones under Gluconic Acid.

ααα-*d*-Gluco-nonose



$C_9H_{18}O_9$

MW, 270

$[\alpha]_D^{15} + 13.5^\circ$ in H_2O .

Phenylhydrazone: m.p. 224–5°.

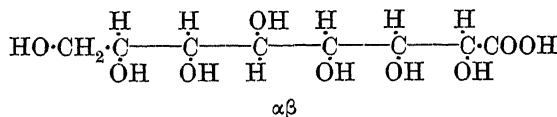
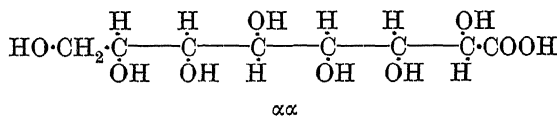
Osazone: m.p. 244°.

Philippe, *Ann. chim.*, 1912, 26, 362.

Fischer, *Ann.*, 1892, 270, 104.

Anderson, *J. Am. Chem. Soc.*, 1911, 33, 1513.

d-Gluco-octonic Acid



$C_8H_{16}O_9$

MW, 256

αα.

γ-Lactone: cryst. from H_2O . M.p. 151–2°. $[\alpha]_D^{20} + 53.7^\circ$.

Amide: m.p. 160.5–161.5°. $[\alpha]_D^{20} - 24.4^\circ$ in H_2O .

Phenylhydrazide: m.p. 190.5–194° decomp. $[\alpha]_D^{20} - 17.8^\circ$ in H_2O .

αβ.

γ-Lactone: m.p. 185.5–186°. $[\alpha]_D^{20} + 24.6^\circ$ in H_2O .

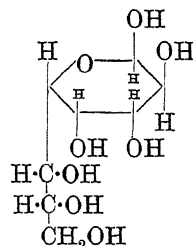
Amide: m.p. 125.5–126.5°. $[\alpha]_D^{20} + 12.1^\circ$ in H_2O .

Phenylhydrazide: m.p. 162.5–164.5°. $[\alpha]_D^{20} + 25.9^\circ$ in H_2O .

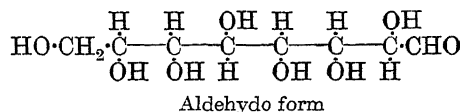
Fischer, *Ann.*, 1892, 270, 90.

Hockett, Hudson, *J. Am. Chem. Soc.*, 1938, 60, 622.

αα-*d*-Gluco-octose (*d*-Gluco-*l*-gala-octose)



β-Pyranose form



$C_8H_{16}O_8$

MW, 240

Pyranose form.

α-Form: monohydrate. Cryst. from MeOH. M.p. 92°. $[\alpha]_D^{20} - 63.0^\circ$ (initial), –46.7° (final) in H_2O . *Dihydrate*: cryst. M.p. 96–7° (110–15°). $[\alpha]_D^{18} - 86.3^\circ$ (initial), –49.6° (final) in H_2O . *β-Form*: non-cryst. $[\alpha]_D - 28.1^\circ$.

Methylglycoside: $C_9H_{18}O_8$. MW, 254. (α). Cryst. M.p. 156–7°. $[\alpha]_D^{20} - 138.0^\circ$ in H_2O . *Hexa-acetyl*: m.p. 86–7°. $[\alpha]_D^{20} - 99^\circ$ in $CHCl_3$.

Hepta-acetyl: (α). Cryst. from EtOH. M.p. 130°. $[\alpha]_D^{20} + 75.1^\circ$ in $CHCl_3$. (β). Cryst. from H_2O . M.p. 92–3°. Sol. EtOH.

Aldehyde form.

Phenylhydrazone: m.p. 203–4°.

Osazone: m.p. 229–30° (216–17°). *Hexa-acetyl*: m.p. 95°. $[\alpha]_D^{20} + 78^\circ$ in $CHCl_3$.

Dibenzyl mercaptal: m.p. 157°. $[\alpha]_D^{20} + 15.8^\circ$ in Py.

Philippe, *Ann. chim.*, 1912, 26, 345.

Fischer, *Ann.*, 1892, 270, 95.

Anderson, *J. Am. Chem. Soc.*, 1911, 33, 1513.

Hann, Merrill, Hudson, *J. Am. Chem. Soc.*, 1944, 66, 1912.

Glucoseonol.

See under Peonol.

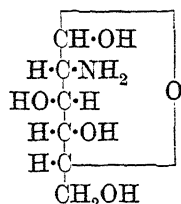
Glucosaccharic Acid.

See Saccharic Acid.

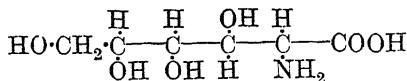
Glucosamic Acid.

See Glucosaminic Acid.

Glucosamine (Chitosamine)

 $C_6H_{13}O_5N$

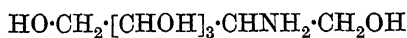
MW, 179

d-.
Occurs in the skeletal polysaccharide chitin of insects, crustacea and fungi. Needles from EtOH. M.p. 110° decomp. Sol. H_2O , hot MeOH. Spar. sol. EtOH. Insol. Et_2O , $CHCl_3$. $[\alpha]_D^{25} + 44^\circ$ in H_2O . HNO_2 — chitose.*B.HCl*: (α). $[\alpha]_D^{25} + 100^\circ$ initial, $+ 72.5^\circ$ final, in H_2O . (β). $[\alpha]_D^{25} + 25^\circ$ initial, $+ 72.6^\circ$ final, in H_2O .*Methylglycoside*: hydrochloride, m.p. 185–7° decomp. $[\alpha]_D^{25} - 24.2^\circ$ in H_2O . 3:4:6-*Triacetyl*: hydrobromide, m.p. 230–3°. $[\alpha]_D^{25} + 20.6^\circ$ in $CHCl_3$. 3:4:6-*Trimethyl*: b.p. 85°/0.004 mm. $n_D^{25} 1.4555$. $[\alpha]_D^{25} + 169.8^\circ$ in MeOH; hydrochloride, m.p. 237° decomp. $[\alpha]_D^{25} + 129.6^\circ$ in H_2O , $[\alpha]_D^{25} + 113.6^\circ$ in MeOH.*N-Acetyl*: m.p. 196°. $[\alpha]_D^{18} + 75^\circ$ (initial) $\rightarrow 41.2^\circ$ in H_2O .*N- α -Hydroxypropionyl*: m.p. 217°. $[\alpha]_D^{18} + 69.1^\circ$ (initial) $\rightarrow 66.2^\circ$ in H_2O .*N-Carbomethoxyl*: m.p. 196–7° decomp. $[\alpha]_D^{20} - 3.28^\circ$ (initial) $\rightarrow +34.4^\circ$ in H_2O .*N-Carbethoxyl*: m.p. 176.5–178° decomp. $[\alpha]_D^{25} + 46.2^\circ$ (initial) $\rightarrow +33.3^\circ$ in H_2O .*N-Benzylidene*: m.p. 156°.*N-Me*: α -*penta-acetyl*, m.p. 158.5–9.5°. $[\alpha]_D^{17} + 102^\circ$ in $CHCl_3$.*Tetra-acetyl deriv.*: m.p. 143°. *N-acetyl*: (α). M.p. 187° (188–9°). (β). M.p. 139–40°.*Oxime*: m.p. about 127°. *Hydrochloride*: m.p. 166°.*Semicarbazone*: m.p. 165° decomp.*Osazone*: m.p. 210°.*l*-.
N-Me: degradation product of streptomycin.M.p. 130–2° decomp. $[\alpha]_D^{24} - 64^\circ$ in H_2O . β -*Penta-acetyl*, m.p. 153–3.5°. $[\alpha]_D^{25} - 16.5^\circ$ in $CHCl_3$.Levene, *Chemical Reviews*, 1925, 2, 179 (*Bibl.*).Hynd, Macfarlane, *Biochem. J.*, 1926, 20, 1264.Komori, *Chem. Abstracts*, 1927, 21, 372.van Alphen, *Chem. Abstracts*, 1930, 24, 2113.Micheel, Micheel, *Ber.*, 1932, 65, 253.Hawarth, Lake, Peat, *J. Chem. Soc.*, 1939, 271.Kuehl, *J. Am. Chem. Soc.*, 1946, 68, 536.Glucosaminic Acid (*Chitosaminic acid*, glucosaminic acid, 2:3:4:5-tetrahydroxy-1-amino-caproic acid) $C_6H_{13}O_6N$

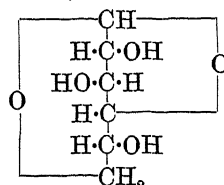
MW, 195

d-.
Plates or needles from H_2O . Decomp. above 250°. $[\alpha]_D^{25} + 14.31^\circ$ in 2.5% HCl aq.*l*-.
Leaflets or needles from H_2O . Chars at 250°. Sol. hot EtOH. Insol. Et_2O . $[\alpha]_D^{18} - 14.49^\circ$ in 2.5% HCl aq.*Nitrile*: *penta-acetyl*, m.p. 118–19°. *N-Me*: m.p. 236°. *B.HCl*: m.p. 136–7°. $[\alpha]_D^{25} - 4.7^\circ$ in H_2O . *Nitrile*: m.p. 113°. $[\alpha]_D^{25} - 75^\circ$ (initial) $\rightarrow -8.3^\circ$ in H_2O .*Nitrile*: *penta-acetyl*, m.p. 118–19°.*N-Me*: m.p. 236°. *B.HCl*: m.p. 136–7°. $[\alpha]_D^{25} - 4.7^\circ$ in H_2O . *Nitrile*: m.p. 113°. $[\alpha]_D^{25} - 75^\circ$ (initial) $\rightarrow -8.3^\circ$ in H_2O .Levene, *J. Biol. Chem.*, 1918, 36, 77.Pringsheim, Ruschmann, *Ber.*, 1915, 48, 680.Bergmann, Zervas, Silberkweit, *Ber.*, 1931, 64, 2428.Wolfrom, Thompson, *J. Am. Chem. Soc.*, 1947, 69, 1847.

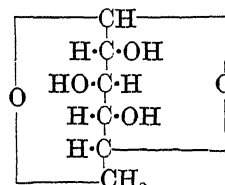
Glucosaminol

 $C_6H_{15}O_5N$

MW, 181

Cryst. M.p. 132°. $[\alpha]_D$ slight.*B.HCl*: m.p. 160–1°.*N-Acetyl*: m.p. 153°. $[\alpha]_D^{18} - 11^\circ$ in H_2O .Karrer, Meyer, *Helv. Chim. Acta*, 1937, 20, 626. β -Glucosan (1:6-Anhydroglucose, *laevo*-glucosan)

Furanose form



Pyranose form

 $C_6H_{10}O_5$

MW, 162

Furanose form.
M.p. 110.5–111.5°. $[\alpha]_D^{25} + 43.3^\circ$ in H_2O .*Tri-Me*: $C_9H_{16}O_5$. MW, 204. M.p. 51–2°. $[\alpha]_D^{25} + 18.9^\circ$ in Me_2CO .*Triacetyl*: m.p. 82.5–83.5°. $[\alpha]_D^{25} - 15.3^\circ$ in $CHCl_3$.*Tri-toluene-p-sulphonyl*: m.p. 127–8°.*Tri-p-nitrobenzoyl*: pale yellow cryst. M.p. 231–2°. $[\alpha]_D^{25} + 25.3^\circ$ in Me_2CO .Dimler, Davis, Hilbert, *J. Am. Chem. Soc.*, 1946, 68, 1377.

Pyranose form.

Plates or prisms. M.p. 179–80°. Very sol. H_2O . Sol. MeOH , EtOH . Insol. Et_2O . Does not reduce Fehling's. $[\alpha]_D^{20} - 66.2^\circ$ in H_2O . Dil. acids \rightarrow glucose.

2:3:4-*Tri-Me ether*: $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. M.p. 63–4°. B.p. 135.5°/12 mm. $[\alpha]_D^{20} - 63.5^\circ$ in H_2O .

2:3:4-*Tri-acetyl*: needles from AcOEt . M.p. 110°. $[\alpha]_D^{20} - 45.5^\circ$ in EtOH .

Tribenzoyl: cryst. from AcOH . M.p. 199.5–200°.

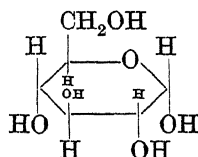
Venn, *Chem. Abstracts*, 1925, 19, 41.

Irvine, Oldham, *J. Chem. Soc.*, 1921, 119, 1744.

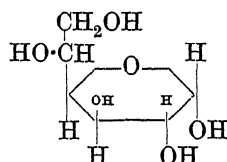
Karrer, Smirnoff, *Helv. Chim. Acta*, 1921, 4, 817.

Pictet, Sarasin, *Helv. Chim. Acta*, 1918, 1, 87.

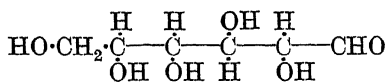
Josephson, *Ber.*, 1929, 62, 313.

Glucose (Dextrose, grape sugar)

Pyranose form (I)



Furanose form (II)



Aldehyde form (III)

$\text{C}_6\text{H}_{12}\text{O}_6$

MW, 180

d-. Pyranose form, (I).

Occurs free in many fruits and in plant products as glucosides. α -Form: cryst. from 70% EtOH at ord. temps. M.p. 146°. $[\alpha]_D^{20} + 111.2^\circ$ initial, + 52.5° final, in H_2O . β -Form: cryst. from H_2O above 98°. M.p. 148–50°. $[\alpha]_D^{20} + 17.5^\circ$ initial, + 52.5° final, in H_2O .

Sol. H_2O , hot EtOH , hot Py . Heat of comb. 677.2 (673.7) Cal. Reduces Tollen's, Fehling's, and Barfoed's reagents. Ox. \rightarrow gluconic acid \rightarrow saccharic acid. Red. \rightarrow sorbitol. Forms bisulphite comp. Restores colour slowly to Schiff's reagent. Forms add. comps. (glucosates) with metallic oxides.

Methylglucoside: $\text{C}_7\text{H}_{14}\text{O}_6$. MW, 194.

α -Form: needles from abs. EtOH . M.p. 166°. $[\alpha]_D^{20} + 158.9^\circ$ in H_2O . 2:3:4:6-*Tetra-Me ether*: syrup. B.p. 89–92°/0.4 mm. $[\alpha]_D^{25} + 151^\circ$ in H_2O . D_4^{20} 1.0944. n_D^{20} 1.4460.

2:3:4:6-*Tetra-acetyl*: m.p. 100°. $[\alpha]_D^{20} + 130.5^\circ$ in CHCl_3 .

β -Form: prisms from EtOH . M.p. 105°. $[\alpha]_D^{20} - 34.2^\circ$ in H_2O . 2:3:4-*Tri-Me ether*: needles from pet. ether. M.p. 93–4°. $[\alpha]_D^{20} - 22.9^\circ$ in MeOH . 2:3:6-*Tri-Me ether*: cryst. from pet. ether. M.p. 57.5°. $[\alpha]_D^{20} - 29.3^\circ$ in MeOH . 2:3:4:6-*Tetra-Me ether*: needles from pet. ether. M.p. 40–1°. $[\alpha]_D^{20} - 17.43^\circ$ in EtOH . 2:3:4:6-*Tetra-acetyl*: cryst. from MeOH . M.p. 104–5°. $[\alpha]_D^{20} - 18.2^\circ$ in CHCl_3 .

2-*Me ether*: prisms from EtOH . M.p. 158°. $[\alpha]_D^{20} + 34.6^\circ$ initial, + 66° final, in H_2O . *Phenylhydrazone*: m.p. 177°. $[\alpha]_D^{20} - 13.3^\circ$ in Py .

3-*Me ether*: α -form. Plates from MeOH . M.p. 160–1°. $[\alpha]_D^{20} + 104.3^\circ$ initial, + 55.3° final, in H_2O . β -Form: prismatic needles from $\text{Me}_2\text{CO-MeOH}$. M.p. 133.5–135°. $[\alpha]_D^{20} + 31.9^\circ$ initial, + 55.1° final, in H_2O . *Osazone*: m.p. 178–9°. $[\alpha]_D^{20} - 109^\circ$ initial, -9° final, in EtOH . *Tetra-acetyl*: cryst. from EtOH . M.p. 95–6°.

6-*Me ether*: needles from EtOH . M.p. 153–4°. $[\alpha]_D^{20} + 104.5^\circ$ initial, + 58.5° final, in H_2O . *Osazone*: cryst. from EtOH . M.p. 183°. *Tetra-acetyl*: cryst. from EtOH . M.p. 95–6°. $[\alpha]_D^{20} + 21.5^\circ$.

2:3:4-*Tri-Me ether*: $\text{C}_9\text{H}_{18}\text{O}_6$. MW, 222. Syrup. B.p. 162–6°/0.3 mm. $[\alpha]_D^{20} + 42.7^\circ$ (+ 66.8°) in H_2O .

2:3:6-*Tri-Me ether*: needles from Et_2O . M.p. 124°. B.p. 165–70°/0.4 mm. $[\alpha]_D^{18} + 118^\circ$.

2:3:4:6-*Tetra-Me ether*: $\text{C}_{10}\text{H}_{20}\text{O}_6$. MW, 236. α -Form: needles from pet. ether. M.p. 96°. n_D 1.4588. $[\alpha]_D^{20} + 100.8^\circ$ initial, + 83.3° final, in H_2O . β -Form: m.p. 50°. B.p. 125°/0.5 mm. $[\alpha]_D^{20} + 73.1^\circ$ initial, + 83.1° final, in H_2O .

Ethylglucoside: $\text{C}_8\text{H}_{16}\text{O}_6$. MW, 208. α -Form: m.p. 113–14°. $[\alpha]_D^{20} + 150.3^\circ$. β -Form: m.p. 73°. $[\alpha]_D^{20} - 33.4^\circ$.

2:3:4:6-*Tetra-acetyl*: (β). Cryst. from EtOH . M.p. 117°. $[\alpha]_D^{20} + 2.2^\circ$ in EtOH .

2:3:4:6-*Tetra-acetyl bromo*: see Acetobromoglucose.

Penta-acetyl: α -form, needles from EtOH . M.p. 112–13°. $[\alpha]_D^{20} + 101.6^\circ$ in CHCl_3 . β -Form: cryst. from EtOH . M.p. 134°. $[\alpha]_D^{20} + 3.8^\circ$.

2:3:4:6-*Tetrapropionyl*: (β) M.p. 111–12°. $[\alpha]_D^{25} + 21.8^\circ$ in EtOH .

6-*Benzoyl*: see Vaccinin.

2:3:4:6-*Tetrabenzoyl*: needles from ligroin. M.p. 119–20°. $[\alpha]_D^{21} + 70.6^\circ$ in EtOH .

Pentabenzoyl: (α). Needles from AcOEt . M.p. 157°. $[\alpha]_D^{25} + 107.6^\circ$ in CHCl_3 . (β). Needles from AcOEt . M.p. 187°. $[\alpha]_D^{24} + 23.7^\circ$ in CHCl_3 .

6-*Triphenylmethyl*: needles + $2\text{C}_2\text{H}_5\text{OH}$ from EtOH . M.p. 57–8°. $[\alpha]_D^{20} + 59.6^\circ$ in Py . *Tetra-acetyl*: needles from EtOH . M.p. 129–31°. $[\alpha]_D^{27} + 97.8^\circ$ in Py .

Tetracarbanilate: m.p. 215–17°. $[\alpha]_D^{25} + 7.6^\circ$ in Me₂CO.

Oxime: m.p. 136.7°. $[\alpha]_D - 2.2^\circ$ in H₂O.

Osazone: m.p. 210°.

3:4-Dibromophenylhydrazones: m.p. 165–7°.

3:4-Dibromophenylosazones: m.p. 225–6° decomp.

1':1'-p-Tolylbenzylhydrazones: m.p. 169.5–170.5°.

1':1'-Phenylphenethylhydrazones: m.p. 142°.

2:5-Dibromophenylosazones: m.p. 228–9°.

3:5-Dibromophenylosazones: m.p. 172°.

West, Holden, *J. Am. Chem. Soc.*, 1934, 56, 930.

Hagen, U.S.P., 1,928,891, (*Chem. Abstracts*, 1933, 27, 6006).

Coles, *Iowa State College Journal of Science*, 1932, 6, 33, 43 (*Bibl.*).

Oldham, Rutherford, *J. Am. Chem. Soc.*, 1932, 54, 1086.

Levene, Raymond, *J. Biol. Chem.*, 1932, 97, 751.

Hirst, *J. Chem. Soc.*, 1926, 350.

Fischer, *Ber.*, 1890, 23, 2618.

Charlton, Haworth, Herbert, *J. Chem. Soc.*, 1931, 2855.

d. Furanose form, (II).

Methylglucoside: α -Form. Needles from AcOEt. M.p. 62–3°. $[\alpha]_D^{25} + 136^\circ$ in MeOH. 5:6-Monocarbonate: m.p. 130°. $[\alpha]_D^{25} + 130^\circ$ in MeOH. *Tetra-Me ether*: m.p. 11°. B.p. 94°/0.04 mm. n_D^{25} 1.4457. $[\alpha]_D^{25} + 106.5^\circ$ in MeOH. β -Form: syrup. $[\alpha]_D^{25} - 77^\circ$ in H₂O.

2:3:5:6-Tetra-Me ether: syrup. B.p. 117°/0.2 mm. $[\alpha]_D^{25} - 28.8^\circ$ in CHCl₃.

Ethylglucoside: α -Form. Needles from AcOEt. M.p. 82–3°. $[\alpha]_D^{25} + 98^\circ$ in H₂O. 5:6-Monocarbonate: m.p. 138–40°. $[\alpha]_D^{25} + 117^\circ$ in EtOH. β -Form: cryst. from AcOEt–Et₂O. M.p. 59–60°. $[\alpha]_D^{25} - 86^\circ$ in H₂O. 5:6-Monocarbonate: m.p. 164–5°. $[\alpha]_{5461}^{19} - 55.0^\circ$ in H₂O.

1:2-Monoacetone deriv.: cryst. from AcOEt. M.p. 156–7°. $[\alpha]_D^{25} - 11.0^\circ$ in H₂O. *Tri-Me ether*: syrup. B.p. 138–9°/12 mm. $[\alpha]_D - 29.5^\circ$ in MeOH.

1:2–5:6-Di-acetone deriv.: needles from pet. ether. M.p. 109–10°. $[\alpha]_D^{17} - 18.6^\circ$ in H₂O. 3-Me ether: b.p. 105–6°/0.3 mm. $[\alpha]_D^{27} - 31.4^\circ$. n_D^{17} 1.4518.

Pentabenzoyl: (α). Cryst. from EtOH. M.p. 118–20°. $[\alpha]_D^{20} + 79^\circ$ in CHCl₃. (β). Cryst. from EtOH. M.p. 146–7°. $[\alpha]_D^{20} - 82.0^\circ$ in CHCl₃.

Pentanitrate: (α). M.p. 53.5°. $[\alpha]_D^{20} + 143.2^\circ$. (β). M.p. 111°. $[\alpha]_D^{20} + 23.13^\circ$. Explosive.

Josephson, *Ber.*, 1929, 62, 1913.

Micheel, Hess, *Ann.*, 1926, 450, 21.

Pringsheim, Koloduy, *Ber.*, 1926, 59, 1135.

Haworth, Porter, Waite, *J. Chem. Soc.*, 1932, 2254.

d. Aldehyde form, (III).

Penta-Me ether: b.p. 108–10°/0.4 mm. $[\alpha]_D^{20} - 35.1^\circ$ in C₂H₅Cl₄. *Di-Me acetal*: b.p. 95°/0.8 mm. $[\alpha]_D^{20} + 15.09^\circ$ in MeOH. *Di-Et mercaptal*: see under Glucothiose.

Penta-acetyl: plates from Me₂CO–Et₂O. M.p. 116–18°. $[\alpha]_D^{25} + 2.7^\circ$ in C₂H₅Cl₄. *Di-Et mercaptal*: see under Glucothiose.

Pentabenzoyl: semi-acetal, plates from EtOH. M.p. 76–82°. $[\alpha]_D^{17} + 37.1^\circ$ in EtOH. *Di-Et mercaptal*: see under Glucothiose.

Levene, Meyer, *J. Biol. Chem.*, 1926, 69, 175.

Brigl, Mühlischlegel, *Ber.*, 1930, 63, 1551.

Wolfrom, *J. Am. Chem. Soc.*, 1929, 51, 2190.

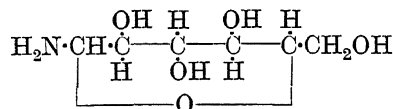
l.

Prisms from MeOH–EtOH. M.p. 141–3°. Sol. H₂O. Spar. sol. EtOH. $[\alpha]_D^{20} - 51.4^\circ$ final.

Fischer, *Ber.*, 1890, 23, 2618.

Sowden, Fischer, *J. Am. Chem. Soc.*, 1947, 69, 1963.

Glucosimine



or



C₆H₁₃O₅N

MW, 179

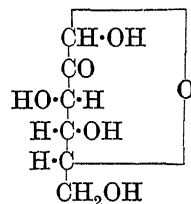
Needles from 95% MeOH. M.p. 127–8° decomp. (122–3°). Sol. H₂O. Insol. EtOH, Et₂O. Dil. acids → glucose.

Levene, *J. Biol. Chem.*, 1915, 24, 60.

Irvine, Thomson, Garnett, *J. Chem. Soc.*, 1913, 103, 239.

Hynd, Macfarlane, *Biochem. J.*, 1926, 20, 1264.

Glucosone (Fructosone, mannosone)



Suggested structure

C₆H₁₀O₆

MW, 178

d.

Syrup. Sol. EtOH. Insol. Et₂O. Lævorotatory in H₂O. Reduces cold Fehling's. Baryta water → gluconic acid. Zn + AcOH → *d*-fructose. Phenylhydrazine → glucosazone.

Triacetyl deriv.: cryst. from CHCl₃–pet. ether. M.p. 76°. $[\alpha]_D^{19} + 84.2^\circ$ in 40% EtOH.

Tetra-acetyl: monohydrate, m.p. 151°. $[\alpha]_D^{20} + 8.5^\circ$ in EtOH.Aq.

3 : 4 : 6-*Triacetyl*-1-benzoyl: cryst. from EtOH. M.p. 116°. $[\alpha]_D^{19} + 144.3^\circ$ in CHCl_3 .

dl-. See α -Acrosone.

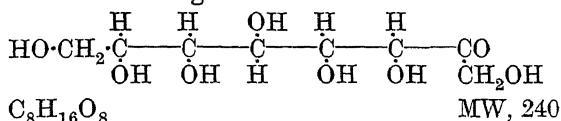
Dixon, Harrison, *Biochem. J.*, 1932, 26, 1954.

Maurer, Petsch, *Ber.*, 1933, 66, 995.

Fischer, Tafel, *Ber.*, 1889, 22, 88, 98.

Becker, May, *J. Am. Chem. Soc.*, 1949, 71, 1491.

d-Gluco-l-tagato-octose



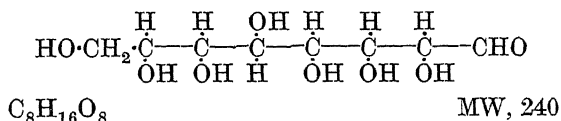
$[\alpha]_D^{23} + 30.8^\circ$.

Hexa-acetyl: m.p. 77–9°. $[\alpha]_D^{21} + 35^\circ$ in CHCl_3 .

Phenylosazone: m.p. 208° decomp.

Hann, Merrill, Hudson, *J. Am. Chem. Soc.*, 1944, 66, 1912.

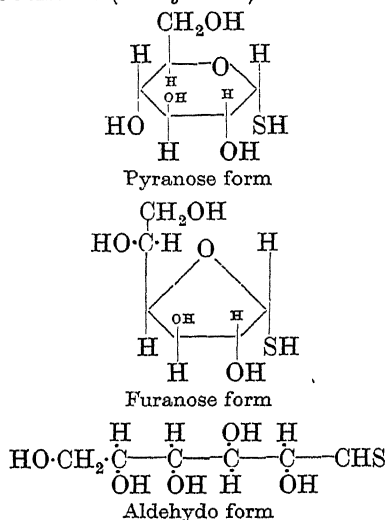
d-Gluco-l-talo-octose



Cryst. M.p. 117–18°. $[\alpha]_D^{20} - 26.2^\circ$ (initial) $\rightarrow -6.5^\circ$ (final) in H_2O .

Hann, Merrill, Hudson, *J. Am. Chem. Soc.*, 1944, 66, 1912.

Glucothiose (Thioglucose)



$\text{C}_6\text{H}_{12}\text{O}_5\text{S}$

MW, 196

Amorphous solid + $1\text{H}_2\text{O}$.

Pyranose form.

α -.

Tetra-acetyl deriv.: m.p. 74.5°. $[\alpha]_D^{20} - 8.3^\circ$ (initial) $\rightarrow +47^\circ$ (final).

Penta-acetyl deriv.: m.p. 128–9°.

Ethylglycoside: m.p. 117°. $[\alpha] + 269^\circ$ in H_2O . *Tetra-acetyl*: m.p. 97.5°. $[\alpha]_D + 207^\circ$ in CHCl_3 .

β -.

Tetra-acetyl deriv.: cryst. from MeOH. M.p. 113–14°. $[\alpha]_D^{20} - 2.13^\circ$ in $\text{C}_2\text{H}_5\text{Cl}_4$. *Methylglycoside*: m.p. 94–5°. $[\alpha]_D^{20} - 18.6^\circ$ in $\text{C}_2\text{H}_5\text{Cl}_4$. *Benzoyl deriv.*: cryst. from EtOH. M.p. 126°. $[\alpha]_D^{20} - 12.4^\circ$ in $\text{C}_2\text{H}_4\text{Cl}_2$.

Furanose form.

α -*Ethylglycoside*: m.p. 153°. $[\alpha]_D + 120.8^\circ$.

β -*Ethylglycoside*: cryst. + $1\text{H}_2\text{O}$. M.p. 46–7°. Anhyd., m.p. 153°. $[\alpha]_D + 120.8^\circ$.

Aldehyde form.

Di-Me mercaptal: m.p. 161°. $[\alpha]_D^{24} - 20.76^\circ$ in N-NaOH.Aq. *Penta-acetyl*: m.p. 83°. $[\alpha]_D^{20} + 38.71^\circ$ in $\text{C}_2\text{H}_5\text{Cl}_4$.

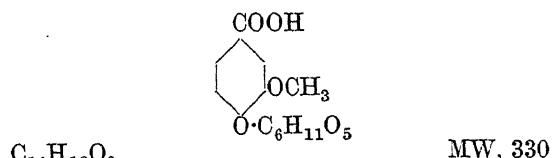
Di-Et mercaptal: *penta-Me ether*, b.p. 152°/0.6 mm. $[\alpha]_D^{20} - 19.2^\circ$ in MeOH. *Penta-acetyl*: cryst. from MeOH.Aq. M.p. 45–7°. $[\alpha]_D^{20} + 11.4^\circ$ in CHCl_3 . *Penta-benzoyl*: plates from EtOH. M.p. 97–8°. $[\alpha]_D^{19} + 49.6^\circ$ in CHCl_3 .

Dibenzylmercaptal: m.p. 64°. $[\alpha]_D^{22} + 31.75^\circ$. *S-Et-O-Me monothioacetal*: m.p. 116–18°. $[\alpha]_D^{23} + 47.8^\circ$ in H_2O . *Penta-acetyl*: m.p. 69–71°. $[\alpha]_D^{27} + 27.1^\circ$ in CHCl_3 .

Kahlbaum, D.R.P. 557,247, (*Chem. Abstracts*, 1933, 27, 374).

Schneider, Bansa, *Ber.*, 1931, 64, 1322.

Glucovanillic Acid



$\text{C}_{14}\text{H}_{18}\text{O}_9$

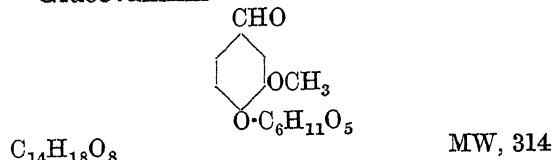
MW, 330

Prisms + H_2O from H_2O . M.p. 211–12°. Sol. EtOH, hot H_2O . Insol. Et_2O . Emulsin \rightarrow glucose + vanillic acid.

Tetra-acetyl deriv.: needles from dil. EtOH. M.p. 181–2°. *Me ester*: needles from MeOH. M.p. 144–5°.

Mauthner, *J. prakt. Chem.*, 1911, 83, 556.

Glucovanillin



$\text{C}_{14}\text{H}_{18}\text{O}_8$

MW, 314

Needles + $2\text{H}_2\text{O}$ from EtOH.Aq. M.p. 192°. Mod. sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . $[\alpha]_D^{20} - 88.03^\circ$ in H_2O .

Tetra-acetyl deriv.: m.p. 143–4°. $[\alpha]_D^{20} - 50.68^\circ$ in Me_2CO .

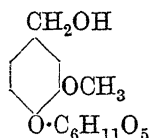
Oxime: m.p. 152°.

Phenylhydrazone: m.p. 195°.

Goris, *Compt. rend.*, 1924, **179**, 70.

Robertson, Waters, *J. Chem. Soc.*, 1930, 2733.

Glucovanillyl Alcohol



$C_{14}H_{20}O_8$ MW, 316

Needles + H_2O . M.p. 120°. Sol. H_2O , EtOH. Insol. Et_2O . Emulsin \rightarrow glucose + vanillyl alcohol.

Goris, *Compt. rend.*, 1924, **179**, 70.

Tiemann, *Ber.*, 1885, **18**, 1597.

Glucosylose

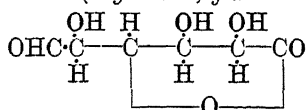
$C_{11}H_{20}O_{10}$ MW, 312

Occurs as mixture of dibenzoyl derivs. in leaves and stem of *Daviesia latifolia*, R.Br. Amorph., hygroscopic solid. Sol. H_2O , MeOH. Mod. sol. EtOH. Does not reduce Fehling's or form an osazone.

Di-benzoyl deriv.: (1) m.p. 152-3°. $[\alpha]_D^{25} - 105.9^\circ$ in MeOH. Penta-acetyl deriv., m.p. 203°. (2) Isodibenzoylglucosylose. Needles from H_2O . M.p. 173-4°. Penta-acetyl deriv., m.p. 173-4°.

Tutin, *J. Chem. Soc.*, 1915, **107**, 7.

d-Glucurone (Glycurone, glucuronolactone)



$C_6H_8O_6$ MW, 176

Cryst. from H_2O . M.p. 177°. Sol. H_2O . Insol. EtOH. $[\alpha]_D^{25} + 19.4^\circ$ in H_2O .

Diacetyl deriv.: m.p. 130-1°.

Diacetyl-chloro deriv.: $C_{10}H_{11}O_7Cl$. MW, 278.5. M.p. 107.5-108.5°. $[\alpha]_D^{25} + 95.5^\circ$ in $CHCl_3$.

Triacetyl deriv.: (α). Plates from Et_2O . M.p. 110-12°. $[\alpha]_D^{24} + 203.6^\circ$ in $CHCl_3$. (β). Prisms from EtOH. M.p. 194-5°. $[\alpha]_D^{25} + 84.1^\circ$ in $CHCl_3$.

α -Benzoyl deriv.: m.p. 98-102° decomp.

Oxime: m.p. 151°. $[\alpha]_D + 14.4^\circ$ in H_2O .

Semicarbazone: m.p. 188-9° decomp. (slow heat.).

Thiosemicarbazone: m.p. 223°.

Phenylhydrazone: m.p. 160°.

p-Bromophenylhydrazone: m.p. 144° decomp. unsym.-Diphenylhydrazone: m.p. 150°.

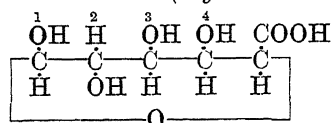
Vedder, *Chem. Abstracts*, 1933, **27**, 2183.

Goebel, Babers, *J. Biol. Chem.*, 1933, **100**, 573, 743; **101**, 173.

Kiliani, *Ber.*, 1926, **59**, 1469.

Zervas, Sessler, *Ber.*, 1933, **66**, 1327.

d-Glucuronic Acid (Glycuronic acid)



$C_6H_{10}O_7$ MW, 194

M.p. 156°. Sol. EtOH. Reduces Fehling's and Tollen's reagents. $[\alpha]_D^{25} + 36.00^\circ$ in H_2O . NaOI \rightarrow saccharic acid.

2:3:4-Tri-Me ether: $C_9H_{16}O_7$. MW, 236. Yellow syrup. $n_D^{16} 1.4709$. $[\alpha]_D^{18} + 58^\circ$.

Methylglycoside: Me ester: $C_8H_{14}O_7$. MW, 222. Syrup. $[\alpha]_D^{25} + 88^\circ$ in H_2O . 2:3:4-Tri-Me ether: needles. M.p. 133°. $[\alpha]_D^{25} - 38^\circ$ in H_2O .

1-Benzoyl: m.p. 145°. $[\alpha]_D^{25} - 16.6^\circ$ in $CHCl_3$. Me ester: m.p. 190-1°. $[\alpha]_D^{25} - 16.3^\circ$ in MeOH.

Lactone: see Glucurone.

p-Bromophenyllosazone: m.p. 199°.

Bergmann, Wolff, *Ber.*, 1923, **56**, 1060.

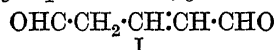
Weinmann, *Ber.*, 1929, **62**, 1637.

Ehrlich, Rehorst, *Ber.*, 1929, **62**, 628.

Zervas, Sessler, *Ber.*, 1933, **66**, 1326.

Challinor, Haworth, Hirst, *J. Chem. Soc.*, 1931, 258.

Glutacondialdehyde (4-Hydroxy-1-aldehydopentadiene, 1:3-dialdehydopropylene, propylene 1:3-dialdehyde pentenedial, glutaconic aldehyde)



or



$C_5H_6O_2$ MW, 98

Neither the dialdehyde (I) nor its enol form (II) has been isolated in the free state. $NaHSO_3$ forms a bis-bisulphite comp.

Enol form (II):

Acetyl: $C_7H_8O_3$. MW, 140. Brownish needles from pet. ether. M.p. 75°.

Benzoyl: $C_{12}H_{10}O_3$. MW, 202. Yellow needles from hot EtOH. M.p. 116-18°.

Di-anil monohydrochloride: crimson needles from MeOH. M.p. 139-40°.

Na salt: $C_5H_5O_2Na \cdot 2H_2O$. Dark red leaflets from H_2O . Gives coloured ppts. with aq. sols. of metallic salts.

Ba salt: $(C_5H_5O_2)_2Ba \cdot 5H_2O$. Yellowish-red cryst. powder.

Baumgarten, Glatzel, *Ber.*, 1926, **59**, 2658.

Glutaconic Acid (Propylene-1:3-dicarboxylic acid)



$C_5H_6O_4$ MW, 130

Labile (cis-) form:

Short prisms from Et_2O . M.p. 136°. Sol. H_2O , EtOH, Me_2CO . Spar. sol. Et_2O . Insol.

CHCl_3 , C_6H_6 . $k = 1.43 \times 10^{-4}$ at 0° Stable in solid state and in Et_2O sol. Changes on melting and in H_2O sol. to *trans*-form. Ac_2O at $40^\circ \rightarrow$ hydroxy-anhydride.

Di-Et ester: $\text{C}_9\text{H}_{14}\text{O}_4$. MW, 186. B.p. $119-20^\circ/15$ mm. D_4^{25} 1.05317. n_D^{25} 1.44680, n_D^{30} 1.44099.

Monoanilide: m.p. 135° .

Dinitrile: m.p. $33-4^\circ$. B.p. $126.4-126.8^\circ$. D_4^{25} 1.00956. n_D^{25} 1.46088.

Stable (trans-) form:

Flat needles from $\text{Et}_2\text{O}-\text{C}_6\text{H}_6$. M.p. 138° . Sol. H_2O , EtOH , Et_2O . $k = 1.74 \times 10^{-4}$ at 0° . Does not give anhydride with Ac_2O at 40° .

Chloro-anhydride: 6-chloro- α -pyrone. $\text{C}_5\text{H}_3\text{O}_2\text{Cl}$. MW, 130.5. M.p. 27° .

Hydroxy-anhydride: 6-hydroxy- α -pyrone. $\text{C}_5\text{H}_4\text{O}_3$. MW, 112. Needles from C_6H_6 . M.p. $87-8^\circ$. $\text{FeCl}_3 \rightarrow$ intense green col. changing rapidly to pale brown.

Di-Et ester: B.p. $236-8^\circ$, $132-4^\circ/18$ mm., $124-5^\circ/12$ mm. D_4^{25} 1.05391. n_D^{25} 1.44910, n_D^{30} 1.44314.

Monoanilide: m.p. 167° .

Dianilide: m.p. 228° .

Gidvani, *J. Chem. Soc.*, 1932, 2666.

McCombs, Packer, Thorpe, *J. Chem. Soc.*, 1931, 547, 559.

Malachowski, *Ber.*, 1929, 62, 1323.

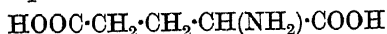
Ingold, Thorpe, *J. Chem. Soc.*, 1921, 119, 499.

Lochte, Pickard, *J. Am. Chem. Soc.*, 1946, 68, 721.

Glutaconic Aldehyde.

See Glutacondialdehyde.

Glutamic Acid (1-Aminoglutaric acid, 1-aminopropane-1 : 3-dicarboxylic acid)



$\text{C}_5\text{H}_9\text{O}_4\text{N}$ MW, 147

d.

Product of acid hydrolysis of many plant and animal proteins. The Na salt has a meaty flavour and is used in meat extracts and as a condiment particularly in the Far East.

Rhombic cryst. from $\text{EtOH} \cdot \text{Aq}$. M.p. $224-5^\circ$ ($247-9^\circ$) decomp. Spar. sol. H_2O . Very spar. sol. EtOH . Heat of comb. C_p 366 Cal. $[\alpha]_D^{25} + 11.0^\circ$ in H_2O , $[\alpha]_D^{30} + 34.9^\circ$ in 10% $\text{HCl} \cdot \text{Aq}$.

B.HCl: m.p. 202° decomp., 213° (rapid heat.).

Di-Me ester: *N*-benzoyl, m.p. 216° .

Mono-Et ester: $\text{C}_7\text{H}_{13}\text{O}_4\text{N}$. MW, 175. Prisms from 50% EtOH . M.p. 194° (164°). *Hydrochloride*: m.p. 134° .

Di-Et ester: $\text{C}_9\text{H}_{17}\text{O}_4\text{N}$. MW, 203. Oil. B.p. $139-40^\circ/10$ mm. Very sol. H_2O .

N-Acetyl: $\text{C}_7\text{H}_{11}\text{O}_5\text{N}$. MW, 189. M.p. 199° .

3-Monoamide: glutamine. $\text{C}_5\text{H}_{10}\text{O}_3\text{N}_2$. MW, 146. Occurs widespread in plants. Needles from $\text{EtOH} \cdot \text{Aq}$. M.p. $184-5^\circ$. Sol. H_2O . Very spar. sol. EtOH . $[\alpha]_D^{25} + 8^\circ$ in H_2O , $[\alpha]_D^{30} + 32^\circ$ in 5% $\text{HCl} \cdot \text{Aq}$. *N-Chloroacetyl*: $\text{C}_7\text{H}_{11}\text{O}_4\text{N}_2\text{Cl}$.

MW, 222.5. Needles from AcOEt . M.p. $130-2^\circ$. $[\alpha]_D^{25} - 104^\circ$ in H_2O . *N-Carbobenzyloxy*: needles from AcOEt . M.p. $135-6^\circ$. $[\alpha]_D^{25} - 5.2^\circ$ in EtOH .

3-Mono-N-methylamide: m.p. 192° . $[\alpha]_D^{25} + 6.45^\circ$.

3-Mono-N-ethylamide: m.p. 200° . $[\alpha]_D^{25} + 6.25^\circ$.

1-Monoamide: isoglutamine. Cryst. Sol. H_2O . Very spar. sol. org. solvents. $[\alpha]_D^{25} + 21.1^\circ$ in H_2O .

l.

Leaflets from H_2O . M.p. 213° decomp. (rapid heat.). Tasteless. $[\alpha]_D^{25} - 12.9^\circ$ in H_2O , $[\alpha]_D^{30} + 31.1^\circ$ in $\text{HCl} \cdot \text{Aq}$.

dl.

Rhombic cryst. from H_2O . M.p. 199° ($225-7^\circ$) decomp. Sol. hot H_2O . Spar. sol. cold H_2O , EtOH , Et_2O , CS_2 , ligroin.

B.HCl: m.p. 193° decomp.

Mono-Et ester: m.p. 185° .

3-Monoamide: *dl*-glutamine. M.p. 186° .

N-Chloroacetyl: cryst. M.p. 123° .

Picrolonate: decomp. at 184° .

Abderhalden, Nienburg, *Z. physiol. Chem.*, 1933, 219, 155.

Bergmann, Zervas, Salzmann, *Ber.*, 1933, 66, 1290.

Tseng, Chu, *Chem. Abstracts*, 1933, 27, 708, 1867; 1932, 26, 5548.

King, *Organic Syntheses*, 1932, Collective Vol. I, 281.

Dunn, Smart, Redemann, Brown, *J. Biol. Chem.*, 1931, 94, 599.

Fischer, Kropp, Stahlschmidt, *Ann.*, 1909, 365, 183.

Bergmann, Zervas, *Ber.*, 1932, 65, 1197; *Z. physiol. Chem.*, 1933, 221, 51.

Han, *Ind. Eng. Chem.*, 1929, 21, 984.

Dyson, *Chemical Age (London)*, 1931, 24, 328.

Lichtenstein, Gertner, *J. Am. Chem. Soc.*, 1942, 64, 1021.

Archibald, *Chemical Reviews*, 1945, 37, 161.

Glutamine.

See under Glutamic Acid.

Glutaraldehyde (Glutaric dialdehyde, propane-1 : 3-dial, 1 : 3-dialdehydopropane)



$\text{C}_5\text{H}_8\text{O}_2$ MW, 100

Oil. B.p. $187-9^\circ$ decomp., $71-2^\circ/10$ mm. Sol. H_2O . Volatile in steam. Polymerises in presence of $\text{H}_2\text{O} \rightarrow$ "glassy" form which on dist. in vacuo regenerates the dialdehyde.

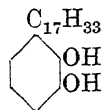
Dioxime: needles from H_2O . M.p. 175° (178° , 171°). Sublimes without decomp. Hot min. acids \rightarrow pyridine.

Fischer, Düll, Ertel, *Ber.*, 1932, 65, 1471.

Shaw, *J. Chem. Soc.*, 1925, 127, 215.

v. Braun, Sobceki, *Ber.*, 1911, 44, 2533.

Glutarenghol (2 : 3-Dihydroxyheptadecenyl-benzene, 3-heptadecenylcatechol)



$C_{23}H_{38}O_2$ MW, 346

From fruit of *Glutarenghas*.

Di-Me ether: b.p. 196–202°/0.2 mm.

Backer, Haack, *Rec. trav. chim.*, 1941, 60, 656.

Glutaric Acid (Propane-1 : 3-dicarboxylic acid)



$C_5H_8O_4$ MW, 132

Needles from C_6H_6 . M.p. 97–8°. B.p. 302–4°, 200°/20 mm. Very sol. H_2O , $EtOH$, Et_2O . k (first) = 4.73×10^{-5} at 25°, (second) = 2.9×10^{-6} at 25°.

Anhydride: $C_5H_6O_3$. MW, 114. Cryst. from Et_2O . M.p. 56°. B.p. 150°/10 mm.

Mono-Me ester: $C_6H_{10}O_4$. MW, 146. B.p. 150–1°/10 mm. D_4^{20} 1.164. n_D^{20} 1.4392.

Di-Me ester: $C_7H_{12}O_4$. MW, 160. B.p. 84–5°/6 mm. D_4^{20} 1.0876. n_D^{20} 1.4246.

Mono-Et ester: $C_7H_{12}O_4$. MW, 160. B.p. 143–5°/7 mm.

Di-Et ester: $C_8H_{16}O_4$. MW, 188. B.p. 103–4°/7 mm. D_4^{20} 1.022. n_D^{20} 1.4241.

Di-tert. butyl ester: b.p. 125–5°/13 mm.

Di-cyclopentyl ester: b.p. 218–20°/24 mm. D_4^{20} 1.0392.

p-Nitrobenzyl ester: m.p. 69°.

Mono-p-bromophenacyl ester: m.p. 137°.

Di-p-bromophenacyl ester: m.p. 46.6–46.8°.

Dichloride: $C_5H_6O_2Cl_2$. MW, 169. B.p. 107–8°/16 mm. D_4^{20} 1.3221.

Diamide: $C_5H_{10}O_2N_2$. MW, 130. Leaflets. M.p. 175–6°.

Mono-nitrile: see 3-Cyanobutyric Acid.

Di-nitrile: trimethylene cyanide, 1 : 3-dicyanopropane. $C_3H_4N_2$. MW, 94. B.p. 144–7°/13 mm., 131–4°/10 mm.

Imide: $C_5H_7O_2N$. MW, 113. Glistening scales from H_2O . M.p. 152°. *N-Me*: b.p. 128–30°/15 mm.

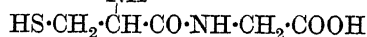
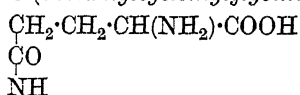
Marvel, Tuley, *Organic Syntheses*, 1932, Collective Vol. I, 283.

Boedtker, *J. pharm. chim.*, 1932, 15, 225.

Berner, *Z. physik. Chem.*, 1929, 141A, 116.

Fourneau, Sabetay, *Bull. soc. chim.*, 1929, 45, 838.

Glutathione (Glutamylcysteinylglycine)



$C_{10}H_{17}O_6N_3S$ MW, 307

Basic respiratory peptide occurring in plant and animal tissues. Cryst. M.p. 190–2° decomp. Unstable. $[\alpha]_D^{28.5} = -9.4^\circ$ in H_2O , -85° in 10% $HCl.Aq$. Incubated + H_2O at 62° \rightarrow pyrrolidone-carboxylic acid + cysteinylglycine. Acid hyd. \rightarrow glycine + glutamic acid + cysteine. Addition of Cu_2O to the sol. in 0.5N/ H_2SO_4 \rightarrow insol. cryst. Cu^+ deriv. Ox. \rightarrow disulphide, m.p. 123°.

Cu⁺ deriv.: $[\alpha]_D^{16.5} = +45.6^\circ$ in $HCl.Aq$.

Phenylcarbamyld deriv.: m.p. 210° (foaming).

Hopkins, *J. Biol. Chem.*, 1929, 84, 269.

Eggleton, *Science Progress*, 1932, 27, 32 (Review).

Pirie, Bernal, *Biochem. J.*, 1932, 26, 75.

Mason, *J. Biol. Chem.*, 1931, 90, 409.

Nicolet, *J. Biol. Chem.*, 1930, 88, 389.

Kendall, Mason, McKenzie, *ibid.*, 409.

Pirie, *Biochem. J.*, 1930, 24, 51.

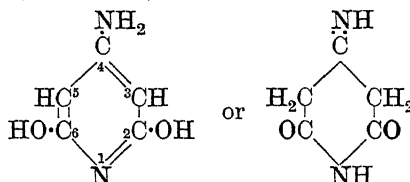
Meldrum, Dixon, *ibid.*, 472.

Harington, Mead, *Biochem. J.*, 1935, 29, 1602.

du Vigneaud, Miller, *J. Biol. Chem.*, 1936, 116, 469.

Hegedus, *Helv. Chim. Acta*, 1948, 31, 787.

Glutazine (2 : 6-Dihydroxy-4-amino-pyridine, 2-iminoglutarimide)



$C_5H_6O_2N_2$ MW, 126

Rectangular plates from H_2O . M.p. 300° decomp. Spar. sol. cold H_2O : sol. reacts acid. Insol. $EtOH$, $AcOH$. Sol. alkalis, cold dil. min. acids. $FeCl_3$ on H_2O sol. \rightarrow deep red col. which on warming \rightarrow dark green. Heat + $HCl.Aq$. $\rightarrow NH_4Cl$ + 2 : 4 : 6-trihydroxypyridine.

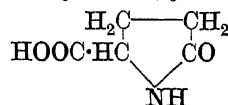
N-Acetyl: glistening plates from H_2O . M.p. 285–90°.

Niementowski, Sucharda, *J. prakt. Chem.*, 1916, 94, 203.

Glutimic Acid.

See Glutiminic Acid.

Glutiminic Acid (Pyroglutamic acid, 2-pyrrolidone-5-carboxylic acid, glutimic acid)



$C_5H_7O_3N$ MW, 129

d.

Cryst. from H_2O . M.p. 182–3°. $[\alpha]_D +10.7^\circ$ in H_2O .

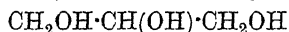
The free acid is a thick gum. Decomp. on dist. Misc. with H_2O , $EtOH$. Insol. Et_2O . The *d*- and *l*-forms in aq. sol. have dextro and lævo rotations, respectively, but their metallic salts in aq. sol. show reversed sign of rotation. Aq. sol. + $FeCl_3 \longrightarrow$ intense yellow col. Esters and ether-esters of the *d*-acid are lævorotatory. Esters of the *l*-acid have not been recorded.

dl.
Me ester: $C_4H_8O_4$. MW, 120. B.p. 119–20°/14 mm. D_{15}^{15} 1.2798. $[\alpha]_D^{15}$ – 6.44° (– 4.8°).
Di-Me ether Me ester: $C_6H_{12}O_4$. MW, 148. B.p. 77–8°/15 mm. D_4^{20} 1.0634. $[\alpha]_D^{20}$ – 69.7°.
Di-Me ether Et ester: $C_7H_{14}O_4$. MW, 162. B.p. 92°/17 mm. D_4^{20} 1.0309. $[\alpha]_D^{20}$ – 69.9°.
Et ester: diacetyl. $C_9H_{14}O_6$. MW, 218. B.p. 247–9°. D_{15}^{15} 1.1570. $[\alpha]_D^{15}$ – 16.31°.
Ba salt: $C_8H_{10}O_8Ba \cdot 2H_2O$. MW, 347. $[\alpha]_D^{20}$ – 9.8° in H_2O .
Ca salt: $C_8H_{10}O_8Ca \cdot 2H_2O$. MW, 250. $[\alpha]_D^{20}$ – 14.6° in H_2O .
Quinine salt: m.p. 187–8° (182°). $[\alpha]_D^{20}$ – 127° in H_2O .
Brucine salt: m.p. 222°. $[\alpha]_D^{20}$ – 33° in H_2O .
l.
Ba salt: $[\alpha]_D^{20}$ + 9.9° in H_2O .
Ca salt: $[\alpha]_D^{20}$ + 12.9° in H_2O .
Quinine salt: m.p. 178–80° (165–7°). $[\alpha]_D^{20}$ – 116.2° in H_2O .
Brucine salt: m.p. 222°. $[\alpha]_D^{20}$ – 22° in H_2O .
dl.
 $k = 2.8 \times 10^{-4}$ at 25°. Ox. with MnO_2 or by electrolysis of Cu salt \rightarrow glycollic aldehyde. On long standing \rightarrow polymeric anhydride, needles from H_2O , decomp. at 250°.
Me ester: b.p. 119–20°/14 mm. D_{15}^{15} 1.2814.
Mono-acetone (isopropylidene) deriv.: $C_7H_{12}O_4$. MW, 160. B.p. 84°/14 mm. D_4^{19} 1.1055. n_D^{26} 1.4230.
Et ester: $C_5H_{10}O_4$. MW, 134. B.p. 120–1°/14 mm. D_{15}^{15} 1.1909. *Mono-acetone (isopropylidene) deriv.*: $C_8H_{14}O_4$. MW, 174. B.p. 89°/11 mm. D_4^{20} 1.0754. n_D^{25} 1.4263.
Propyl ester: $C_6H_{12}O_4$. MW, 148. B.p. 126–7°/14 mm. D_{15}^{15} 1.1453.
Amide: $C_3H_7O_3N$. MW, 105. Prisms from MeOH. M.p. 92°. *Acetone (isopropylidene) deriv.*: $C_6H_{11}O_3N$. MW, 145. Cryst. from C_6H_6 . M.p. 111–12°.
2-Benzoyl: $C_{10}H_{10}O_5$. MW, 210. M.p. 141–2°.
 Glattfeld, *Am. Chem. J.*, 1913, 50, 151.
 Nef, *Ann.*, 1914, 403, 295.
 Nef, Hedenburg, Glattfeld, *J. Am. Chem. Soc.*, 1917, 39, 1643.
 Frankland, Gebhard, *J. Chem. Soc.*, 1905, 87, 864.
 Glattfeld, Hanke, *J. Am. Chem. Soc.*, 1918, 40, 987–9.
 Ott, Krämer, *J. prakt. Chem.*, 1933, 137, 255.

Glycerin.

See Glycerol.

Glycerol (*Glycerin*, 1 : 2 : 3-trihydroxypropane)



$C_3H_8O_3$ MW, 92
 Colourless syrup. Solidifies at about 0° to rhombic cryst. M.p. 20°. B.p. 290° part. decomp., 210°/50 mm., 182°/20 mm., 179–80°/12

mm., 166°/9 mm. D_4^{15} 1.26414, $D_{17.5}^{17.5}$ 1.2620, D_{15}^{15} 1.26468. Heat of comb. C_p 4323 cal./gm. Very hygroscopic. Misc. in all proportions with H_2O and EtOH. Sol. 11 parts AcOEt, 500 parts Et_2O . Insol. $CHCl_3$, CS_2 , pet. ether, C_6H_6 . Volatile in steam. Mild ox. \rightarrow "glycerose" (glyceraldehyde + dihydroxyacetone). Forms metallic derivs. Its sulphuric esters are very hygroscopic and unstable.

1-*Mononitrate*: $C_3H_7O_5N$. MW, 137. Prisms from H_2O , EtOH, or Et_2O . M.p. 58–9°. B.p. 155–60°. Non-explosive.

2-*Mononitrate*: leaflets from H_2O . M.p. 54°. B.p. 155–60°. More sol. than the 1-deriv.

1 : 2-*Dinitrate*: $C_3H_6O_7N_2$. MW, 182. Oil. B.p. 146–8°/15 mm. slight decomp.

1 : 3-*Dinitrate*: $C_3H_6O_7N_2 \cdot \frac{1}{3}H_2O$. Prisms from H_2O . M.p. 26°.

Hepworth, *J. Chem. Soc.*, 1919, 115, 842.

Trinitrate: see Nitroglycerin.

Monophosphate: see Glycerophosphoric Acid.

Formates: see Monoformin, Diformin and Triformin.

Acetates: see Monoacetin, Diacetin and Triacetin.

Butyrates: see Tributyrin and under Butyric Acid.

Isobutyrate: see Mono-isobutyryn, Di-isobutyryn and Tri-isobutyryn.

1-*Caproate*: α -monocaproin. $C_9H_{18}O_4$. MW, 190. B.p. 132–4°/2 mm.

Tricaproate: see under Caproic Acid.

1-*Caprylate*: α -monocaprylin. $C_{11}H_{22}O_4$. MW, 218. M.p. 40°.

Tricaprylate: see under Caprylic Acid.

1-*Caprate*: α -monocaprin. $C_{13}H_{26}O_4$. MW, 246. M.p. 54°.

Tricaprate: see under *n*-Capric Acid.

Monolaurate: see Monolaurin.

1 : 3-*Dilaurate*: $\alpha\alpha'$ -dilaurin. $C_{27}H_{52}O_5$. MW, 456. M.p. 57°.

Trilaurate: see Trilaurin.

Monomyristate: see Monomyristin.

1 : 3-*Dimyristate*: $\alpha\alpha'$ -dimyristin. $C_{31}H_{60}O_5$. MW, 512. M.p. 64°.

Trimyristate: see Trimyristin.

Palmitates: see Monopalmitin, Dipalmitin and Tripalmitin.

Stearates: see Monostearin, Distearin and Tristearin.

Oleates: see Mono-olein and Triolein.

1-*Benzoate*: $C_{10}H_{12}O_4$. MW, 196. *l.* Cryst. M.p. 66.5–67°. $[\alpha]_D$ – 16.8° in EtOH, – 15.3° in Py. *dl.* M.p. 36°. B.p. 124° in high vacuum.

2-*Benzoate*: m.p. 72.5°.

1 : 2-*Dibenzoate*: $C_{17}H_{16}O_5$. MW, 300. M.p. 60°.

Tribenzoate: $C_{24}H_{20}O_6$. MW, 404. M.p. 76° (71°).

1-*p*-*Bromobenzoate*: m.p. 70°.

1-*p*-*Nitrobenzoate*: *l.* Cryst. M.p. 87–8°.

$[\alpha]_D^{25} -16.4^\circ$ in Py. $[\alpha]_D^{35} -18.4^\circ$ in EtOH. *dl.*
M.p. 107° .

2-*p*-Nitrobenzoate : m.p. $120-1^\circ$.

1-*sym*-Trinitrobenzoate : cryst. from EtOH.
M.p. 164.5° .

Tri-*o*-aminobenzoate : m.p. 105° . *B*, $3HCl$:
m.p. 150° decomp. Picrate : m.p. 102° .

Tri-*m*-aminobenzoate : m.p. 82° .

Tri-*p*-aminobenzoate : m.p. 168° .

1-Phenoxyacetate : needles from EtOH.
Stable form : m.p. $100-100.5^\circ$. Labile form :
m.p. $79-80^\circ$.

Tri-phenoxyacetate : phenoxacetin. $C_{27}H_{26}O_9$.
MW, 494. Plates from EtOH- Me_2CO . M.p.
 $80-80.5^\circ$.

Other esters : see under the Acids.

Rewadikar, Watson, *J. Indian Inst. Sci.*,
1930, 13A, 128.

1-*Me* ether : 1:2-dihydroxy-3-methoxypropane.
 $C_4H_{10}O_3$. MW, 106. B.p. 220° , $136^\circ/40$ mm.
 D_4^{25} 1.111. n_D^{25} 1.442. Di-*p*-nitrobenzoate :
m.p. 108° . Diphenylcarbamate : m.p. $118-19^\circ$.

2-*Me* ether : 1:3-dihydroxy-2-methoxypropane.
B.p. 232° , $148^\circ/40$ mm. D_4^{25} 1.124. n_D^{25}
1.446. Di-*p*-nitrobenzoate : m.p. 155° . Di-
phenylcarbamate : m.p. 102° .

1:2-Di-*Me* ether : 1-hydroxy-2:3-dimethoxypropane.
 $C_5H_{12}O_3$. MW, 120. B.p. 180° , $100^\circ/40$ mm.
 D_4^{25} 1.016. n_D^{25} 1.421.

1:3-Di-*Me* ether : 2-hydroxy-1:3-dimethoxypropane.
B.p. 169° , $88^\circ/40$ mm. D_4^{25}
1.004. n_D^{25} 1.417.

Tri-*Me* ether : 1:2:3-trimethoxypropane.
 $C_6H_{14}O_3$. MW, 134. B.p. 148° . D_4^{25} 0.937.
 n_D^{25} 1.401.

1-*Et* ether : 1:2-dihydroxy-3-ethoxypropane.
 $C_5H_{12}O_3$. MW, 120. B.p. 222° , $118^\circ/21$ mm.
 D_4^{25} 1.063. n_D^{25} 1.441.

1:3-Di-*Et* ether : 2-hydroxy-1:3-diethoxypropane.
 $C_7H_{16}O_3$. MW, 148. B.p. 191° ,
 $108-10^\circ/60$ mm. D_4^{25} 0.953. n_D^{25} 1.420.

Tri-*Et* ether : 1:2:3-triethoxypropane.
 $C_9H_{20}O_3$. MW, 176. B.p. 181° , $103-5^\circ/60$ mm.
 D_4^{25} 0.937. n_D^{25} 1.401.

1-Propyl ether : $C_6H_{14}O_3$. MW, 134. B.p.
 $118-22^\circ/15$ mm. D_4^{25} 1.074. n_D^{25} 1.440.

1:3-Dipropyl ether : $C_9H_{20}O_3$. MW, 176.
B.p. $216-18^\circ$, $135-7^\circ/60$ mm. D_4^{25} 0.927. n_D^{25}
1.424.

1:3-Di-isopropyl ether : b.p. $198-9^\circ$, $123-4^\circ/$
60 mm. D_4^{25} 0.914. n_D^{25} 1.418.

1-*n*-Butyl ether : $C_7H_{16}O_3$. MW, 148. B.p.
 $138-40^\circ/22$ mm. D_4^{25} 1.002. n_D^{25} 1.4463.

1-Isoamyl ether : $C_8H_{18}O_3$. MW, 162. B.p.
 254° , $136-8^\circ/10$ mm. D_4^{25} 0.976. n_D^{25} 1.440.

1-Cetyl ether : see Chimyl Alcohol.

1-Octadecyl ether : see Batyl Alcohol.

1-Octadecenyl ether : see Selachyl Alcohol.

1-Phenyl ether : 1:2-dihydroxy-3-phenoxypropane.
 $C_9H_{12}O_3$. MW, 168. M.p. $67-8^\circ$
($53-4^\circ$). B.p. $145-8^\circ/0.6$ mm.

Dict. of Org. Comp.—II.

1:3-Diphenyl ether : 2-hydroxy-1:3-diphenoxypropane.
 $C_{15}H_{16}O_3$. MW, 244. M.p.
 $80-1^\circ$.

1-*o*-Tolyl ether : see Myanesin.

1-*m*-Tolylether : m.p. 60° ($65-70^\circ$). B.p. $199^\circ/$
16 mm.

1-*p*-Tolyl ether : m.p. 73° .

1:3-Di-*o*-tolyl ether : $C_{17}H_{20}O_3$. MW, 272.
B.p. $196^\circ/2$ mm. $n_D^{18.5}$ 1.5605. D_4^{20} 1.111.

1:3-Di-*m*-tolyl ether : b.p. $205^\circ/2$ mm. $n_D^{18.5}$
1.5612. D_4^{20} 1.110.

1:3-Di-*p*-tolyl ether : m.p. 88° .

1-Benzyl ether : $C_{10}H_{14}O_3$. MW, 182. B.p.
 $164-6^\circ/2$ mm. D_4^{25} 1.130. n_D^{25} 1.530.

1:3-Dibenzyl ether : $C_{17}H_{20}O_3$. MW, 272.
B.p. $198-204^\circ/2$ mm. D_4^{25} 1.100. n_D^{25} 1.547.

1:2:4-Dinitrophenylether : m.p. 85.3° .

1-Triphenylmethylether : *d.* M.p. 97° . $[\alpha]_D^{35}$
 3.4° in tetrachloroethane, -17.7° in Py.

Methylene ether : see Methyleneglycerol.

Ethylidene ether : see Ethylideneglycerol.

Isopropylidene ether, acetone deriv., acetone-
glycerol : see Isopropylideneglycerol.

Benzylidene ether : see Benzylideneglycerol.

Fairbourn, *J. Chem. Soc.*, 1932, 1965,
1972; 1931, 445; 1930, 369; *Chemistry*
and Industry, 1930, 49, 1021.

α -Monobromohydrin : 3-bromopropylene
glycol. $C_3H_7O_2Br$. MW, 155. B.p. $134^\circ/16$
mm.

β -Monobromohydrin : 2-bromotrimethylene
glycol. B.p. $106^\circ/6$ mm. D_4^{18} 1.7709. n_D^{18}
1.5228.

Dibromohydrin : see 2:3-Dibromopropyl Alco-
hol and *sym*-Dibromoisopropyl Alcohol.

Monochlorohydrin : see 3-Chloropropylene
Glycol and 2-Chlorotrimethylene Glycol.

Dichlorohydrin : see 2:3-Dichloropropyl Alco-
hol and *sym*-Dichloroisopropyl Alcohol.

α -Monoiodohydrin : 3-iodopropylene glycol.
 $C_3H_7O_2I$. MW, 202. M.p. 49° . Di-*p*-nitro-
benzoyl : m.p. 102° .

β -Monoiodohydrin : 2-iodotrimethylene glycol.
M.p. $52-3^\circ$.

Di-iodohydrin : see 2:3-Di-iodopropyl Alco-
hol and *sym*-Di-iodoisopropyl Alcohol.

Glattfeld, Klaas, *J. Am. Chem. Soc.*, 1933,
55, 1115.

Smith, Laudon, *Ber.*, 1933, 66, 899.

Fairbourn, Stephens, *J. Chem. Soc.*, 1932,
1975.

Carré, *Bull. soc. chim.*, 1910, 7, 835.

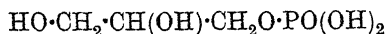
Verkade, van Room, *Rec. trav. chim.*,
1942, 61, 831.

Glycerophosphoric Acid (Glycerol mono-
phosphate)

$C_3H_9O_6P$ MW, 172

Exists in several isomeric forms. The free
acid in every case is a syrup. Decomp. on dist.
Slowly hyd. by H_2O .

α -Glycerophosphoric acid (*glycerol-1-mono-phosphate*)



d.

Di-Me ether di-Me ester: $\text{C}_7\text{H}_{17}\text{O}_6\text{P}$. MW, 228. $[\alpha]_D^{20} + 5.1^\circ$.

Li salt: $\text{Li}_2\text{C}_3\text{H}_7\text{O}_6\text{P}$. MW, 184. $[\alpha]_D^{18} + 3.51^\circ$ in H_2O .

l.

Di-Me ether Na salt: $\text{Na}_2\text{C}_5\text{H}_{11}\text{O}_6\text{P}$. MW, 244. $[\alpha]_D^{20} - 7.2^\circ$.

Li salt: $[\alpha]_D^{18} - 3.02^\circ$ in H_2O .

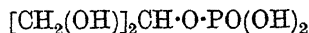
dl.

Ca salt: $\text{CaC}_3\text{H}_7\text{O}_6\text{P}$. MW, 210. Sol. 2.6 parts in 100 parts H_2O at 18° . A second modification is sol. 1.8 in 100 parts H_2O at 18° .

Ba salt: $\text{BaC}_3\text{H}_7\text{O}_6\text{P}$, 0.25 H_2O . MW, 307 (anhyd.). Sol. 1.87 in 100 parts H_2O at 16° .

Quinine salt: m.p. 155° .

β -Glycerophosphoric acid (*glycerol-2-mono-phosphate*)



1-*Caproate*: *Ba salt*, m.p. $261-3^\circ$.

1-*Laurate*: *Ba salt*, needles. M.p. $245-55^\circ$.

1:2-*Dipalmitate*: cryst. M.p. $62-3^\circ$.

Quinoline salt: m.p. $102-4^\circ$.

Ba salt: $\text{BaC}_3\text{H}_7\text{O}_6\text{P}$, 1 H_2O . MW, 325. Sol. 5.25 parts in 100 parts H_2O at 21° . Other (unstable) forms of this salt exist.

"Natural glycerophosphoric acid" obtained from animal and vegetable phosphatides is a mixture of about 3 parts β - and 1 part of the optically active α -comp. and has $[\alpha]_D$ about -0.5° .

"Synthetic glycerophosphoric acid" made by interaction of glycerol and phosphoric acid, anhydride, or salts, is also a mixture of the α - and β -comps. but not identical with fully racemized "natural glycerophosphoric acid." $D_{14}^{14} 1.59$. Becomes glassy and pulverisable at -20° . *Ba salt*: $\text{BaC}_3\text{H}_7\text{O}_6\text{P}$, $\frac{1}{2}\text{H}_2\text{O}$. Sol. 1 in 53.7 H_2O at 17° . *Ca salt*: $\text{CaC}_3\text{H}_7\text{O}_6\text{P}$. Sol. 1 in 22.4 H_2O at 16° .

Fleury, Paris, *Compt. rend.*, 1933, 196, 1416.

Charpentier, Bocquet, *Compt. rend.*, 1932, 194, 104.

Frisch, Waldmann, Austrian P., 128,071, (*Chem. Abstracts*, 1932, 26, 4422).

Karrer, Saloman, *J. Biol. Chem.*, 1931, 93, 407, 409.

Hill, Pyman, *J. Chem. Soc.*, 1929, 2236.

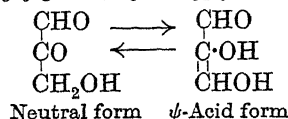
Abderhalden, Eichwald, *Ber.*, 1918, 51, 1308.

Baer, Cushing, Fischer, *Can. J. Research*, 1943, 21B, 119.

Glycerose.

See under Glycerol.

Glycerosone (*Glycollylformaldehyde*, 2-hydroxy-1-ketopropionaldehyde, glyoxylylcarbinol, hydroxymethylglyoxal, hydroxypyruvic aldehyde)



Neutral form ψ -Acid form

$\text{C}_3\text{H}_4\text{O}_3$

MW, 88

Produced as polymer during photochemical decomposition of glyoxal vapour under mercury-vapour lamp illumination. Sol. $\text{H}_2\text{O} \rightarrow$ acid sol. which reduces Fehling's in the cold. H_2O sol. adds Br_2 instantly. Forms yellow Na salt.

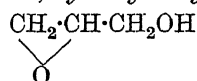
Dioxime: m.p. 168° decomp.

Tri-phenylhydrazone: two modifications. (a) Formed in the cold. Yellow cryst. from EtOH.Aq. M.p. 161° . (b) Formed hot. Reddish cryst. from EtOH.Aq. M.p. 132° .

Quinoxaline deriv.: yellow cryst. from EtOH.Aq. M.p. 165° .

Norrish, Griffiths, *J. Chem. Soc.*, 1928, 2829.

Glycide (*Glycidol*, *epihydrin-alcohol*, 3-hydroxypropylene oxide, hydroxymethyl-ethylene oxide)



$\text{C}_3\text{H}_6\text{O}_2$

MW, 74

l.

Liq. B.p. $56-56.5^\circ/11$ mm. $D_4^{20} 1.117$. $n_D^{20} 1.4293$. $[\alpha]_D^{20} + 15^\circ$.

p-Nitrobenzoate: lemon yellow cryst. M.p. $59-60^\circ$. $[\alpha]_D^{20} + 37.9^\circ$ in CHCl_3 .

dl.

B.p. $166-7^\circ$ decomp., $65-6^\circ/2.5$ mm., $41^\circ/1$ mm. $D_4^{20} 1.1143$. $n_D^{20} 1.4302$. Sol. H_2O , EtOH, Et_2O , Me_2CO , CHCl_3 , C_6H_6 . Spar. sol. pet. ether, xylene. $\text{H}_2\text{O} \rightarrow$ glycerol. Polymerises on boiling Py sol. Does not reduce Fehling's or $\text{NH}_3\cdot\text{AgNO}_3$.

Acetyl: b.p. $168-9^\circ$. $D_4^{20} 1.124$.

Me ether: methoxypropylene oxide. $\text{C}_4\text{H}_8\text{O}_2$. MW, 88. B.p. $115-18^\circ$. Sol. H_2O .

Et ether: ethoxypropylene oxide. $\text{C}_5\text{H}_{10}\text{O}_2$. MW, 102. B.p. $124-6^\circ$ (128°). $D_4^{25} 0.94$. $n_D^{25} 1.406$. Sol. cold H_2O .

Phenyl ether: phenoxypropylene oxide. $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 150. B.p. $243-4^\circ$, $133^\circ/23$ mm., $115-16^\circ/3-4$ mm. $D_4^{25} 1.10$. $n_D^{25} 1.53$.

Phenylurethane: m.p. 60° .

1-*Naphthylurethane*: m.p. 102° .

Mono-nitrate: "nitroglycide." B.p. 174° part decomp., $62-4^\circ/15$ mm. $D_4^{20} 1.332$. Insol. H_2O .

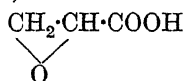
p-Nitrobenzoate: pale yellow cryst. M.p. 56° .

Rider, Hill, *J. Am. Chem. Soc.*, 1930, 52, 1521.

Bigot, *Ann. chim. phys.*, 1891, 22, 482.

Sowden, Fischer, *J. Am. Chem. Soc.*, 1942, 64, 1291.

Glycidic Acid (*Ethylene oxide carboxylic acid, acrylic acid oxide*)



$\text{C}_3\text{H}_4\text{O}_3$ MW, 88

Liq. misc. in all proportions with H_2O , EtOH, Et_2O . Vapour is lachrymatory. The free acid and its salts on warming with $\text{H}_2\text{O} \rightarrow$ glyceric acid or its salts.

*d*l.

K salt: $[\alpha]_D^{18} + 30.16^\circ$ in H_2O .

l.

K salt: $[\alpha]_D^{18} - 11.7^\circ$ in H_2O .

dl.

Et ester: $\text{C}_5\text{H}_8\text{O}_5$. MW, 116. B.p. $161-3^\circ$. Immiscible with H_2O . $D_4^{20} 1.0933$.

Abderhalden, Eichwald, *Ber.*, 1915, 48, 116.

Freudenberg, *Ber.*, 1914, 47, 2034.

Glycidol.

See Glycide.

Glycine (*Aminoacetic acid, glycoll*)



$\text{C}_2\text{H}_5\text{O}_2\text{N}$ MW, 75

Prisms. M.p. 262° decomp. (turns brown at 228°). Sol. 2 parts H_2O at $20-25^\circ$, 930 parts EtOH, 164 parts Py. Insol. Et_2O . Triboluminescent. Heat of comb. C_p 3110 cal./gm. k (acid) $= 1.15 \times 10^{-10}$ at 25° ; k (base) $= 1.7 \times 10^{-12}$ at 25° . Isoelectric point, pH ca. 6. Sweet taste.

The acid and its salts combine with many metallic salts to give double salts.

B, HCl: m.p. 185° .

N-Acetyl: see Acetyl glycine.

N-Benzoyl: see Hippuric Acid.

Me ester: $\text{C}_3\text{H}_7\text{O}_2\text{N}$. MW, 89. B.p. about 130° decomp., $54^\circ/50$ mm. Absorbs CO_2 .

B, HCl: m.p. 175° . Sol. EtOH.

Et ester: $\text{C}_4\text{H}_9\text{O}_2\text{N}$. MW, 103. B.p. $148-9^\circ/750$ mm. slight decomp., $65^\circ/40$ mm., $51-2^\circ/10$ mm. $D_4^{20} 1.0275$. $n_D^{20} 1.42417$. Misc. with H_2O , EtOH, Et_2O , C_6H_6 , ligroin. *B, HCl*: needles. M.p. 144° . Sublimes. Very sol. H_2O , EtOH. *Picrate*: m.p. 157° .

Allyl ester: $\text{C}_5\text{H}_9\text{O}_2\text{N}$. MW, 115. *B, HCl*: m.p. $170-80^\circ$.

Amide: see Aminoacetamide.

Nitrile: see Aminoacetonitrile.

Anhydride: see 2:5-Diketopiperazine.

Hydrazide: see aminoacethydrazide.

$\text{NH}_2\text{CH}_2\text{CO}\cdot\text{NH}\cdot\text{NH}_2$. $\text{C}_2\text{H}_5\text{ON}_3$. MW, 89. Hygroscopic cryst. M.p. $80-5^\circ$. Decomp. at 150° . Sol. CHCl_3 . Spar. sol. EtOH. Insol. Et_2O . Absorbs CO_2 . Reduces Fehling's. *Hydrochloride*: needles. M.p. $200-1^\circ$.

Anilide: needles + $2\text{H}_2\text{O}$ from H_2O . M.p. 62° . Sol. H_2O , EtOH. Spar. sol. Et_2O , C_6H_6 .

o-Toluidide: needles from H_2O . M.p. 66° .

m-Toluidide: cryst. from H_2O . M.p. 74° .

p-Toluidide: m.p. anhyd. 107° .

Picrate: m.p. 190° .

N-Me: see Sarcosine.

N-Di-Me: see Dimethylglycine.

N-Et: see Ethylglycine.

N-Di-Et: see Diethylglycine.

N-Phenyl: see Phenylglycine.

Contardi, Ravazzoni, *Chem. Zentr.*, 1934, I, 1186.

Kulikov, Slastenina, *Chem. Abstracts*, 1933, 27, 2675.

Anslow, King, *Organic Syntheses*, 1932, Collective Vol. I, 292; *J. Chem. Soc.*, 1929, 2463.

Fischer, *Ber.*, 1906, 39, 548.

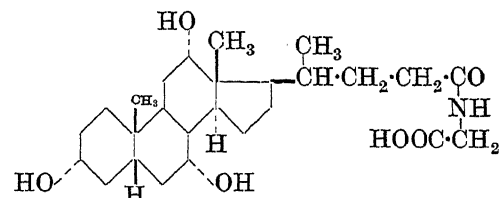
Sah, *J. Chinese Chem. Soc.*, 1936, 4, 198.

Tobie, Ayres, *J. Am. Chem. Soc.*, 1942, 64, 725.

Glycine Aldehyde.

See Aminoacetaldehyde.

Glycocholic Acid (*Cholylglycine*)



$\text{C}_{26}\text{H}_{43}\text{O}_6\text{N}$ MW, 465

Constituent of bile. M.p. $154-5^\circ$ (144°) decomp. $[\alpha]_D^{18} + 24.3^\circ$ in H_2O , $+27.8^\circ$ in 90% EtOH. Forms add. comps. with nitrobenzene, aniline, benzaldehyde, etc. Hyd. \rightarrow glycine + cholic acid.

Tetra-acetyl: m.p. 145° . *Chloride*: m.p. 164° .

Tres-Chemisch-Pharmazeutische Industrie, D.R.P., 574,654, (*Chem. Zentr.*, 1933, I, 1550).

Minovici, Vangelovici, *Chem. Zentr.*, 1932, I, 397.

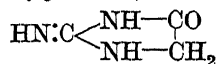
Letsche, *Z. physiol. Chem.*, 1909, 60, 462.

Cartese, Baumann, *J. Am. Chem. Soc.*, 1935, 53, 1393.

Glycocol.

See Glycine.

Glycocyamidine (*Glycolylguanidine, 4-keto-2-iminotetrahydroglyoxaline*)



$\text{C}_3\text{H}_5\text{ON}_3$ MW, 99

Free base very sol. cold H_2O . Turns brown at about 240° and chars gradually up to 300° .

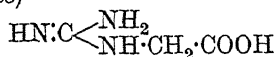
B, HCl: m.p. 213° .

Picrate: needles or plates from H_2O . M.p. $214-15^\circ$ decomp.

Me deriv.: see Creatinine.

King, *J. Chem. Soc.*, 1930, 2374.

Glycocyamine (*Guanidinoacetic acid*, *N-guanylglycine*)



$\text{C}_3\text{H}_7\text{O}_2\text{N}_3$ MW, 117

Plates from boiling H_2O . M.p. above 300° (250 – 60°).

B.HCl: plates from conc. *HCl*. M.p. 200° decomp.

Picrate: needles from boiling H_2O . M.p. 210° decomp.

"*Half-picrate*": plates from boiling H_2O . M.p. 242° decomp.

Me deriv.: see Creatine.

Brand, Brand, *Organic Syntheses*, 1942, XXII, 59.

King, *J. Chem. Soc.*, 1930, 2374.

Glycogen ("Animal starch")

$(\text{C}_6\text{H}_{10}\text{O}_5)_n$

Polysaccharide occurring in livers of animals. White powder. Sol. cold H_2O to slightly opalescent sol. $[\alpha]_D^{25} +191^\circ$ in H_2O . I \rightarrow red col. Does not reduce Fehling's. Hyd. by dil. acids \rightarrow glucose only.

"*Triacetate*": decomp. at 177° . Sol. CHCl_3 , Me_2CO . Insol. H_2O , MeOH , EtOH . $[\alpha]_D^{20} +170^\circ$ in CHCl_3 .

"*Tri-Me deriv.*": m.p. 147° (softens at 135°). $[\alpha]_D^{20} +209^\circ$ in CHCl_3 .

Haworth, Percival, *J. Chem. Soc.*, 1932, 2277.

Mizutani, F.P., 720,268, (*Chem. Abstracts*, 1932, 26, 3870).

Kermack, *Science Progress*, 1946, 34, 778 (*Review*).

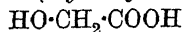
Glycol.

See Ethylene Glycol.

Glycoline.

See 2: 5-Dimethylpyrazine.

Glycollic Acid (*Hydroxyacetic acid*)



$\text{C}_2\text{H}_4\text{O}_3$

MW, 76

Constituent of cane-sugar juice. Needles from H_2O , leaflets from Et_2O . M.p. 80° . Sol. H_2O , EtOH , Et_2O . Heat of comb. C_p 167 Cal. $k = 1.5 \times 10^{-4}$ at 25° . Prolonged heat. at $100^\circ \rightarrow$ glycollic anhydride. Dist. in vacuum \rightarrow glycolide + polyglycolide. $\text{H}_2\text{O}_2(+\text{Fe}^{++}) \rightarrow$ glyoxylic acid.

Ammonium salt: m.p. 102° . B.p. $160^\circ/10$ mm. Distills undecomp. in vacuo. Hygroscopic.

Acetyl: see Acetoxyacetic Acid.

Benzoyl: m.p. 112° . *Anhydride*: m.p. 126° .

Carbomethoxyl: $\text{CH}_3\text{O} \cdot \text{CO} \cdot \text{OCH}_2 \cdot \text{COOH}$. Micro-plates from Et_2O or C_6H_6 . M.p. 33 – 4° . B.p. $112^\circ/0.6$ mm.

Me ester: $\text{C}_3\text{H}_6\text{O}_3$. MW, 90. B.p. 151° . $D^{18}_{1.1677}$. *Phenylurethane*: m.p. 74° .

Et ester: $\text{C}_4\text{H}_8\text{O}_3$. MW, 104. B.p. 160° . $D^{15}_{1.0869}$. *o-Iodobenzoate*: b.p. $169^\circ/0.02$ mm. $D^{20}_{1.647}$. n^{25}_D 1.5637.

Anhydride: m.p. 128 – 30° . Insol. EtOH , Et_2O . *Diacetate*: b.p. 178 – $80^\circ/20$ mm.

Amide: hydroxyacetamide. $\text{C}_2\text{H}_5\text{O}_2\text{N}$. MW, 75. Leaflets from EtOH . M.p. 116 – 17° .

Nitrile: hydroxyacetonitrile, formaldehyde cyanhydrin. $\text{C}_2\text{H}_3\text{ON}$. MW, 57. B.p. 183° slight decomp., $98^\circ/10$ mm. *Benzoyl*: m.p. 195 – 6° .

Phenylurethane: m.p. 141° decomp.

Hydrazide: hydroxyacethydrazide. $\text{HO} \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{NH} \cdot \text{NH}_2$. M.p. 93° . *B.HCl*: m.p. 155° .

Me ether: see Methoxyacetic Acid.

Et ether: see Ethoxyacetic Acid.

Butyl ether: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 113 – $16^\circ/10$ mm.

Isobutyl ether: b.p. $114^\circ/9$ mm.

Phenyl ether: see Phenoxyacetic Acid.

Cu salt: (α) *monohydrate*. Blue needles. Loses H_2O at 130° . Spar. sol. (0.832%) H_2O . (β) *Monohydrate*. Blue platelets. Loses H_2O at 105° . Spar sol. (0.521%) H_2O .

Société Franco-Belge d'Ougré, F.P., 735,050, (*Chem. Abstracts*, 1933, 27, 914).

Brigl, Grüner, *Ber.*, 1932, 65, 642.

Palomaa, *Chem. Zentr.*, 1913, II, 1959.

Kopetschni, Karczag, D.R.P., 262,883, (*Chem. Zentr.*, 1913, II, 728).

Polstorff, Meyer, *Ber.*, 1912, 45, 1910.

Glycollic Aldehyde (*Hydroxyacetaldehyde*)



$\text{C}_2\text{H}_4\text{O}_2$

MW, 60

Plates. M.p. 96 – 7° . Sol. H_2O , hot EtOH . Spar. sol. Et_2O . Fresh H_2O sols. contain bimolecular form of the aldehyde which becomes monomolecular after 24 hours. Reduces Fehling's in the cold. 1% NaOH . Aq. at 0° (on standing) \rightarrow hexose mixture. Conc. alkalis \rightarrow yellow col.

Mono-acetyl: bimolecular form. M.p. 157 – 8° .

Triacetyl: cryst. from Et_2O –pet. ether. M.p. 52° .

n-Butyryl: b.p. $93^\circ/14$ mm. *Semicarbazone*: m.p. 145 – 6° .

n-Nonoyl: b.p. $149^\circ/14$ mm. *Semicarbazone*: m.p. 121 – 2° .

Benzoyl: m.p. 32 – 4° . B.p. 124 – $6^\circ/9$ mm.

Oxime: m.p. 78 – 81° . *Semicarbazone*: m.p. 194 – 5° (209°).

Phenylacetyl: b.p. $158^\circ/14$ mm. *Semicarbazone*: m.p. 137 – 8° .

Carbomethoxyl: $\text{CH}_3\text{O} \cdot \text{CO} \cdot \text{OCH}_2 \cdot \text{CHO}$. B.p. 78 – $9^\circ/17$ mm.

Carbobenzoyloxy: $\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \text{CO} \cdot \text{O} \cdot \text{CH}_2 \cdot \text{CHO}$.

Syrup. Insol. H_2O . *Phenylhydrazones*: m.p. 80–1°. 2:4-*Dinitrophenylhydrazones*: dark yellow cryst. M.p. 185°.

Dimer: see 2:5-Dihydroxy-1:4-dioxan.

Di-Me acetal: $C_4H_{10}O_3$. MW, 106. B.p. 158–9°/749 mm.

Di-Et acetal: $C_6H_{14}O_3$. MW, 134. B.p. 167°, 57–8°/8 mm. D_{25}^{20} 0.888.

Et ether: $C_4H_8O_2$. MW, 88. (a) Aldehydic form. B.p. 71–3°. Reduces $NH_3 \cdot AgNO_3$ in cold. (b) Deriv. of cyclic form of glycollic aldehyde ("glycolose"). Bimolecular. M.p. 59–60°. B.p. 84–5°/9 mm. Sol. ord. org. solvents. Spar. sol. cold H_2O , pet. ether. Reduces hot $NH_3 \cdot AgNO_3$. Does not reduce Fehling's.

Phenylhydrazones: cryst. M.p. about 162°. Sol. H_2O , EtOH, Et $_2O$.

Phenylosazones: glyoxal phenylosazones. Yellow plates from Et $_2O$. M.p. 179–80°. Sol. $CHCl_3$, C_6H_6 , hot EtOH. Insol. H_2O , ligroin.

p-Nitrophenylosazones: glyoxal-*p*-nitrophenylosazones. M.p. 311°.

Hartung, *J. Am. Chem. Soc.*, 1927, 49, 2520.

Fischer, Taube, *Ber.*, 1927, 60, 1707.

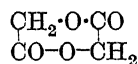
Aoyama, *J. Pharm. Soc. Japan*, 1927, 539, 27.

Bergmann, Miekeley, *Ber.*, 1921, 54, 2150.

v. Pechmann, *Ber.*, 1897, 30, 2460.

Ohle, Melkonian, *Ber.*, 1941, 74, 291.

Glycollide (Glycollodilactone)



$C_4H_4O_4$

MW, 116

Cryst. from EtOH. M.p. 84°.

Johansson, Sebelius, *Ber.*, 1919, 52, 745.

Glycollylformaldehyde.

See Glycerosone.

Glycollylguanidine.

See Glycocyanidine.

p-Glycollylphenol.

See *p*-Hydroxyphenacyl Alcohol.

Glycollylurea.

See Hydantoin.

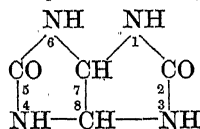
Glycolose.

See under Glycollic Aldehyde.

Glycoluric Acid.

See Hydantoic Acid.

Glycoluril (Acetylenediurene, glyoxaldiurene)



$C_4H_6O_2N_4$

MW, 142

Needles or prisms from H_2O . Decomp. at 300°. Insol. EtOH, AcOH. Sol. NH_4OH , HCl. 1:4-*Di-Me*: needles from H_2O . M.p. 285–7°.

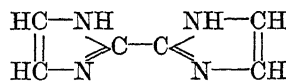
1:6-*Di-Me*: needles from H_2O . M.p. 230–2°. 1:3:4:6-*Tetra-Me*: needles from EtOH. M.p. 217°.

1:3:4:6-*Tetra-acetyl*: needles from EtOH. M.p. 236–8°.

Schiff, *Ann.*, 1877, 189, 157.

Behrend, Meyer, Rusche, *Ann.*, 1905, 339, 4.

Glycosine (2:2'-Di-iminazole)



$C_6H_6N_4$

MW, 134

Prisms from AcOH or boiling H_2O . Very spar. sol. ord. org. solvents. Insol. cold H_2O . Di-acidic base or weak acid according to conditions. Br.Aq. on aq. sols. \rightarrow green ppt. Na alcoholates \rightarrow violet-red col. Nitration \rightarrow mixture of mono-, di-, tri-, and tetra-nitro derivs. Alkali salts mod. sol. H_2O and cryst. in reddish-brown needles which explode on heating. Alkaline sol. couples with diazonium salts.

Dinitro deriv.: yellow hexagonal leaflets. M.p. 283° decomp.

Trinitro deriv.: light brown leaflets. Decomp. above 300°.

Tetranitro deriv.: yellow prisms. M.p. 276° decomp. Explosive.

Tetra-azobenzene deriv.: dark red needles + $8H_2O$. M.p. 230–2°.

Picrate: needles from H_2O . M.p. above 270°.

Polyiodides: $C_6H_6N_4 \cdot HI \cdot I_2$. M.p. 194–5°. $C_6H_6N_4 \cdot 2HI_3$. M.p. 204–6°. $C_6H_6N_4 \cdot I_8$. M.p. 185–6°.

Lehmstedt, *Ann.*, 1927, 456, 253.

Lehmstedt, Rolker, *Ber.*, 1943, 76, 879.

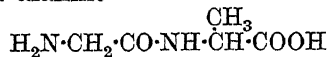
Glycurone.

See Glucurone.

Glycuronic Acid.

See Glucuronic Acid.

Glycyl-alanine



$C_5H_{10}O_3N_2$

MW, 146

*d*l-.

Needles or plates from EtOH.Aq. M.p. 235–6° decomp. (brown at 218°). Very sol. H_2O . Insol. ord. org. solvents. $[\alpha]_D^{20} - 50^\circ$ (42°) in H_2O .

Me ester hydrochloride: $C_6H_{13}O_3N_2Cl$. MW, 196.5. M.p. 160–2°.

Anhydride: see 3-Methyl-2:5-diketopiperazine.

NH_4Cl double salt: $[\alpha]_D^{20} - 9.4^\circ$.

*dl*l-.

M.p. 227° decomp. Very sol. H_2O . Very spar. sol. EtOH. k (acid) = 4.4×10^{-9} at 20°; k (base) = 7.6×10^{-12} at 20°.

Et ester: picrate, m.p. 97–8°. *p*-Toluenesulphonyl, m.p. 68°.

Anhydride: see 3-Methyl-2:5-diketopiperazine.

Carbethoxyl: needles from H₂O. M.p. 188°. *Et ester*, needles from Et₂O. M.p. 66° (sinters at 62°).

p-Toluenesulphonyl: m.p. 167°.

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, 97, 717.

Abderhalden, *Fermentforschung*, 1931, 12, 376; 1928, 9, 446, (*Chem. Abstracts*, 1931, 25, 2741; 1928, 22, 2550).

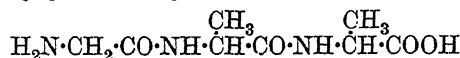
Bergmann, Grafe, *Z. physiol. Chem.*, 1930, 187, 195.

Schönheimer, *Z. physiol. Chem.*, 1926, 154, 211.

Fischer, *Ber.*, 1908, 41, 2867.

Fischer, Schulze, *Ber.*, 1907, 40, 943.

Glycyl-*dl*-alanyl-*dl*-alanine

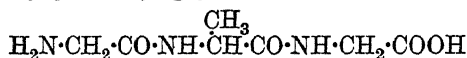


C₈H₁₅O₄N₃ MW, 217

Pearly leaflets from EtOH.Aq. M.p. 204–5° decomp. Hygroscopic.

Schlack, Kumpf, *Z. physiol. Chem.*, 1926, 154, 140, 162.

Glycyl-alanyl-glycine



C₇H₁₃O₄N₃ MW, 203

d-.

Needles from H₂O or EtOH.Aq. M.p. 245° (darkens at 220°) (rapid heat.). Very easily sol. dil. acids or alkalis. Insol. ord. org. solvents. $[\alpha]_D^{20}$ – 64.3° in H₂O. Alkalis + CuSO₄ → bluish-violet col.

l-.

Chloroacetyl deriv.: m.p. 130° decomp. $[\alpha]_D^{20}$ + 48.3°.

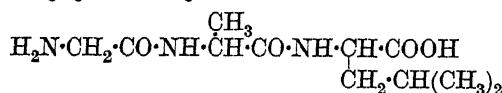
dl-.

M.p. 243°.

Levene, Pfaltz, *J. Biol. Chem.*, 1926, 68, 277.

Fischer, *Ber.*, 1908, 41, 853.

Glycyl-*d*-alanyl-*l*-leucine



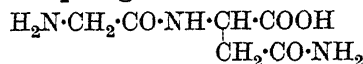
C₁₁H₂₁O₄N₃ MW, 259

Needles from H₂O. M.p. 239–40° decomp. $[\alpha]_D^{20}$ – 90° in H₂O. Sol. hot H₂O. Mod. sol. cold H₂O. Insol. EtOH. Reacts weakly acidic.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, 81, 15.

Fischer, Brunner, *Ann.*, 1905, 340, 150.

Glycyl-*l*-asparagine



C₆H₁₁O₄N₃ MW, 189

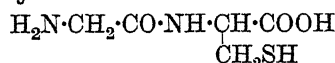
Needles from EtOH.Aq. M.p. 216° decomp. Very sol. H₂O. Very spar. sol. EtOH. $[\alpha]_D^{20}$ – 6.4° in H₂O. Reacts weakly acidic. Alkalis + CuSO₄ → reddish-violet col.

Anhydride: m.p. 274° decomp. (brown at 245°).

Miyanoki, *J. Biochem. Japan*, 1931, 13, 389.

Fischer, Koenigs, *Ber.*, 1904, 37, 4587.

Glycylcysteine



C₅H₁₀O₃N₂S MW, 178

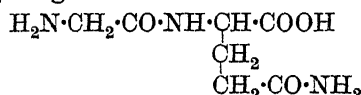
Cryst. from H₂O. M.p. 177° decomp. (sinters at 130°).

Pirie, *Biochem. J.*, 1931, 25, 616.

Glycyl-diglycyl-glycine.

See Triglycylglycine.

Glycyl-*d*-glutamine



C₇H₁₃O₄N₃ MW, 203

Cryst. + 1H₂O from MeOH.Aq. Decomp. at 199–200° (anhyd.). $[\alpha]_D^{25}$ – 2.47° in H₂O. Reacts acid to litmus.

Thierfelder, Cramm, *Z. physiol. Chem.*, 1919, 105, 64.

Glycylglycine



C₄H₈O₃N₂ MW, 132

Leaflets from EtOH.Aq. Decomp. at 260–2° (215–20°, 235–6°). Sol. hot H₂O. Very spar. sol. EtOH. Insol. Et₂O. Heat of comb. C_p 472.4 Cal. *k* (acid) = 5.6 × 10^{–9} at 20°; *k* (base) = 7.6 × 10^{–12} at 20°.

Acetyl deriv.: plates from EtOH. M.p. 187–9°.

Bromoacetyl deriv.: m.p. 174–5°.

Chloroacetyl deriv.: prisms from H₂O. M.p. 178–80°. *Et ester*: m.p. 153–4°.

Benzoyl deriv.: m.p. 208°.

2:4-Dinitrobenzoyl: cryst + 1H₂O. M.p. 210°.

Et ester: C₆H₁₂O₃N₂. MW, 160. Needles from CHCl₃-pet. ether. M.p. 88–9°. *Hydrochloride*: m.p. 182° decomp. *Carbethoxyl*: m.p. 87°. *Acetyl*: m.p. 152°. *o*-Nitrophenylsulphenyl: m.p. 157°. *Helianthate*: m.p. 210°.

2-Naphthalenesulphonate: B,C₁₀H₇SO₃H. M.p. 193°.

p-Toluenesulphonyl: $C_{11}H_{14}O_5N_2S$. MW, 286. Needles from H_2O . M.p. 178° .
 $B_2H_2PtCl_6$: orange-red cryst. + $2H_2O$. Decomp. at 120° (anhyd.).

Fischer, Fourneau, *Ber.*, 1901, **34**, 2868.
 Dunn, Butler, Deakers, *J. Biol. Chem.*, 1932, **99**, 217 (*Bibl.*).
 Dernby, *Biochem. Z.*, 1917, **81**, 166.
 Schott, Larkin *et al.*, *J. Org. Chem.*, 1947, **12**, 490.

Glycylglycylalanine.

See Diglycylalanine.

Glycyl-glycyl-glycine.

See Diglycylglycine.

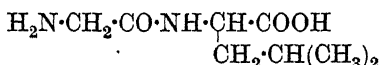
Glycylglycyl-leucine.

See Diglycyl-leucine.

Glycylglycylvaline.

See Diglycylvaline.

Glycyl-leucine



$C_8H_{16}O_3N_2$ MW, 188

*d*l-.

Cryst. from H_2O . $[\alpha]_D^{20} + 37.6^\circ$ in H_2O .

*l*l-.

Plates from EtOH.Aq. M.p. 256° decomp. (245°) (yellow at 246°). $[\alpha]_D^{20} - 35.2^\circ$ in H_2O ; -35° in 10% HCl.

Et ester: hydrochloride, m.p. $161-2^\circ$.

Anhydride: m.p. $254-5^\circ$. $[\alpha]_D^{20} + 31^\circ$ in H_2O .

Carbonyl deriv.: $CO(C_8H_{15}O_3N_2)_2$. M.p. 135° .

*dl*l-.

Tetragonal cryst. from EtOH.Aq. M.p. 242° decomp. Sol. H_2O . Insol. EtOH.

Carbethoxyl: plates from Me_2CO , needles from EtOH.Aq. M.p. 136° .

Amide: $C_8H_{17}O_2N_3$. MW, 187. *Hydrochloride*, m.p. $211-12^\circ$.

Anhydride: m.p. 245° .

p-Toluenesulphonyl: m.p. $81-2^\circ$. *Et ester*, m.p. 83.5° .

2-Naphthalenesulphonyl: m.p. 123° .

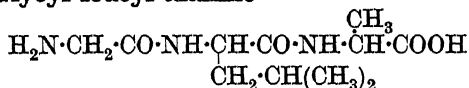
$C_6H_5 \cdot NCO$ deriv.: m.p. 177° .

Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, **97**, 717.

Abderhalden, *Z. physiol. Chem.*, 1927, **168**, 201; 1926, **160**, 256.

Fischer, Warburg, *Ann.*, 1905, **340**, 157.

Glycyl-leucyl-alanine



$C_{11}H_{21}O_4N_3$ MW, 259

Glycyl-l-leucyl-d-alanine.

Needles from H_2O . M.p. $235-6^\circ$ decomp. $[\alpha]_D^{20} - 59^\circ$ in H_2O . Very sol. H_2O . Insol. EtOH.

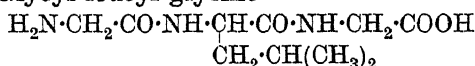
Inactive.

Tetragonal plates from H_2O . M.p. 250° decomp. Sol. H_2O . Alkali + $CuSO_4 \rightarrow$ red-dish-violet col.

Abderhalden, Fodor, *Z. physiol. Chem.*, 1912, **81**, 20.

Fischer, Warburg, *Ann.*, 1905, **340**, 164.

Glycyl-leucyl-glycine



$C_{10}H_{19}O_4N_3$ MW, 245

*d*l-.

M.p. 215° . $[\alpha]_D^{20} + 25^\circ$.

Benzoyl: cryst. from H_2O . M.p. 186° . $[\alpha]_D^{24} + 35.2^\circ$ in H_2O containing 1 equiv. NaOH.

Me ester: benzoyl, cryst. from AcOEt-Et₂O. M.p. 180° . *Carbobenzoyloxy*: m.p. 131° .

*l*l-.

$[\alpha]_D^{24} - 41.2^\circ$ in H_2O .

Benzoyl: m.p. 186° . $[\alpha]_D^{24} - 35.8^\circ$ in H_2O containing 1 equiv. NaOH.

Me ester: carbobenzoyloxy, m.p. 131° .

*dl*l-.

Fine needles from EtOH.Aq. M.p. 232° (206°) decomp. Insol. MeOH, Et₂O, AcOEt.

Et ester: $C_{12}H_{23}O_4N_3$. MW, 273. M.p. 51° .

Fischer, Brunner, *Ann.*, 1905, **340**, 150.

Abderhalden, *Fermentforschung*, 1930, **11**, 143; 1928, **10**, 179, (*Chem. Abstracts*, 1930, **24**, 1623; 1929, **23**, 1113).

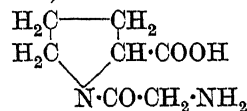
Abderhalden, Möller, *Z. physiol. Chem.*, 1928, **174**, 206.

Bergmann, Zervas, Fruton, *J. Biol. Chem.*, 1935, **111**, 225.

Glycyl-p-phenetidine.

See under *p*-Phenetidine.

Glycyl-l-proline (*N*-Aminoacetylpyrrolidine-2-carboxylic acid)



$C_7H_{12}O_3N_2$ MW, 172

Prisms from MeOH.Aq. M.p. 185° . $[\alpha]_D^{20} - 113.8^\circ$ in H_2O ($[\alpha]_D^{18} - 86.2^\circ$). Hygroscopic.

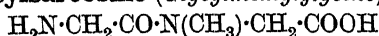
Anhydride: m.p. $180-3^\circ$. $[\alpha]_D^{20} - 202^\circ$.

Bergmann, Zervas, *Ber.*, 1932, **65**, 1192.

Abderhalden, Zumstein, *Fermentforschung*, 1930, **12**, 1, (*Chem. Abstracts*, 1931, **25**, 77).

Abderhalden, Komm, *Z. physiol. Chem.*, 1925, **145**, 308.

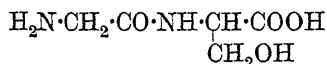
Glycylsarcosine (Glycylmethylglycine)



$C_5H_{10}O_3N_2$ MW, 146

Cryst. from EtOH.Aq. M.p. 220° ($200-1^\circ$).

Levene, Simms, Pfaltz, *J. Biol. Chem.*, 1924, **61**, 450.

Glycyl-*dl*-serine

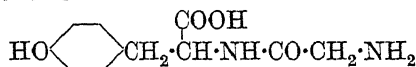
$\text{C}_5\text{H}_{10}\text{O}_4\text{N}_2$ MW, 162

Plates from MeOH.Aq. M.p. 207° decomp. (yellow at 195°). Very sol. H_2O . Spar. sol. MeOH. Insol. Et_2O .

Anhydride: thick rods from H_2O . M.p. 227° (sinters at 220°). Spar. sol. EtOH.

Fischer, Roesner, *Ann.*, 1910, 375, 201.
Cf. Bergmann, Miekeley, *Z. physiol. Chem.*, 1924, 140, 128.

Glycyltyrosine



$\text{C}_{11}\text{H}_{14}\text{O}_4\text{N}_2$ MW, 238

d-.
Amorphous. M.p. 160° decomp. (sinters at 120°).

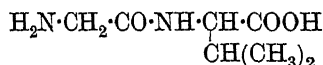
l-.
M.p. 165° decomp. (sinters at 125°). Sol. H_2O , MeOH. Spar. sol. EtOH. Insol. Et_2O .
Et ester hydrochloride: $\text{C}_{13}\text{H}_{18}\text{O}_4\text{N}_2\text{Cl}$. MW, 302.5. M.p. 245° decomp.

Anhydride: needles. M.p. 295° decomp. $[\alpha]_D^{20} + 125.4^\circ$.

dl-.
Anhydride: cryst. from hot H_2O . M.p. 255-7°. Sol. alkalis. Very spar. sol. cold H_2O and dil. acids. Insol. EtOH, Et_2O .

Fischer, Schrauth, *Ann.*, 1907, 354, 21.
Fischer, *Ber.*, 1904, 37, 2496.
Greenstein, *J. Biol. Chem.*, 1932, 95, 465.
Abderhalden, *Fermentforschung*, 1931, 12, 295; 1930, 11, 399, (*Chem. Abstracts*, 1931, 25, 2694; 1930, 24, 3218).

Glycylvaline



$\text{C}_7\text{H}_{14}\text{O}_3\text{N}_2$ MW, 174

d-.
Needles from EtOH.Aq. M.p. 254° (sinters at 239°). Sol. 2 parts cold H_2O . $[\alpha]_D^{20} - 19.6^\circ$ in H_2O ; -10.5° in normal HCl; -6.9° in normal NaOH.

Anhydride: needles. M.p. 266° (sinters at 260°). $[\alpha]_D^{20} + 20.5^\circ$ in AcOH; $+33^\circ$ in H_2O .

l-.
 $[\alpha]_D^{25} + 20.3^\circ$ in H_2O .

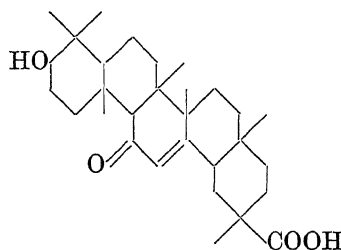
dl-.
M.p. 240°.

Dichloroacetyl deriv.: m.p. 152°.
Benzoyl deriv.: m.p. 135-6°.

$\text{C}_6\text{H}_5\cdot\text{NCO deriv.}$: m.p. 155°.

Fischer, Scheibler, *Ann.*, 1908, 363, 140.
Levene, Steiger, Rothen, *J. Biol. Chem.*, 1932, 97, 717.
Abderhalden, *Fermentforschung*, 1928, 10, 213, (*Chem. Abstracts*, 1929, 23, 1389).

Glycyrrhetic Acid



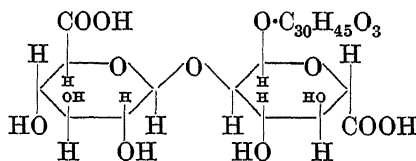
$\text{C}_{30}\text{H}_{46}\text{O}_4$ MW, 470

The aglycone from glycyrrhinic acid, the sweet principle of liquorice, *Glycyrrhiza glabra*, Linn. Needles from AcOH- Et_2O -ligroin. M.p. 297-8°. $[\alpha]_D + 163^\circ$ in CHCl_3 .

Me ester: needles from EtOH. M.p. 253-5°.
Acetyl: m.p. 300°. $[\alpha] + 145^\circ$ in CHCl_3 .

Ruzicka, Leuenberger, *Helv. Chim. Acta*, 1936, 19, 1402.
Ruzicka *et al.*, *Helv. Chim. Acta*, 1937, 20, 312, 1271.
Ruzicka, Marxer, *Helv. Chim. Acta*, 1939, 22, 195.
Ruzicka, Jeger, *Helv. Chim. Acta*, 1942, 25, 775.
Bilham, Kon, Ross, *J. Chem. Soc.*, 1942, 535.
Ruzicka, Jeger, Winter, *Helv. Chim. Acta*, 1943, 26, 265.

Glycyrrhinic Acid



Partial structure

$\text{C}_{42}\text{H}_{62}\text{O}_{16}$ MW, 822

Acidic saponin of liquorice root. $[\alpha]_D^{17} + 46.2^\circ$ in EtOH.

NH₄ salt: needles from EtOH. $[\alpha]_D^{17} + 43.2^\circ$ in EtOH.

Tri-Me ester, penta-Me ether: leaves from EtOH. M.p. 275-6°. $[\alpha]_D^{18} + 34.3^\circ$ in CHCl_3 .

Tschirsch, Cederburg, *Arch. Pharm.*, 1907, 245, 97.
Vass, Klein, Sauer, *Ber.*, 1937, 70, 122.
Lythgoe, Trippett, *J. Chem. Soc.*, 1950, 1986.

Glyoxal (Diformyl) $\text{C}_2\text{H}_2\text{O}_2$

MW, 58

Yellow prisms. M.p. 15° . B.p. 51° . The vapour has green col. and burns with violet flame. D_{20}^{20} 1.14. n_D^{20} 1.3826. Very sol. ord. org. solvents. Polymerises on standing or in presence of trace of H_2O . Aq. sol. contains monomolecular glyoxal, reacts weakly acid, reduces $\text{NH}_3\cdot\text{AgNO}_3$, does not reduce Fehling's.

Di-acetate: diacetoxyacetaldehyde. $\text{C}_6\text{H}_8\text{O}_5$. MW, 160. B.p. $92-3^\circ/6$ mm. n_D^{22} 1.4320. *2:4-Dinitrophenylhydrazones*: m.p. $143-4^\circ$. *Dimedone deriv.*: m.p. $169.5-170^\circ$.

Tetra-acetate: tetragonal cryst. from H_2O or AcOH . M.p. $106-7^\circ$.

Tetra-Et acetal: $\text{C}_{10}\text{H}_{22}\text{O}_4$. MW, 206. B.p. 180° , $88-9^\circ/14$ mm.

Dibenzyl mercaptal: m.p. 174° decomp. *Phenylhydrazones*: needles from pet. ether. M.p. 89° .

Phenylosazone: m.p. $169-70^\circ$ part. decomp.

p-Bromophenylosazone: m.p. 215° decomp.

p-Chlorophenylosazone: m.p. 227° decomp.

p-Nitrophenylosazone: m.p. 310° decomp.

p-Tolylbenzylosazone: m.p. 221° .

o-Tolylosazone: m.p. $105-6^\circ$.

m-Tolylosazone: m.p. $125-6^\circ$.

p-Tolylosazone: m.p. 224° .

α -*Naphthylsazone*: m.p. 211° .

β -*Naphthylsazone*: m.p. 252° .

m-Nitrobenzohydrazones: m.p. $339.5-340.5^\circ$.

Dioxime: see Glyoxime.

"*Sulphate*": $[-\text{CHO}_2\text{SO}_2]_2$. Colourless needles. M.p. $176-7^\circ$. Sol. H_2O .

Consortium für elektrochemische Industrie, D.R.P., 573,721, (*Chem. Abstracts*, 1933, 27, 4253).

I.C.I., F.P., 734,537; D.R.P., 574,162, (*Chem. Abstracts*, 1933, 27, 999, 3486).

I.G., D.R.P., 521,722, (*Chem. Abstracts*, 1931, 25, 3363).

Ruggli, Henzi, *Helv. Chim. Acta*, 1929, 12, 362.

Kindler, *Ber.*, 1921, 54, 647.

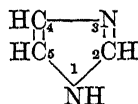
Hess, Uibrig, *Ber.*, 1917, 50, 365.

Glyoxaldiurene.

See Glycoluril.

Glyoxalic Acid.

See Glyoxylic Acid.

Glyoxaline (Iminazole, 1:3-diazole) $\text{C}_3\text{H}_4\text{N}_2$

MW, 68

Thick prisms. M.p. $88-9^\circ$. B.p. 255° . Easily sol. H_2O , EtOH , Et_2O . Strongly basic. Un-

attacked by H_2CrO_4 . $\text{KMnO}_4\cdot\text{Aq.} \rightarrow$ formic acid. $\text{H}_2\text{O}_2 \rightarrow$ oxamide.

Benzoyl: leaflets. M.p. $202-3^\circ$. *Dibromide*: m.p. 255° .

B,AuCl₃: decomp. at 190° .

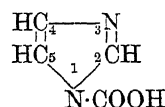
B,H,AuCl₄: yellow needles. Decomp. at 230° .

Oddo, *Gazz. chim. ital.*, 1932, 62, 1092; 1928, 58, 573; 1926, 56, 958.

Ruggli, Henzi, *Helv. Chim. Acta*, 1929, 12, 362 (*Bibl.*).

Pyman, *J. Soc. Dyers Colourists*, 1920, 36, 107 (*Review*).

Snyder, Handrick, Brooks, *Organic Syntheses*, 1942, XXII, 65.

Glyoxaline-1-carboxylic Acid (Iminazole-1-carboxylic acid) $\text{C}_4\text{H}_4\text{O}_2\text{N}_2$

MW, 112

The free acid is not known.

Et ester: $\text{C}_6\text{H}_8\text{O}_2\text{N}_2$. MW, 140. B.p. $135-8^\circ/60$ mm. *Picrate*: m.p. 124° .

John, *Ber.*, 1935, 68, 2283.

Glyoxaline-4-carboxylic Acid (Iminazole-4-carboxylic acid).

Amide: $\text{C}_4\text{H}_5\text{ON}_3$. MW, 111. Cryst. + $1\text{H}_2\text{O}$. M.p. 214° . *Hydrochloride*: m.p. 220° . *Picrate*: m.p. 208° .

Methylamide: prisms. M.p. 145° .

Picrate: m.p. 195° .

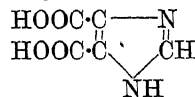
Hydrazide: cryst. + $1\text{H}_2\text{O}$. M.p. 213° . *Picrate*: m.p. 223° .

Gerard, Parrod, *Compt. rend.*, 1930, 190, 328.

Yabuta, Kambe, *Chem. Abstracts*, 1933, 27, 1882.

Balaban, *J. Chem. Soc.*, 1930, 270.

Parrod, *Bull. soc. chim.*, 1933, 53, 196.

Glyoxaline-4 : 5-dicarboxylic Acid (Iminazole-4 : 5-dicarboxylic acid) $\text{C}_5\text{H}_4\text{O}_4\text{N}_2$

MW, 156

Prisms. M.p. 288° decomp. k (first) = 2.85×10^{-4} ; (second) = 6.44×10^{-10} .

Mono-K salt: cryst. + $1\text{H}_2\text{O}$. M.p. 281° .

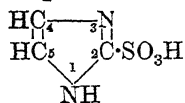
Di-Me ester: $\text{C}_7\text{H}_8\text{O}_4\text{N}_2$. MW, 184. M.p. $200-3^\circ$.

Diamide: $\text{C}_5\text{H}_6\text{O}_2\text{N}_4$. MW, 154. M.p. above 360° . *1-Me*: m.p. $263-6^\circ$ decomp.

Yllner, *Chem. Abstracts*, 1928, 22, 589.

Tamamushi, *Chem. Abstracts*, 1929, 23, 1639.

Baxter, Spring, *J. Chem. Soc.*, 1945, 229; 1947, 378.

Glyoxaline-2-sulphonic Acid $C_3H_4O_3N_2S$

MW, 148

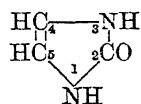
Colourless prisms + $1H_2O$ from H_2O . M.p. 303° (softens and darkens at 285°). Readily sol. hot H_2O . Sol. 8 parts cold H_2O . Insol. EtOH.

Barnes, Pyman, *J. Chem. Soc.*, 1927, 2711.

Glyoxaline-4(5)-sulphonic Acid.

Anhydrous cubes from H_2O . M.p. 307° .

Barnes, Pyman, *J. Chem. Soc.*, 1927, 2711.

Glyoxalone (2-Iminazolone) $C_3H_4ON_2$

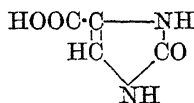
MW, 84

Pyramidal cryst. Decomp. at $250-1^\circ$ (darkens at 225°). Sol. hot H_2O , acids, alkalis.

1 : 3-Diacetyl : silky needles. M.p. $105-6^\circ$.

Hilbert, *J. Am. Chem. Soc.*, 1932, 54, 3413.

Duckinsky, Dolan, *J. Am. Chem. Soc.*, 1946, 68, 2350.

Glyoxalone-4-carboxylic Acid (2-Iminazolone-4-carboxylic Acid) $C_4H_4O_3N_2$

MW, 128

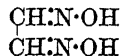
Colourless nodules from hot H_2O . M.p. 261° decomp. Insol. ord. org. solvents. Reduces Tollen's reagent and $NH_3 \cdot AgNO_3$. Aq. sol. + $FeCl_3 \rightarrow$ dark brown col. $CrO_3 \rightarrow$ parabanic acid.

Et ester : $C_6H_8O_3N_2$. MW, 156. Glistening plates from EtOH. Aq. M.p. 255° .

Hilbert, *J. Am. Chem. Soc.*, 1932, 54, 3413.

Glyoxylylcarbinol.

See Glycerosone.

Glyoxime (Glyoxal-dioxime, di-isonitrosoethane) $C_2H_4O_2N_2$

MW, 88

Plates from H_2O . M.p. 178° . Sublimes. Sol. hot H_2O , EtOH, Et_2O . Aq. sol. reacts weakly acidic.

Dibenzoyl : m.p. 139° .

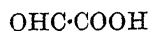
Milone, *Chem. Abstracts*, 1933, 27, 706.

Bamberger, Seligman, *Ber.*, 1903, 36, 3831.

Hantzsch, Wild, *Ann.*, 1896, 289, 293.

Glyoximic Acid.

See Isonitrosoacetic Acid.

Glyoxylic Acid (Glyoxalic acid, aldehydoformic acid) $C_2H_2O_3$

MW, 74

Occurs in plant and animal tissues and fluids. Colourless prisms. M.p. 98° . Very sol. cold $H_2O \rightarrow$ yellow sol. Spar. sol. EtOH, Et_2O , C_6H_6 . Slowly reduces $NH_3 \cdot AgNO_3$. $k = 0.474 \times 10^{-3}$ at 25° . Heat above m.p. \rightarrow glycollic + oxalic acids + H_2O .

Me ester : $C_3H_4O_3$. MW, 88. Leaflets. M.p. 53° . *Semicarbazone* : m.p. 206° decomp.

Et ester : $C_4H_6O_3$. MW, 102. B.p. 130° . *Oxime* : acetyl deriv., b.p. $118^\circ/8$ mm. $D_4^{20} 1.1490$. $n_D^{20} 1.4507$.

Phenylhydrazones : m.p. $129-30^\circ$. *Semicarbazones* : m.p. 122° . 2 : 4 : 6-Tribromophenylhydrazones : m.p. 126° . p-Carbethoxyphenylhydrazones : pale yellow cryst. M.p. $92-3^\circ$. 2-Carboxy-5-chlorophenylhydrazones : m.p. $212-13^\circ$. $H_2SO_4 \rightarrow$ 6-chloroindazolone.

Anilide : m.p. $77-8^\circ$. 2 : 4-Dinitrophenylhydrazones : m.p. $171-2^\circ$.

Di-Me acetal : methyl ester, b.p. $60-1^\circ/2$ mm.

Di-Et acetal : diethoxyacetic acid. $C_6H_{12}O_4$. MW, 148. B.p. $108-10^\circ/11$ mm. *Et ester* : $C_6H_{16}O_4$. MW, 176. B.p. 199° , $83-5^\circ/13$ mm. $D_4^{25} 0.994$. *Phenyl ester* : b.p. $150-2^\circ/13$ mm. *Di-Me amide* : b.p. $105^\circ/12$ mm. *Dibenzylamide* : b.p. $168^\circ/1$ mm. *Nitrile* : b.p. $55-6^\circ/12$ mm.

Di-Et mercaptal : *di-Et ester*, b.p. $130-3^\circ/12$ mm.

Phenylhydrazones : (α) Decomp. on heating. (β) M.p. 144° (137°) decomp.

p-Nitrophenylhydrazones : m.p. 200° decomp.

2 : 4-Dichlorophenylhydrazones : decomp. at 150° .

2 : 4-Dinitrophenylhydrazones : m.p. 190° decomp.

2 : 4 : 6-Tribromophenylhydrazones : m.p. 170° decomp.

Benzylphenylhydrazones : m.p. 172° .

Oxime : see Isonitrosoacetic Acid.

Semicarbazones : m.p. 240° ($202-3^\circ$) decomp.

Phenylsemicarbazones : m.p. $183-4^\circ$.

p-Nitrophenylsemicarbazones : m.p. 249° .

α -Naphthylsemicarbazones : m.p. $190-1^\circ$.

Diureide : see Allantoin.

Mohrschulz, *Z. Elektrochem.*, 1926, 32, 434.

Hatcher, Holden, *Chem. Abstracts*, 1926, 20, 323.

Avy, *Bull. soc. chim.*, 1931, 49, 14.

Oroshnik, Sperry, *J. Am. Chem. Soc.*, 1941, 63, 3338.

Scheibler, Beiser et al., *Ber.*, 1934, 67, 1507.

Maurer, Drefahl, *Ber.*, 1942, 75, 1489.

Gmelinol $C_{22}H_{26}O_7$

MW, 402

Constituent of the wood of *Gmelina leichhardtii* ("Colonial beech"). Plates or prisms from H_2O or EtOH. M.p. 124° . $[\alpha]_D + 123.3^\circ$ in $CHCl_3$.

Acetyl: prisms from EtOH. M.p. 118° . B.p. $320^\circ/3$ mm.

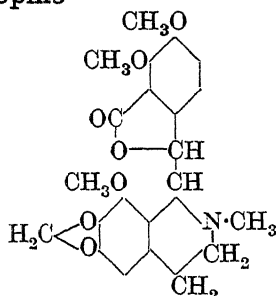
Phenylurethane: m.p. 189° .

Birch, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1938, **71**, 391.

Harradence, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1940, **74**, 117.

 α -Gnoscopine.

See Narcotine.

 β -Gnoscopine $C_{22}H_{23}O_7N$

MW, 413

Prisms from MeOH. M.p. 180° . HNO_3 . Aq. \rightarrow cotarnine + opianic acid.

B.HCl: m.p. $86-8^\circ$ ($224-6^\circ$ on standing).

Picrate: m.p. $199-201^\circ$.

Hope, Robinson, *J. Chem. Soc.*, 1914, **105**, 2085.

Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1318.

Gofruside.

See under Corotoxigenin.

Gorlic Acid $C_{18}H_{30}O_2$

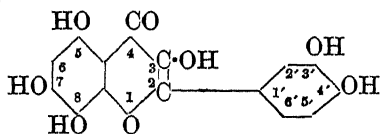
MW, 278

Occurs as glyceride in *Oncoba echinata*, Oliver (Gorli). Oil. $D_{20}^{25} 0.9364$. Turns yellow in air.

Amide: $C_{18}H_{31}ON$. MW, 277. Cryst. from Me_2CO . M.p. 95° .

André, Jouatte, *Bull. soc. chim.*, 1928, **43**, 352.

Gossypetin (3:5:7:8:3':4'-Hexahydroxy-flavone)

 $C_{15}H_{10}O_8$

MW, 318

Colouring matter of Indian cotton flowers, *Gossypium herbaceum*, Linn. and other *G.* species and of *Hibiscus sabdariffa*, Linn. Yellow needles.

M.p. $311-13^\circ$ ($310-14^\circ$). Sol. EtOH, Et_2O . Spar. sol. H_2O .

3:5:8:3':4'-Penta-Me ether: $C_{20}H_{20}O_8$. MW, 388. M.p. $253-4^\circ$.

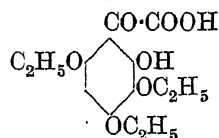
Hexa-Me ether: $C_{21}H_{22}O_8$. MW, 402. M.p. $170-2^\circ$.

Hexa-Et ether: $C_{27}H_{34}O_8$. MW, 486. M.p. $144-6^\circ$.

Hexa-acetyl: m.p. $229-30^\circ$.

Baker, Nodzu, Robinson, *J. Chem. Soc.*, 1929, 74 (Bibl.).

Gossypetonic Acid (2-Hydroxy-3:4:6-triethoxybenzoylformic acid)

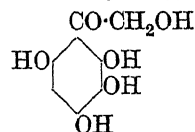
 $C_{14}H_{18}O_7$

MW, 298

Yellow needles from C_6H_6 . M.p. $154-5^\circ$ decomp.

Perkin, *J. Chem. Soc.*, 1913, **103**, 655.

Gossypitol (ω -2:3:4:6-Pentahydroxyacetophenone, 2:3:4:6-tetrahydroxyphenacyl alcohol)

 $C_8H_8O_6$

MW, 200

ω -3:4:6-Tetra-Me ether: $C_{12}H_{16}O_6$. MW, 256. Needles from EtOH. M.p. $115-16^\circ$.

ω -2:3:4-Tetra-Et ether: $C_{16}H_{24}O_6$. MW, 312. M.p. $46-8^\circ$. Oxime: m.p. $93-5^\circ$.

ω -3:4:6-Tetra-Et ether: m.p. $110-11^\circ$. Oxime: m.p. $127-9^\circ$.

Perkin, *J. Chem. Soc.*, 1913, **103**, 653.

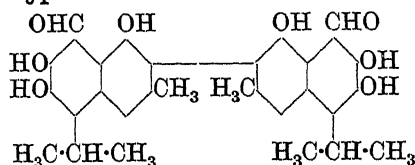
Gossypitone $C_{15}H_{18}O_8$

MW, 316

Red needles. Sol. Py, quinoline. Spar. sol. hot H_2O . Insol. EtOH, $PhNO_2$. Alkalis \rightarrow blue col.

Hexa-acetyl deriv.: m.p. $228-30^\circ$.

Perkin, *J. Chem. Soc.*, 1913, **103**, 657.

Gossypol

Suggested structure

 $C_{30}H_{30}O_8$

MW, 518

Toxic principle of cottonseed. Yellow cryst. from pet. ether. M.p. 214° . Red form: m.p.

184–5°. Cryst. +1HCOOH, m.p. 197–8°; O_3 → gossypolic acid. Conc. H_2SO_4 → scarlet col. $FeCl_3$ → dark olive-green col. $Ni(OAc)_2$ → violet col. $SnCl_4$ → dark red col.

Tetra-Me ether: m.p. 259–60°. *Diacetyl*: m.p. 264–5°.

Hexa-Me ether: colourless form. (α) Cryst. from Me_2CO – $MeOH$. M.p. 231–2°. (β) Cryst. from pet. ether. M.p. 221°. Red form: m.p. 158–60°.

Hexa-Et ether: colourless form. (α) Cryst. from Me_2CO – $MeOH$. M.p. 231–2°. (β) Cryst. from pet. ether. M.p. 211–12°. Red form: m.p. 128–30°.

Hexa-acetyl: m.p. 276–9°.

Hexa-benzoyl: m.p. 202–4° decomp.

Di-phenylthydrazone: yellow plates from C_6H_6 . M.p. 303°.

Di-Py salt: dark yellow cryst. M.p. 167–9°.

Campbell, Morris, Adams, *J. Am. Chem. Soc.*, 1937, 59, 1723, 1729.

Adams et al., *J. Am. Chem. Soc.*, 1941, 63, 2439.

Gossypolic Acid

$(C_{12}H_{14}O_4)_2$ MW, 444

Cryst. from EtOH. M.p. 241°. $FeCl_3$ on EtOH sol. → violet col.

Di-Me ether: prisms from dil. EtOH. M.p. 231–3°. *Di-Me ester*: needles from dil. MeOH. M.p. 138–9°.

Karrer, Tobler, *Helv. Chim. Acta*, 1932, 15, 1209.

Adams et al., *J. Am. Chem. Soc.*, 1941, 63, 2439.

Gossypose.

See Raffinose.

Gossypyl Alcohol

$C_{30}H_{62}O$ MW, 438

Occurs in wax of American cotton. (α) M.p. 87–8°. Spar. sol. $CHCl_3$, Et_2O . (β) M.p. 86°. Mod. sol. $CHCl_3$, Et_2O . (γ) M.p. 82–3°. Sol. $CHCl_3$, Et_2O .

Fargher, Probert, *Chem. Abstracts*, 1923, 17, 1890; 1924, 18, 2813.

Gramicidin.

Antibiotic polypeptide elaborated by strains of *Bacillus brevis*. As normally obtained, gramicidin is a mixture of at least four entities of which gramicidin A (leaves from Me_2CO , m.p. 227–8°) and gramicidin B (rods from Me_2CO , m.p. 258–9°) are best characterized. Neither contains ionizable groups, the only reactive functions being hydroxyl and the indole nucleus. Hyd. of either comp. → tryptophan, glycine, alanine, valine, leucine and ethanolamine. The suggested unit of structure—of MW approximately 2000—is formed from four residues each of *d*-leucine and *l*-tryptophan, two

each of *d*-valine, *l*-valine and *l*-alanine and one each of glycine and ethanolamine.

James, Synge, *Biochem. J.*, 1951, 50, 109 (Bibl.).

Gregory, Craig, *J. Biol. Chem.*, 1948, 172, 839.

Craig, Gregory, Barry, *Cold Springs Harbour Symposium on quantitative biology*, 1950, 14, 24.

Synge, *Biochem. J.*, 1949, 44, 542.

Hotchkiss, Dubos et al., *J. Biol. Chem.*, 1940, 132, 791; 1941, 141, 155.

Gramicidin S (Soviet gramicidin).

Antibiotic polypeptide elaborated by strains of *Bacillus brevis*. Similar to, but not identical with, gramicidin. Cryst. from Me_2CO . Aq. M.p. 268–70°. Sol. Et_2O , EtOH, Me_2CO . Insol. H_2O , acids, alkalis. $[\alpha]_D^{25} - 292^\circ$. Gives biuret and xanthoproteic reactions. Ninhydrin → blue col. MW about 2000. Thermostable. The suggested minimum unit of structure contains one residue each of *l*-ornithine, *l*-proline, *l*-valine, *l*-leucine and *d*-phenylalanine, the sequence being α -*l*-valyl-*l*-ornithyl-*l*-leucyl-*d*-phenylalanyl-*l*-prolyl.

Gauze, Braznikov, *Chem. Abstracts*, 1945, 39, 1893, 1894.

Hausze et al., *Chem. Abstracts*, 1946, 40, 918.

Synge, *Biochem. J.*, 1945, 39, 363.

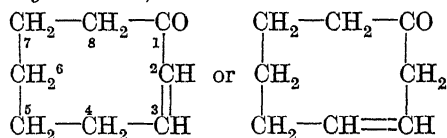
Sanger, *Biochem. J.*, 1946, 40, 261.

Consden, Gordon, Martin, Synge, *Biochem. J.*, 1946, 40, xlii; 1947, 41, 596.

Gramine.

See Donaxine.

Granatal (Δ^2 (or Δ^3)-Cyclo-octenone, 3 (or 4)-ketocyclo-octene)

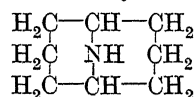


$C_8H_{12}O$ MW, 124

B.p. 200–1°, 73.3–74°/8 mm. D_4^{20} 0.990. Sol. ord. org. solvents. Reduces Tollen's reagent. Ox. → adipic acid.

Willstätter, Waser, *Ber.*, 1911, 44, 3424.

Granatanine (Dihydrogranatanine, 2 : 6-trimethylenepiperidine, "norggranatanine")



$C_8H_{15}N$ MW, 125

Needles. M.p. 50–60°. Zn dust dist. → 2-propylpyridine.

$B.HAuCl_4$: yellow plates from H_2O . M.p. 225°. Sol. hot H_2O .

B_2, H_2PtCl_6 : yellow plates from dil. HCl. M.p. above 255° .

N-Benzoyl: needles from pet. ether. M.p. 111° .

N-Nitroso: cryst. from pet. ether. M.p. 148° . Sol. hot H_2O , Et_2O , C_6H_6 .

N-Me: see N-Methylgranatanine.

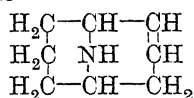
Ciamician, Silber, *Ber.*, 1893, 26, 2750; 1894, 27, 2851.

Cope, Overberger, *J. Am. Chem. Soc.*, 1948, 70, 1433.

Granataninol.

See Granatoline.

Granatenine



$C_8H_{13}N$ MW, 123

Free base not isolated.

$B, HAuCl_4$: yellow plates from dil. HCl. M.p. 186° .

B_2, H_2PtCl_6 : yellowish-red cryst. M.p. above 260° .

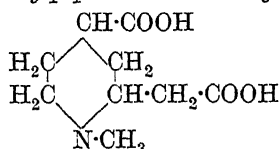
N-Me: see N-Methylgranatenine.

Ciamician, Silber, *Ber.*, 1894, 27, 2857.

Granatic Acid.

There are two Granatic Acids described in the literature.

(1) Granatic Acid (N-Methylpiperidine-4-carboxylic acid-2-acetic acid, homotropinic acid, 2-[N-methyl-4-carboxypiperidyl]-acetic acid, N-methyl-2-carboxymethylpiperidine-4-carboxylic acid)



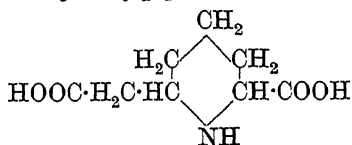
$C_9H_{15}O_4N$ MW, 201

M.p. $240-5^\circ$ decomp.

$B, HAuCl_4$: m.p. 190° decomp.

Ciamician, Silber, *Ber.*, 1896, 29, 487.

(2) Granatic Acid (Piperidine-2-carboxylic acid-6-acetic acid, 2-[6-carboxypiperidyl]-acetic acid, 6-carboxymethylpiperidine-2-carboxylic acid)



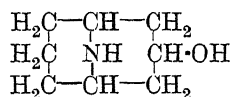
$C_8H_{13}O_4N$ MW, 187

Yellow prisms. M.p. 270° .

N-Me di-Me ester: $C_{11}H_{19}O_4N$. MW, 229. Oil. Methiodide: m.p. 167° .

Piccinini, *Gazz. chim. ital.*, 1899, 29, i, 415; ii, 104.

Granatoline (Granataninol, 3-hydroxygranatanine)



$C_8H_{15}ON$ MW, 141

Needles and prisms from Et_2O . M.p. 134° . Sol. H_2O , $EtOH$. Spar. sol. Et_2O .

$B, HAuCl_4$: yellow needles and prisms from dil. HCl. M.p. 215° .

N-Nitroso: plates + H_2O . M.p. $72-3^\circ$, anhyd. 125° .

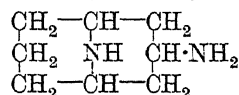
N-Acetyl: m.p. 120° . O-Acetyl: m.p. 80° .

N-Me: see N-Methylgranatoline.

Ciamician, Silber, *Ber.*, 1894, 27, 2855.

Note. These authors refer to the above compound as "Norgranatoline" and the N-Me deriv. as "Granatoline."

Granatylamine (3-Aminogranatanine)



$C_8H_{16}N_2$ MW, 140

Imino-N-Me: $C_9H_{18}N_2$. MW, 153. Oil. B.p. $235-40^\circ$ decomp., $160-70^\circ/60$ mm. Sol.

H_2O . Platinichloride: m.p. $260-1^\circ$ decomp.

$B, (HAuCl_4)_2$: yellow cryst. M.p. $238-9^\circ$.

Piccinini, Cortese, *Gazz. chim. ital.*, 1901, 31, i, 566.

Piccinini, Quartaroli, *Gazz. chim. ital.*, 1899, 29, ii, 119.

ψ -Granatylamine.

Stereoisomer of granatylamine. Prisms from pet. ether. M.p. 125° . Hygroscopic.

Picrate: decomp. at $230-47^\circ$.

Imino-N-Me: oil. B.p. $232-6^\circ$. Sol. H_2O . Platinichloride: m.p. 265° decomp.

$B, (HAuCl_4)_2$: m.p. $231-2^\circ$ decomp. Picrate: m.p. $239-40^\circ$ decomp.

Platinichloride: m.p. 256° .

Aurichloride: m.p. 208° decomp.

Piccinini, Cortese, *Gazz. chim. ital.*, 1901, 31, i, 566.

Grantianine

$C_{18}H_{23}O_7N$ MW, 365

Alkaloid from seeds of *Crotalaria grantiana*. M.p. $204-5^\circ$. $[\alpha]_D^{25} +50.6^\circ$ in $CHCl_3$.

Methiodide: m.p. $242-3^\circ$.

Picrate: m.p. $225-8^\circ$.

Adams, Carmack, Rogers, *J. Am. Chem. Soc.*, 1942, 64, 571.

Gratiogenin

$C_{31}H_{50}O_5$

MW, 502

Plates from EtOH. M.p. 198°. Sol. EtOH. Spar. sol. H₂O, Et₂O.

Retzlaff, *Chem. Zentr.*, 1903, I, 42.

Gratioligenin

C₃₇H₆₀O₁₀ MW, 664

Needles from EtOH. M.p. 285°. Spar. sol. EtOH. Insol. H₂O, Et₂O. Hyd. → glucose + gratigenin.

Retzlaff, *Chem. Zentr.*, 1903, I, 42.

Gratiolin

C₄₃H₇₀O₁₅ MW, 826

Diglucoside from tubers of *Gratiola officinalis*. Needles. M.p. 235–7° decomp. Sol. EtOH. Spar. sol. H₂O. Insol. Et₂O. Hyd. → glucose + gratigenin.

Retzlaff, *Chem. Zentr.*, 1903, I, 42.

Gratiolone.

See Betulinic Acid.

Grayanotoxin I

C₂₂H₃₆O₇ MW, 412

Present in *Leucothoe grayana*, Max. Colourless prisms from AcOEt. M.p. 249°. [α]_D²⁰ –6.36°.

Triacetyl deriv.: m.p. 226°.

Tribenzoyl deriv.: m.p. 202–3°.

Mujajima, Takei, *Chem. Abstracts*, 1936, 30, 6747.

Grayanotoxin II

C₂₀H₃₂O₅ MW, 352

Rhombic plates from AcOEt. M.p. 190–1° (197–8°). [α]_D²⁰ –41.88°.

Tetra-acetyl deriv.: m.p. 171–2°.

Di-hydro deriv.: m.p. 247–60°.

Mujajima, Takei, *Chem. Abstracts*, 1936, 30, 6747.

Nakajima, Iwasa, *Chem. Abstracts*, 1950, 44, 1090.

Nakajima, Miyajima, *ibid.*, 7811.

Grayanotoxin III (Desacetylgrayanotoxin I)

C₂₀H₃₄O₆ MW, 370

Cryst. + ½ H₂O. M.p. 235–243°.

Tetra-acetyl: identical with triacetyl deriv. of grayanotoxin I, *q.v.*

Mujajima, Takei, *Chem. Abstracts*, 1936, 30, 6747.

Grindelol

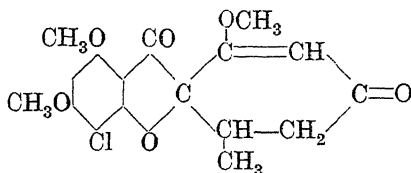
C₂₃H₃₈O₄ (?) MW, 378

Phytosterol glucoside from *Grindelia camporum*. M.p. 257°.

Acetyl deriv.: m.p. 161°.

Power, Salway, *J. Chem. Soc.*, 1913, 103, 402.

Griseofulvin



C₁₇H₁₇O₆Cl MW, 352.5

Metabolic product of *Penicillium griseofulvum* Dierck. Cryst. from EtOH. M.p. 218–19°. Spar. sol. Me₂CO, AcOEt, CHCl₃, C₆H₆, dioxan. Insol. H₂O. [α]_D¹⁹ +417° in Me₂CO, [α]_D¹⁹ +354° in Me₂CO.

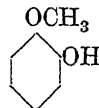
Oxford, Raistrick, Simonart, *Biochem. J.*, 1939, 33, 240.

Grove, (John, Frederick) *et al.*, *Chemistry and Industry*, 1951, 219; *J. Chem. Soc.*, 1952, 3949 *et seq.*

Guacamphol.

See under d-Camphoric Acid.

Guaiacol (Catechol methyl ether, o-hydroxyanisole, o-methoxyphenol)



C₇H₈O₂ MW, 124

(a) Prisms. F.p. 28.20°. M.p. 32° (28.4°). B.p. 205° (204.65°/746 mm.), 106.5°/24 mm. D₄^{21.4} 1.1287. (b) Needles. F.p. –3.2°. Sol. ord. org. solvents. Spar. sol. H₂O. FeCl₃ → green col.

Formyl: guaiacol formate. B.p. 80°/1 mm., 109°/12 mm. D₄²⁴ 1.1251. n_D²⁴ 1.51364.

Acetyl: guaiacol acetate. B.p. 107°/22 mm. (123.4°/13 mm.). D₄²⁵ 1.1285. n_D²⁵ 1.5101.

Mono-guaiacol carbonate: Me ester: C₉H₁₀O₄. MW, 182. B.p. 132–4°/16 mm. Et ester: C₁₀H₁₂O₄. MW, 196. B.p. 265°. Propyl ester: C₁₁H₁₄O₄. MW, 210. B.p. 201–2°/90 mm. D₄^{1.116}. n_D^{15.7} 1.49872. Phenyl ester: C₁₄H₁₂O₄. MW, 244. M.p. 82°.

Di-guaiacol carbonate: duotal. C₁₅H₁₄O₅. MW, 274. M.p. 86°.

Di-guaiacol oxalate: C₁₆H₁₄O₆. MW, 302. M.p. 127°.

Mono-guaiacol succinate: C₁₁H₁₂O₅. MW, 224. M.p. 75°.

Di-guaiacol succinate: C₁₈H₁₈O₆. MW, 330. M.p. 135°.

Benzoyl: guaiacol benzoate. M.p. 57–8°.

3:5-Dinitrobenzoyl: m.p. 141–2°.

p-Nitrophenylacetyl: m.p. 107.1–107.8°.

Cinnamoyl: see Styralol.

p-Bromobenzenesulphonyl: m.p. 103–4°.

Picrate: m.p. 90°. Unstable.

Tri-guaiacol borate: b.p. above 200°/2 mm. M.p. 101–101.8°.

Phosphate: m.p. 91°.

Me ether: see Veratrol.

Et ether: 1-methoxy-2-ethoxybenzene, *o*-methoxyphenetole. $C_9H_{12}O_2$. MW, 152. B.p. 207–9°, 104°/18 mm. D_4^{25} 1.0433. n_D^{25} 1.5210.

Propyl ether: 1-methoxy-2-propoxybenzene, propyl *o*-methoxyphenylether. $C_{10}H_{14}O_2$. MW, 166. B.p. 142–3°/68 mm. D_4^{25} 1.0174. n_D^{25} 1.5119.

n-Butyl ether: 1-methoxy-2-butoxybenzene, butyl *o*-methoxyphenylether. $C_{11}H_{16}O_2$. MW, 180. B.p. 178°/132 mm. D_4^{25} 0.9990. n_D^{25} 1.5067.

Vinyl ether: $C_9H_{10}O_2$. MW, 150. B.p. 202–3°.

Allyl ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 116°/14 mm. D_4^{15} 1.058.

β -*Bromoethyl ether*: $C_9H_{11}O_2Br$. MW, 231. M.p. 43–5°. B.p. 135–40°/7 mm.

β -*Hydroxyethyl ether*: $C_9H_{12}O_3$. MW, 168. B.p. 166–7°/22 mm.

1-*Monoglyceryl ether*: guaiamar. $C_{10}H_{14}O_4$. MW, 198. M.p. 78.5–9°.

1:3-*Diglyceryl ether*: $C_{17}H_{20}O_5$. MW, 304. M.p. 72.5°.

d-Glucoside: $C_{13}H_{18}O_7$. MW, 286. M.p. 156.5–7°.

Cetyl ether: $C_{23}H_{40}O_2$. MW, 348. M.p. 54°. $D_4^{19.4}$ 0.8740.

Phenyl ether: see under 2-Hydroxydiphenyl Ether.

Benzyl ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 57.5–58.5°. B.p. 168–70°/13 mm. n_D^{25} 1.5780.

Phenacyl ether: see under *o*-Hydroxyphenyl phenacyl Ether.

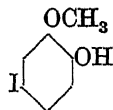
Tanaka, Ishimasa, Koyama, *Chem. Abstracts*, 1926, 20, 2670.

Gallotti, *Chem. Abstracts*, 1933, 27, 4530 (*Bibl.*).

Titherley, Hudson, U.S.P., 1,878,061, *ibid.*, 312.

Hirao, *J. Chem. Soc. Japan*, 1932, 53, 488.

Guaiadol (5-Iodoguaiacol, 4-iodocatechol 2-methyl ether)



$C_7H_7O_2I$ MW, 250

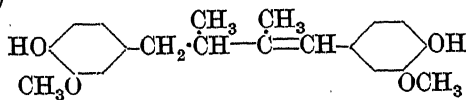
Prisms. M.p. 43°. Sol. ord. org. solvents. Spar. sol. H_2O .

Mameli, Pinna, *Chem. Zentr.*, 1907, II, 2045.

Guaiamar.

See under Guaiacol.

Guaiaretic Acid (2-[4-Hydroxy-3-methoxybenzyl]-3-[4-hydroxy-3-methoxybenzylidene]-butane)



$C_{20}H_{24}O_4$ MW, 328

Leaflets from EtOH. M.p. 99–100.5°. $[\alpha]_D^{25}$ –94° in EtOH.

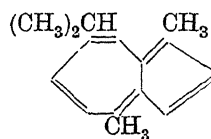
dl-Di-Me ether: $C_{22}H_{28}O_4$. MW, 356. Plates from MeOH. M.p. 112–13°.

Di-Et ether: $C_{24}H_{32}O_4$. MW, 384. *l*: prisms from MeOH. M.p. 95–6°. $[\alpha]_D^{25}$ –48.0° in EtOH. *dl*: prisms. M.p. 103–4°.

Haworth, Mavin, Sheldrick, *J. Chem. Soc.*, 1934, 1423 (*Bibl.*).

Haworth, Richardson, *J. Chem. Soc.*, 1935, 120.

Guaiazulene (1:4-Dimethyl-7-isopropylazulene)



$C_{15}H_{18}$ MW, 198

Bluish violet plates from EtOH. M.p. 31.5°. B.p. 167–8°/12 mm. D_4^{19} 0.9728 (supercooled liq.). Absorption maxima in Et_2O or pet. ether: 6620, 6320, 6030, 5810, 5560 Å.

Picrate: black needles from EtOH. M.p. 122–122.5°. Stable only in presence of excess picric acid.

Styphnate: black needles from MeOH. M.p. 105–6°. Stable only in presence of excess styphnic acid.

sym.-*Trinitrobenzene add. comp.*: m.p. 151–151.5°.

sym.-*Trinitrotoluene add. comp.*: m.p. 89°.

Ruzicka, Rudolph, *Helv. Chim. Acta*, 1926, 9, 134.

Birrell, *J. Am. Chem. Soc.*, 1934, 56, 1248.

Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, 14, 1104.

Pfau, Plattner, *Helv. Chim. Acta*, 1936, 19, 871.

Plattner, Lemay, *Helv. Chim. Acta*, 1940, 23, 897.

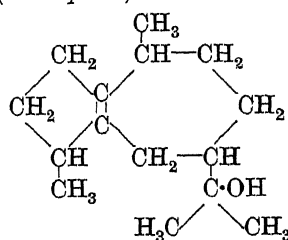
Perrottet, Taub, Briner, *Helv. Chim. Acta*, 1940, 23, 1260.

Plattner et al., *Helv. Chim. Acta*, 1949, 32, 2137.

Guaiene.

See 2:3-Dimethylnaphthalene.

Guaiol (Champacol)



Suggested structure

$C_{15}H_{26}O$

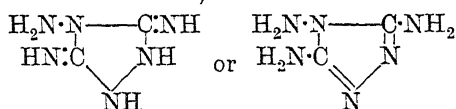
MW, 222

Sesquiterpene alcohol occurring in guaiacum resin. Prisms from EtOH. M.p. 91°. B.p. 288°. Degradation \rightarrow 1:4-dimethylazulene.

Ruzicka, Haagen-Smit, *Helv. Chim. Acta*, 1931, 14, 1122.

Plattner, Magyar, *Helv. Chim. Acta*, 1942, 25, 581.

Guanazine (4-(N-)Aminoguanazole, 4-amino-3:5-di-imino-1:2:4-triazole, or 3:4:5-tri-amino-1:2:4-triazole)



$\text{C}_2\text{H}_6\text{N}_6$ MW, 114

Yellowish-white cryst. from H_2O or EtOH. M.p. 257° decomp. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O . Reacts alkaline. Reduces warm NH_3 , AgNO_3 and Fehling's.

B, HNO_3 : m.p. 210°.

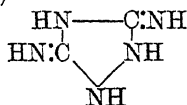
$\text{B}_2, \text{H}_2\text{SO}_4, \text{H}_2\text{O}$: m.p. 275°.

$\text{B}, \text{CH}_3\cdot\text{COOH}, 1\frac{1}{2}\text{H}_2\text{O}$: m.p. 175°.

Triacetyl deriv.: needles from EtOH. M.p. 240°.

Pellizzari, Repetto, *Gazz. chim. ital.*, 1907, 37, ii, 317.

Guanazole (3:5-Di-imino-tetrahydro-1:2:4-triazole)



$\text{C}_2\text{H}_5\text{N}_5$ MW, 99

Prisms from H_2O . M.p. 206°. Sol. H_2O , EtOH. Insol. Et_2O , CHCl_3 , C_6H_6 . $\text{FeCl}_3 \rightarrow$ red col.

B, HCl : m.p. 100°.

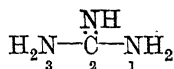
$\text{B}, 2\text{HCl}$: m.p. 145°.

B, HNO_3 : m.p. 165°.

Picrate: m.p. 245°.

Pellizzari, *Gazz. chim. ital.*, 1894, 24, i, 491; 1901, 31, i, 500.

Guanidine (Carbamidine, iminourea)



CH_5N_3 MW, 59

Cryst. caustic solid.

B, HNO_2 : m.p. 76-78.5°.

B, HNO_3 : m.p. 214°.

B, HClO_3 : m.p. 100-1°.

B, HClO_4 : m.p. 245-6°.

$\text{B}_2, \text{H}_2\text{CO}_3$: m.p. 197°.

$\text{B}_2, \text{H}_2\text{CS}_3$: m.p. 133-5°.

$\text{B}, \text{CH}_3\cdot\text{COOH}$: m.p. 229-30°.

$\text{B}, \text{CH}_2\text{Br}\cdot\text{CHBr}\cdot\text{COOH}$: m.p. 107-8°.

$\text{B}, \text{C}_2\text{H}_5\text{OCO}\cdot\text{COOH}$: m.p. 134-6°.

$\text{B}, \text{C}_2\text{H}_5\text{OCO}\cdot\text{CH}_2\cdot\text{CH}_2\cdot\text{COOH}$: m.p. 136-8°.

$\text{B}, \text{C}_6\text{H}_5\text{SO}_3\text{H}$: m.p. 209-10°.

Alizarin-disulphonate: m.p. 259°.

Picrate: m.p. 333°.

m-Br-picrolonate: decomp. at 275°.

Helianthate: m.p. 270°.

1-N-Formyl: m.p. 178° decomp.

1-N-Acetyl: m.p. 145°.

1-N-Chloroacetyl: m.p. 125°.

1-N-Trichloroacetyl: m.p. 183°.

1:2-N-Diacetyl: m.p. 271°.

1:3-N-Diacetyl: m.p. 152°.

1-N-Propionyl: B, HCl , m.p. 170-1°.

B, HAuCl_4 , m.p. 187°. $\text{B}_2, \text{H}_2\text{PtCl}_6$, m.p. 207-8°.

1:3-N-Dipropionyl: m.p. 85-6°.

1-N-Hippuryl: m.p. 183°. *Picrate*, decomp. above 300°.

N-Benzenesulphonyl: m.p. 212°. *Picrate*, m.p. 190-1°.

Manvelli, *Ann. chim. applicata*, 1933, 23, 235 (Review).

Müller, *Z. physiol. Chem.*, 1932, 209, 207.

Gluud, Keller, Schultze, *Chem. Abstracts*, 1932, 26, 2017; D.R.P., 545,713, (*ibid.*, 3517).

Sander, D.R.P., 527,237, (*Chem. Abstracts*, 1931, 25, 4559).

Smith, Sabetta, Steinbach, *Ind. Eng. Chem.*, 1931, 23, 1, 124.

Lecher, *Z. physiol. Chem.*, 1928, 176, 43.

Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, 174, 119.

Pellizzari, *Memorie della reale accademia nazionale dei Lincei*, 1924, 14, 707 (Review).

Guanidinoacetic Acid.

See Glycocyamine.

4-Guanidinobutylamine.

See Agmatine.

3-[1-Guanidino]-butyric Acid



$\text{C}_5\text{H}_{11}\text{O}_2\text{N}_3$ MW, 145

Cryst. + $2\text{H}_2\text{O}$ from H_2O .

B, HCl : m.p. 184°.

B, HAuCl_4 : m.p. 198-200°.

Engeland, Kutscher, *Ber.*, 1910, 43, 2882.

2-[1-Guanidino]-ethyl Alcohol (1-β-Hydroxyethylguanidine)



$\text{C}_3\text{H}_9\text{ON}_3$ MW, 103

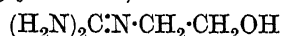
Benzoyl deriv.: *picrate*, m.p. 186°.

Tribenzoyl deriv.: m.p. 156°.

Picrate: m.p. 147°.

Fromm, Fantl, Fisch, *J. prakt. Chem.*, 1930, 124, 163.

2-[2-Guanidino]-ethyl Alcohol (2-β-Hydroxyethylguanidine)



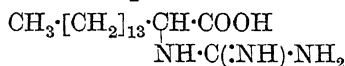
$\text{C}_3\text{H}_9\text{ON}_3$ MW, 103

M.p. 100–1°.

Picrate: m.p. 148–148.5°.

Kawai, *Chem. Abstracts*, 1931, **25**, 5665.

dl-1-Guanidinopalmitic Acid



$\text{C}_{17}\text{H}_{35}\text{O}_2\text{N}_3$ MW, 313

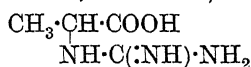
Cryst. from hot MeOH. M.p. 173° decomp.
Spar. sol. EtOH. Insol. H_2O , Et_2O , Me_2CO .

B, HCl: decomp. at 132–4°.

B, HNO_3 : m.p. 155–6° decomp.

Ramsay, *Ber.*, 1908, **41**, 4391.

dl-1-Guanidinopropionic Acid (*Alano-cyamine, alacreatine, isocreatine*)

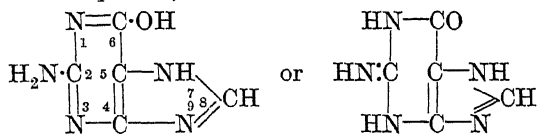


$\text{C}_4\text{H}_9\text{O}_2\text{N}_3$ MW, 131

Prisms from H_2O . M.p. 226° decomp. (rapid heat.). Sol. H_2O . Insol. Et_2O , Me_2CO .

Ramsay, *Ber.*, 1908, **41**, 4388.

Guanine (*2-Aminohypoxanthine, 6-hydroxy-2-amino-purine*)



$\text{C}_5\text{H}_5\text{ON}_5$ MW, 151

Occurs in guano, human faeces, etc. Cryst. Insol. H_2O . Heat of comb. 586.6 Cal. $\text{HCl} + \text{KClO}_3 \rightarrow$ guanidine + parabanic acid.

B, HBr , $2\frac{1}{2}\text{H}_2\text{O}$: m.p. 180°.

1:7-Di-Me: *hydrochloride*, m.p. 275°.
Picrate: m.p. 214°.

1-Me-7-Et: m.p. 256–7°. Picrate: m.p. 266° decomp.

Acetyl deriv.: m.p. above 260°.

Propionyl deriv.: m.p. above 260°.

Picrate: decomp. at 190°.

Hoppe-Seyler, Schmidt, *Z. physiol. Chem.*, 1928, **175**, 304.

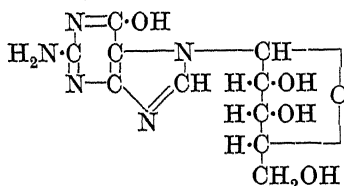
Fischer, *Ber.*, 1897, **30**, 2251.

Levene, *Biochem. Z.*, 1907, **4**, 320.

Guanopterin.

See Isoguanine.

Guanosine (*Vernine, guanine riboside*)



$\text{C}_{10}\text{H}_{13}\text{O}_5\text{N}_5$ MW, 283

Dict. of Org. Comp.—II.

Occurs in leaves and unripe berries of coffee plant. Needles from hot H_2O . M.p. 230–5° decomp. (239° decomp.). $[\alpha]_D^{20} - 64^\circ$ in NaOH. Spar. sol. H_2O . Hyd. \rightarrow guanine + ribofuranose.

Tetra-Me deriv.: *hydrochloride*, decomp. at 98°.

Triacetyl deriv.: m.p. 226°.

Levene, Tipson, *J. Biol. Chem.*, 1932, **97**, 491.

Thannhauser, Topfmüller, *Z. physiol. Chem.*, 1917, **100**, 121.

Levene, Clark, *J. Biol. Chem.*, 1921, **46**, 19.

Davoll, Lythgoe, Todd, *J. Chem. Soc.*, 1948, 1685.

Guanylglycine.

See Glycocyamine.

Guanylguanidine.

See Diguanide.

Guanylhydrazine.

See Aminoguanidine.

Guanylic Acid (*Guanosine 3'-phosphate*)

$\text{C}_{10}\text{H}_{14}\text{O}_8\text{N}_5\text{P}$ MW, 363

Nucleotide occurring in yeast nucleic acid. Needles + $2\text{H}_2\text{O}$. M.p. 208° (218°) decomp. $[\alpha]_D^{20} - 7.5^\circ$ in H_2O . $[\alpha]_D^{20} - 56.1^\circ$ in 5% NaOH. $k_1 = 4.45 \times 10^{-3}$, $k_2 = 8.2 \times 10^{-7}$, $k_3 = 2.0 \times 10^{-10}$.

Brucine salt: m.p. 233° decomp. $[\alpha]_D^{20} - 26.0^\circ$ in EtOH.Aq.

Di-brucine salt: m.p. 203° (214°) decomp.

Peiser, *Ber.*, 1925, **58**, 2051.

Levene, *J. Biol. Chem.*, 1919, **40**, 171; 1920, **41**, 483.

Read, *J. Biol. Chem.*, 1917, **31**, 47.

Gulland, *J. Chem. Soc.*, 1944, 208.

Guanyltoluene.

See Tolamidine.

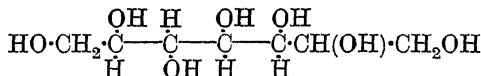
Guanylurea.

See Carbamylguanidine.

Guäthol.

See under Catechol.

Guloheptitol (*Guloheptite*)



$\text{C}_7\text{H}_{16}\text{O}_7$ MW, 212

α -.

Identical with β -galaheptitol, *q.v.*

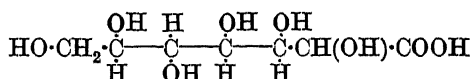
β -.

Cryst. from EtOH.Aq. M.p. 128–9°.

Benzylidene: m.p. 260° decomp.

La Forge, *J. Biol. Chem.*, 1920, **41**, 251.

d-Guloheptonic Acid



$\text{C}_7\text{H}_{14}\text{O}_8$ MW, 226

40

Penta-acetyl: stable form, prisms, m.p. 105–6°. Labile form, needles, m.p. 113°.

2 : 3 : 5 : 6-*Diacetone deriv.*: m.p. 117–117.5°. $[\alpha]_D^{25} + 6.4^\circ$ in H_2O .

Osazone: m.p. 168°, decomp. at 180°. $[\alpha]_D^{20} + 0.5^\circ$ (final) in EtOH-Py.

l.

Syrup. $[\alpha]_D - 20.4^\circ$. Forms cryst. add. comp. with $CaCl_2 \cdot (C_6H_{12}O_6, CaCl_2, H_2O)$, m.p. 200–3° decomp. $[\alpha]_D^{25} - 18.7^\circ$ (initial) $\rightarrow +11.2^\circ$ (final) in H_2O . Red. \rightarrow *l*-sorbitol. $Ba(OH)_2 \rightarrow$ *l*-sorbitol (in part). Does not ferment with yeast.

Phenylhydrazone: m.p. 143°.

Benzylphenylhydrazone: m.p. 130–1°. $[\alpha]_D^{25} + 29^\circ$ in MeOH.

Osazone: m.p. 156°.

dl.

Syrup.

Phenylhydrazone: m.p. 143°.

Osazone: m.p. 157–9°.

Fischer, Curtiss, *Ber.*, 1892, 25, 1025.

Blanksma, Ekenstein, *Chem. Zentr.*, 1908, II, 1583.

Levene, La Forge, *J. Biol. Chem.*, 1915, 20, 430.

Talen, *Rec. trav. chim.*, 1925, 44, 891.

Isbell, *J. Am. Chem. Soc.*, 1933, 55, 2167; *Chem. Abstracts*, 1931, 25, 1223; 1930, 24, 2726.

Sowden, Fischer, *J. Am. Chem. Soc.*, 1945, 67, 1713.

α -Gurjunene

$C_{15}H_{24}$ MW, 204

Tricyclic terpene from gurjun balsam. Oil. B.p. 114–16°/10 mm. D_4^{20} 0.919. n_D^{20} 1.501. $[\alpha]_D^{20} - 110^\circ$. $AcOH + H_2SO_4 \rightarrow$ iso- α -gurjunene, $[\alpha]_D - 135^\circ$, n_D 1.4870. Se \rightarrow azulene.

Trieb, *Ber.*, 1935, 68, 1751.

Ruzicka, Pontalti, Balas, *Helv. Chim. Acta*, 1923, 6, 855.

β -Gurjunene

$C_{15}H_{24}$ MW, 204

Terpene from gurjun balsam. Oil. B.p. 120–3°/13 mm. D_4^{20} 0.9321. n_D^{20} 1.50275 (1.5022). $[\alpha]_D^{20} + 74.5^\circ$ (70.5°). An isomeric hydrocarbon, iso- β -gurjunene, regenerated from the hydrochloride of β -gurjunene, has b.p. 123–9°, D_4^{15} 0.9233, n_D^{15} 1.5105, $\alpha_D^{15} - 39.0^\circ$ (36°).

Trieb, *Ber.*, 1935, 68, 1751.

Ruzicka, Pontalti, Balas, *Helv. Chim. Acta*, 1923, 6, 855.

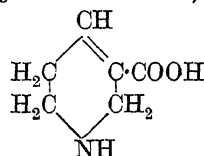
Gurjuresene

$C_{17}H_{28}O_2$ MW, 264

Resin-acid from gurjun balsam. M.p. 40–3°.

Tschirch, Weil, *Arch. Pharm.*, 1903, 241, 372.

Guvacine (Δ^3 -Tetrahydropyridine-3-carboxylic acid, Δ^3 -tetrahydronicotinic acid)



$C_6H_9O_2N$ MW, 127

Short rods + $1H_2O$ from EtOH.Aq. Decomp. at 285°.

Me ester: guvacoline. $C_7H_{11}O_2N$. MW, 141. M.p. 27°. B.p. 114°/14 mm. *Hydrochloride*: m.p. 121–2°. $B_2H_2PtCl_6$: m.p. 211° decomp.

B.HCl: decomp. at 316°.

B.HAuCl_4: m.p. 197–9° decomp.

$B_2H_2PtCl_6$: m.p. 220–1° decomp.

p-Toluenesulphonyl: m.p. 167–8°.

N-Me: see Arecaidine.

Freudenberg, *Ber.*, 1918, 51, 818.

Hess, Leibbrandt, *Ber.*, 1919, 52, 206.

McElvain, Stork, *J. Am. Chem. Soc.*, 1946, 68, 1049.

Guvacoline.

See under Guvacine.

Gynocardic Acid

$C_{17}H_{33}COOH$

$C_{18}H_{34}O_2$ MW, 282

Constituent of chaulmoogra oil. Leaflets from EtOH. M.p. 67.5°. Readily sol. most org. solvents. Has therapeutic value in treatment of tuberculosis and leprosy.

Cu salt: two forms. (α) M.p. 70°. Partially converted to β -form on heating in solution. (β) High m.p. Probably polymer of the α -form.

Me ester: $C_{19}H_{36}O_2$. MW, 296. Fluorescent oil. B.p. 320–30°.

Cholesteryl ester: m.p. 110–12°. *Tetrabromide*: m.p. 77–8°.

Ostromuiskii, Bergman, *J. Russ. Phys. Chem. Soc.*, 1915, 47, 318, (*Chem. Abstracts*, 1916, 10, 44).

Cf. Schöbl, Perkins, Cruz, *Chem. Abstracts*, 1924, 18, 1155. Rock, Fairchild, Power, *Chem. Abstracts*, 1922, 16, 2197. Gardner, *Pharm. J.*, 1922, 109, 154. Raku-zin, Flier, *Chem. Abstracts*, 1916, 10, 1521.

Gynocardin

$C_{13}H_{19}O_9N$ MW, 333

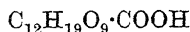
Cyanogenetic β -glucoside from *Gynocardia odorata*, R.Br., and *Pangium edule*, Reinw. Glistening prismatic needles + $1\frac{1}{2}H_2O$ from H_2O . M.p. 162–3° (anhyd.) slight decomp. Sol. hot EtOH. Very spar sol. other org. solvents. Feebly acidic. $[\alpha]_D^{21} + 72.5^\circ$ in H_2O . NaOEt or NaOH in EtOH \rightarrow white solid, $C_{13}H_{18}O_9NNa$. Hot $Ba(OH)_2$.Aq. \rightarrow gynocardinic acid + NH_3 .

Hepta-acetyl deriv.: needles. M.p. 118–19°. $[\alpha]_D^{25} + 40.4^\circ$ in CHCl_3 .

Moore, Tutin, *J. Chem. Soc.*, 1910, 97, 1285.

Cf. Brill, *Chem. Abstracts*, 1917, 11, 3381.

Gynocardinic Acid

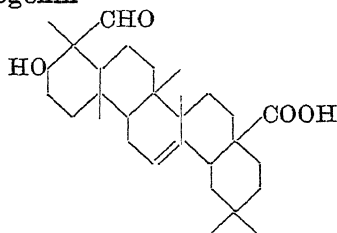


$\text{C}_{13}\text{H}_{20}\text{O}_{11}$ MW, 352

Hydrolysis product of gynocardin. Syrup. Dextrorotatory. Does not reduce Fehling's. Forms cryst. Ba salt. Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ glucose + a carboxylic acid (*quinine salt*: m.p. 224° decomp.).

Power, Lees, *J. Chem. Soc.*, 1905, 87, 349.

Gypsogenin



$\text{C}_{30}\text{H}_{46}\text{O}_4$ MW, 468

Polyterpenoid sapogenin from *Gypsophila* and other species of *Saponaria*. Needles from EtOH. M.p. 275° (sinters at 250°). Spar. sol. hot EtOH. H (+ Pt) in EtOH \rightarrow dihydro-comp., m.p. 321–2°. Se \rightarrow 2:7-dimethylnaphthalene + 1:2:7-trimethylnaphthalene (sapotalin).

Acetyl deriv.: m.p. 192–4° (176–7°) (sinters at 178°).

Me ester: $\text{C}_{29}\text{H}_{46}\text{O}_4$. MW, 458. Needles from EtOH. M.p. 192° (foams at 140°).

Oxime: decomp. at 264–5° (turns brown at 250°).

Semicarbazone: m.p. 272°.

Ruzicka *et al.*, *Helv. Chim. Acta*, 1932, 15, 1496.

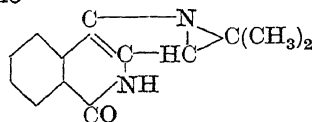
Karrer *et al.*, *Helv. Chim. Acta*, 1924, 7, 784.

van der Haar, *Rec. trav. chim.*, 1927, 46, 85.

Ruzicka, Giacomello, *Helv. Chim. Acta*, 1937, 20, 299.

Vogel, Jeger, Ruzicka, *Helv. Chim. Acta*, 1951, 34, 2321.

Gyrlone



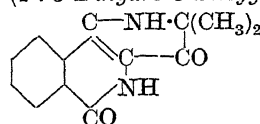
$\text{C}_{13}\text{H}_{12}\text{ON}_2$

MW, 212

Silky needles from H_2O . M.p. 212° (reddens). Mod. sol. hot EtOH. Spar. sol. boiling H_2O . Sol. alkalis. Forms cryst. salts with hydrochloric, chloroauric, chloroplatinic, and chromic acids. Fuming HCl in sealed tube at 135° \rightarrow compound, yellow leaflets from EtOH, m.p. above 300° decomp.; sublimes; isomeric with gyrolone.

Gabriel, *Ber.*, 1911, 44, 90.

Gyrolone (1:3-Dihydro-3-ketogyrlone)



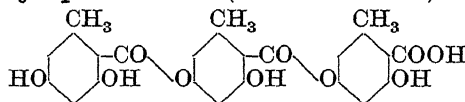
$\text{C}_{13}\text{H}_{12}\text{O}_2\text{N}_2$

MW, 228

Yellow rhombic and quadratic cryst. from hot H_2O . M.p. 303° (blackens). Sol. alkalis. Insol. NH_3 . Aq. H_2O sols fluor. bluish-green. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ malachite-green col., $\text{H}_2\text{O} \rightarrow$ blue ppt.

Gabriel, *Ber.*, 1911, 44, 84.

Gyrophoric Acid (*Triorsellinic acid*)



$\text{C}_{24}\text{H}_{20}\text{O}_{10}$

MW, 468

Occurs in lichens. Cryst. from Me_2CO . M.p. 220° decomp. Sol. EtOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 , CHCl_3 , AcOH. Cold dil. $\text{H}_2\text{SO}_4 \rightarrow$ orsellinic acid. $\text{FeCl}_3 \rightarrow$ reddish-violet col.

Tetra-Me ether Me ester: $\text{C}_{29}\text{H}_{30}\text{O}_{10}$. MW, 538. M.p. 196–7°.

Tetra-acetyl: m.p. 228°.

Tetra-chloroacetyl: m.p. 163–4°.

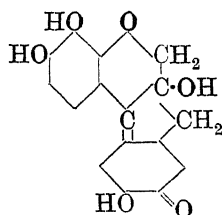
Quinine salt: m.p. 162°.

Asahina, Watanabe, *Ber.*, 1930, 63, 3044.

H

H Acid.

See 1-Amino-8-naphthol-3 : 6-disulphonic Acid.

Hæmatein
 $C_{16}H_{12}O_6$

MW, 300

Brownish-red needles from EtOH.Aq. M.p. above 200°. Spar. sol. H_2O , AcOEt. Insol. $CHCl_3$, C_6H_6 . Sol. conc. $H_2SO_4 \rightarrow$ brownish-violet sol. Gives salts with heavy metals.

Tetra-Me ether: $C_{20}H_{20}O_6$. MW, 356. M.p. 210°.

Perkin, Robinson, *J. Chem. Soc.*, 1908, 93, 1121.

Bollina, Kostanecki, Tambor, *Ber.*, 1902, 35, 1678.

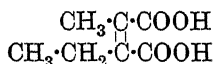
Hummel, Perkin, *Ber.*, 1882, 15, 2337.

Dubský, Chodák, *Chem. Abstracts*, 1940, 34, 7315.

Hæmatin.

See under Hæmin.

dibasic-Hæmatinic Acid (β -Amylene- β : γ -dicarboxylic acid, 1-methyl-2-ethylmaleic acid, 2-pentene-2 : 3-dicarboxylic acid, 1-methyl-2-butylene-2 : 3-dicarboxylic acid)


 $C_7H_{10}O_4$

MW, 158

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, etc.

Di-Me ester: $C_9H_{14}O_4$. MW, 186. B.p. 235°.

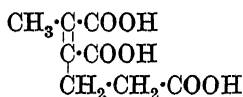
Anhydride: $C_7H_8O_3$. MW, 140. B.p. 230°.

Imide: $C_7H_9O_2N$. MW, 139. M.p. 67° (72°).

Küster, *Ann.*, 1901, 315, 207.

Küster, Galler, *Ann.*, 1906, 345, 16.

tribasic-Hæmatinic Acid (β -Amylene- β : γ : ϵ -tricarboxylic acid, 2-pentene-2 : 3 : 5-tricarboxylic acid, 1-methyl-1-butylene-1 : 2 : 4-tricarboxylic acid)


 $C_8H_{10}O_6$

MW, 202

Exists only in form of salts. Anhydride and imide produced by oxidation of hæmin, bilirubin, etc.

Mono-Me ester: $C_9H_{12}O_6$. MW, 216. B.p. 173-6°/11 mm.

Tri-Me ester: $C_{11}H_{16}O_6$. MW, 244. B.p. 300-1°, 165-7°/10 mm.

Mono-Et ester: $C_{10}H_{14}O_6$. MW, 230. B.p. 165°/10 mm. *Amide*: m.p. 105-10°.

Di-Et ester: $C_{12}H_{18}O_6$. MW, 258. B.p. 179-80°/15 mm.

Tri-Et ester: $C_{14}H_{22}O_6$. MW, 286. B.p. 191°/17 mm.

Anhydride: $C_8H_8O_5$. MW, 184. M.p. 97°.

Imide: $C_8H_9O_4N$. MW, 183. M.p. 114-15°.

Fischer, Nenitzescu, *Z. physiol. Chem.*, 1925, 145, 295.

Küster, Weller, *Ber.*, 1914, 47, 532.

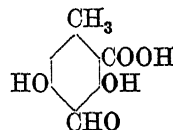
Küster, *Ann.*, 1901, 315, 207.

Küster, Galler, *Ann.*, 1906, 345, 16.

Hæmatoidine.

See Bilirubin.

Hæmatommic Acid (3 : 5-Dihydroxy-4-aldehydo-o-toluic acid, 4-aldehydo-orsellinic acid)


 $C_9H_8O_5$

MW, 196

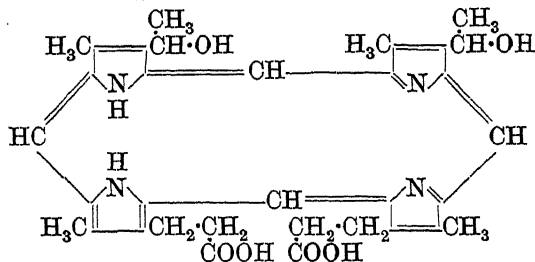
Constituent of *Hæmatomma coccineum*. Needles from AcOH. M.p. 172-3°. Depside with β -orcinol-carboxylic acid methyl ester is atranorin, *q.v.*

Me ester: $C_{10}H_{10}O_5$. MW, 210. M.p. 147°.

Et ester: $C_{11}H_{12}O_5$. MW, 224. M.p. 113°.

Anil: m.p. 206°.

St. Pfau, *Helv. Chim. Acta*, 1933, 16, 282.

Hæmatoporphyrin
 $C_{34}H_{38}O_6N_4$

MW, 598

Deep red cryst. Sol. EtOH. Spar. sol. Et₂O, $CHCl_3$. Insol. H_2O , AcOH.Aq. Obtained from

hæmin and hæmatin by removal of Fe by conc. acids. $\text{HI} + \text{PH}_4\text{I} \rightarrow \text{hæmopyrrole}$.

Di-Me ester: $\text{C}_{36}\text{H}_{42}\text{O}_6\text{N}_4$. MW, 626. M.p. 212°.

Tetra-Me deriv.: m.p. 120°.

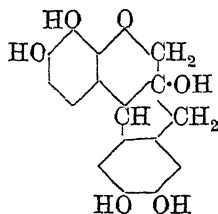
Tetra-Et deriv.: m.p. 149°.

Fischer *et al.*, *Z. physiol. Chem.*, 1929, 185, 33.

Fischer, Zeile, *Ann.*, 1929, 468, 112.

Treibs, *Angew. Chem.*, 1934, 47, 294 (*Bibl.*).

Hæmatoxylin



$\text{C}_{16}\text{H}_{14}\text{O}_6$

MW, 302

Constituent of *Hæmatoxylin campechianum*. Prisms + $3\text{H}_2\text{O}$ from EtOH. M.p. 100–120°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Sol. NH₃ → purple sol. Ox. → hæmatein. KOH fusion → pyrogallol. Forms salts with heavy metals.

Penta-acetyl: m.p. 165–6°.

Tetra-Me ether: $\text{C}_{20}\text{H}_{22}\text{O}_6$. MW, 358. M.p. 139–40°. *Acetyl*: m.p. 178–80°. *Phenylurethane*: m.p. 203.5–6.5°.

Penta-Me ether: $\text{C}_{21}\text{H}_{24}\text{O}_6$. MW, 372. M.p. 144–7°.

O-Di-ethylene monoacetyl: m.p. 132–4°.

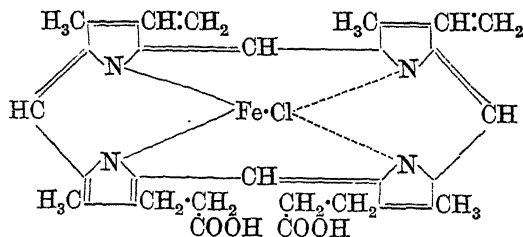
Dibromide: m.p. 120° decomp.

Perkin, Robinson, *J. Chem. Soc.*, 1908, 93, 496, 1121.

Herzig, *Monatsh.*, 1898, 16, 906.

Bolling, Kostanecki, Tambor, *Ber.*, 1902, 35, 1678.

Hæmin



$\text{C}_{34}\text{H}_{32}\text{O}_4\text{N}_4\text{ClFe}$

MW, 651.5

Bluish-black microscopic rhombohedra. Sol. AcOH. Insol. H₂O, EtOH, Et₂O, CHCl₃. Obtained by ox. of blood in presence of NaCl (Teichmann's reaction). Conc. acids → hæmatoporphyrin. Ox. in absence of NaCl → hæmatin, the Cl-free compound: $\text{C}_{34}\text{H}_{33}\text{O}_5\text{N}_4\text{Fe}$,

blue-black cryst., decomp. at 200° without melting. Insol. H₂O, EtOH, Et₂O.

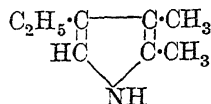
Fischer, Zeile, *Ann.*, 1929, 468, 112.

Fischer, Stangler, *Ann.*, 1927, 459, 53.

Treibs, *Angew. Chem.*, 1934, 47, 294 (*Bibl.*).

Cambi, Szegli, *Chem. Zentr.*, 1934, II, 2681.

Hæmopyrrole (2:3-Dimethyl-4-ethylpyrrole, *phonopyrrole*)



$\text{C}_8\text{H}_{13}\text{N}$

MW, 123

Obtained from hæmatoporphyrin by treatment with HI + PH₄I. B.p. 113°/16 mm.

Picrate: m.p. 123° (108°).

Fischer, Klarer, *Ann.*, 1926, 450, 187, 198.

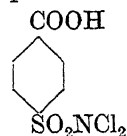
Knorr, Hess, *Ber.*, 1912, 45, 2626 (*Bibl.*).

Fischer, Bartolomäus, *Ber.*, 1912, 45, 1979.

Hæmopyrrole-C.

See Cryptopyrrole.

Halazone (*p*-Sulphondichloroaminobenzoic acid, benzoic acid-*p*-N-dichlorosulphonamide)



$\text{C}_7\text{H}_5\text{O}_4\text{NCl}_2\text{S}$

MW, 270

Prisms from AcOH. M.p. 213°. Spar. sol. H₂O, CHCl₃. Insol. pet. ether. Sol. alkalis, reprecipitated by acids. Explodes on rapid heating on Pt foil. Hyd. by phosphates, and borates. Powerful germicide. Used for sterilisation of drinking water.

Et ester: $\text{C}_8\text{H}_5\text{O}_4\text{NCl}_2\text{S}$. MW, 298. Prisms from CCl₄. M.p. 80°.

Dakin, Dunham, *British Medical Journal*, 1917, I, 683.

Haliclonasterol

$\text{C}_{28}\text{H}_{40}\text{O}$

MW, 392

Sterol of *Haliclona longley*, de Laubenfels. Cryst. M.p. 140.5–141°. $[\alpha]_D^{25} - 41.5^\circ$. Hydrogenation → haliclonastanol, m.p. 137–137.5°.

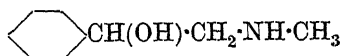
Acetyl: cryst. M.p. 140–1°. $[\alpha]_D^{25} - 46^\circ$.

Benzoyl: cryst. M.p. 146.5°. $[\alpha]_D^{25} - 14.7^\circ$.

3:5-Dinitrobenzoyl: cryst. from MeOH. M.p. 209°.

Bergmann, Feeney, *J. Org. Chem.*, 1949, 14, 1078.

Halostachine (β -Hydroxy- β -phenylethyl-methylamine, α -hydroxy- β -methylaminoethyl-benzene)



$\text{C}_9\text{H}_{13}\text{ON}$

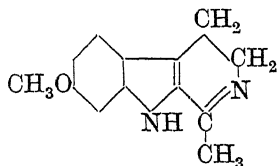
MW, 151

Alkaloid from *Halostachis caspica*. M.p. 43–5°. *B.HCl*: m.p. 113–14°. *N-Me*: b.p. 125–7°/20 mm. $[\alpha]_D -65^\circ$. *Methiodide*: m.p. 230–1° from EtOH.

Men'shikov, Rubinshtein, *J. Gen. Chem. U.S.S.R.*, 1943, 13, 801.

Men'shikov, Borodina, *J. Gen. Chem. U.S.S.R.*, 1947, 17, 1569, (*Chem. Abstracts*, 1948, 42, 2245).

Harmaline (*Dihydroharmine*)



$C_{13}H_{14}ON_2$

MW, 214

Constituent of *Peganium harmala*. Prisms from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H_2O , Et_2O . Optically inactive. Boiling $HCl \rightarrow$ harmalol.

B.HCl: m.p. 212°.

N-Acetyl: m.p. 204–5°.

Methiodide: m.p. 260°.

Methosulphate: m.p. 170–2°.

Benzylidene deriv.: m.p. 245°.

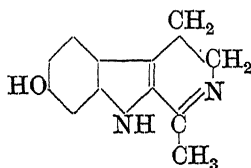
Späth, Lederer, *Ber.*, 1930, 63, 120.

Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.

Perkin, Robinson, *J. Chem. Soc.*, 1919, 115, 933.

Fischer, *Ber.*, 1897, 30, 2483.

Harmalol



$C_{12}H_{12}ON_2$

MW, 200

Constituent of *Peganium harmala*. Needles + $3H_2O$ from H_2O . M.p. 212° decomp. Sol. Me_2CO , $CHCl_3$, hot H_2O . Spar. sol. C_6H_6 . Unstable in air.

Me ether: see Harmaline.

Et ether: m.p. 247–9°.

isoPropylether: m.p. 196–7°. *Hydrochloride*: m.p. 232–4°.

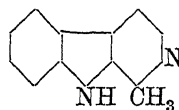
Späth, Lederer, *Ber.*, 1930, 63, 120.

Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.

Perkin, Robinson, *J. Chem. Soc.*, 1919, 115, 933.

Fischer, *Ber.*, 1897, 30, 2483.

Harman (*Aribine*, *loturine*, 2-methylnorharman, 2-methyl-3-carboline)



$C_{12}H_{10}N_2$

MW, 182

Constituent of bark of Brazilian *Arariba rubra*, Mart. Cryst. from C_6H_6 , EtOH, or Et_2O . M.p. 238°. Sol. EtOH, MeOH, Et_2O , Me_2CO , $CHCl_3$. Spar. sol. ligroin, hot H_2O . Sol. min. acids with bluish violet fluor. Bitter taste. Sublimes. Forms cryst. salts with min. acids.

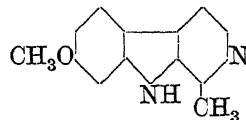
Späth, *Monatsh.*, 1920, 41, 401.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, 119, 1603, 1612.

Akabori, Saito, *Ber.*, 1930, 63, 2245.

Späth, Lederer, *ibid.*, 120.

Harmine (*Banisterine*)



$C_{13}H_{12}ON_2$

MW, 212

Constituent of *Peganium harmala*. Prisms from MeOH. M.p. 257–9° (264–5°). Spar. sol. H_2O , EtOH, Et_2O . Optically inactive. Salts show deep blue fluor. in sol. Boiling $HCl \rightarrow$ harmol, $C_{12}H_{10}ON_2$, m.p. 321°.

B.HCl: m.p. 321°.

N-Me: m.p. 124–5°, + $1H_2O$, m.p. 114–18°. *Hydrochloride*: cryst. + $1H_2O$. M.p. 280° decomp. *Picrate*: yellow cryst. M.p. 249–50° decomp.

Methiodide: m.p. 305–7°.

Methosulphate: m.p. 220°.

Benzylidene deriv.: m.p. 191–2°.

Späth, Lederer, *Ber.*, 1930, 63, 120.

Manske, Perkin, Robinson, *J. Chem. Soc.*, 1927, 1.

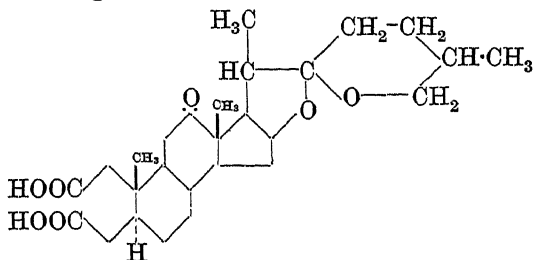
Perkin, Robinson, *J. Chem. Soc.*, 1919, 115, 933.

Fischer, *Ber.*, 1897, 30, 2483.

Harmol.

See under Harmine.

Hecogenic Acid



$C_{27}H_{40}O_7$

MW, 476

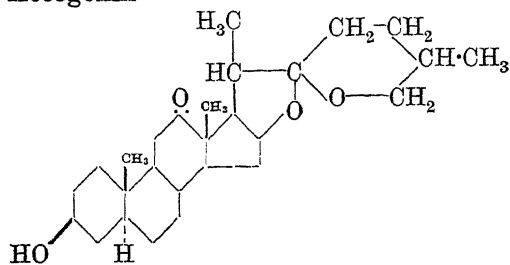
M.p. 268° decomp.

Di-Me ester : m.p. 187°.

Marker *et al.*, *J. Am. Chem. Soc.*, 1943, **65**, 1199.

Wagner, U.S.P. 2,408,827, (*Chem. Abstracts*, 1947, **41**, 1254).

Hecogenin



$C_{27}H_{42}O_4$

MW, 430

Sapogenin isolated from *Hechtia texensis*, *Agave deserti*, *A. gracilipis*, *A. toumeyana*, and *A. sisalana*, Perrine. Exists in 3 polymorphic forms. M.p.s 245°, 253°, and 268°. Wolff-Kishner red. \rightarrow tigogenin.

Acetyl deriv.: exists in 2 forms. M.p.s 243° and 252°.

Semicarbazone : m.p. 195–200° decomp.

2 : 4-Dinitrophenylhydrazone : m.p. 281–2° decomp.

Marker *et al.*, *J. Am. Chem. Soc.*, 1943, **65**, 1199.

Wagner, U.S.P. 2,408,827, (*Chem. Abstracts*, 1947, **41**, 1254).

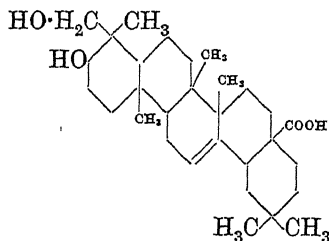
Marker *et al.*, *J. Am. Chem. Soc.*, 1947, **69**, 2167, 2375, 2380, 2397, 2403.

Wagner, Moore, Forker, *J. Am. Chem. Soc.*, 1950, **72**, 1856.

Callow, Cornforth, Spensley, *Chemistry and Industry*, 1951, 699.

Spensley, *Chemistry and Industry*, 1952, 426.

Hederagenin (Mukurosisigenin)



$C_{30}H_{48}O_4$

MW, 472

Cryst. from EtOH. M.p. 327–9° (336–7°). Sol. EtOH, Py. Spar. sol. most org. solvents. Insol. H_2O . $[\alpha]_D^{21} + 70.1^\circ$ in $CHCl_3$ -MeOH. Ox. \rightarrow hederagenolic acid, m.p. 230°.

K salt : needles.

Mono-acetyl : m.p. 156° (275–80°).

Diacetyl : m.p. 160–80°.

Me ester : $C_{31}H_{50}O_4$. MW, 486. M.p. 240° (236–7°). $[\alpha]_D^{25} + 70.9^\circ$. Diacetyl : cryst. + $1H_2O$. M.p. 193°. $[\alpha]_D^{25} + 61.8^\circ$.

Et ester : $C_{32}H_{52}O_4$. MW, 500. M.p. 218–19°. $[\alpha]_D^{25} + 72.5^\circ$. Diacetyl : m.p. 150°. $[\alpha]_D^{25} + 76.47^\circ$.

Amide : $C_{30}H_{48}O_3N$. MW, 471. M.p. 285°.

Lactone : m.p. 354°. $[\alpha]_D^{25} + 16.5^\circ$ in $CHCl_3$.

Acetyl : m.p. 244°.

Phenylurethane : m.p. 155–8°.

Winterstein, Stein, *Z. physiol. Chem.*, 1932, **211**, 5.

Jacobs, *J. Biol. Chem.*, 1925, **63**, 621.

van der Haar, Tamburello, *Ber.*, 1921, **54**, 3148.

Kitasato, *Chem. Abstracts*, 1935, **29**, 469.

Kuwada, Maksukawa, *J. Pharm. Soc. Japan*, 1934, **54**, 13.

Kitasato, *J. Chem. Soc. Japan*, 1939, **60**, 1055.

Jeger, *Fortschritte der Chemie Organischer Naturstoffe*, 1950, Vol. 7, 32.

Hederagenolic Acid.

See under Hederagenin.

Hederin

$C_{41}H_{64}O_{11}$?

MW, 732

Widely distributed saponin. First isolated from *Hedera helix*. Needles from EtOH-pet. ether. M.p. 256–7°. Sol. EtOH, Me_2CO , AcOEt. Insol. Et_2O , pet. ether. $[\alpha]_D^{20} - 9.68^\circ$. Sol. dil. alkalis. Not pptd. by cholesterol. Hyd. \rightarrow hederagenin, arabinose, and rhamnose.

Me ester : $C_{42}H_{66}O_{11}$. MW, 746. M.p. 199–200°.

van der Haar, *Arch. Pharm.*, 1913, **251**, 632.

Ruzicka, Veen, *Z. physiol. Chem.*, 1929, **184**, 69.

Winterstein, Stein, *Z. physiol. Chem.*, 1932, **211**, 5.

Jacobs, *J. Biol. Chem.*, 1925, **63**, 621.

van der Haar, Tamburello, *Ber.*, 1921, **54**, 3148.

Kitasato, *Chem. Abstracts*, 1935, **29**, 469.

Hedonal.

See under Carbamic Acid.

Helenalin

$C_{15}H_{18}O_4$

MW, 262

Occurs in *Helenium* spp. Cryst. from EtOH or C_6H_6 . M.p. 176–8° (167°). $[\alpha]_D^{20} - 101.9^\circ$ in EtOH, $[\alpha]_D^{25} - 102.8^\circ$ in $CHCl_3$. Bitter taste. Sternutator, vermifuge and mod. effective fish poison.

Acetyl deriv.: cryst. M.p. 184° (179–180.5°).

Methoxyacetyl deriv.: hexagonal cryst. from MeOH.Aq. M.p. 135°.

o-Bromobenzoyl deriv.: m.p. 162-3°.

p-Nitrobenzoyl deriv.: cryst. + $\frac{1}{2}$ C₆H₆. M.p. 111°.

3:5-Dinitrobenzoyl deriv.: cryst. + $\frac{1}{2}$ C₆H₆. M.p. 213°.

Tetrahydro deriv.: cryst. M.p. 175-6°.

Acetyl: m.p. 145°.

Clark, *J. Am. Chem. Soc.*, 1936, **58**, 1982.

Adams, Herz, *ibid.*, 1949, **71**, 2546, 2551, 2554.

Helenien

C₇₂H₁₁₆O₄ MW, 1044

Pigment of *Helenium autumnale*, Tagetes. Dipalmitate of lutein. Deep red needles from EtOH. M.p. 92°. Absorption bands in CS₂, 511, 478, 466 mμ. Hyd. → lutein + palmitic acid.

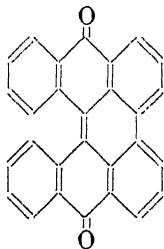
Kuhn, Winterstein, Lederer, *Z. physiol. Chem.*, 1931, **197**, 150.

Winterstein, *Angew. Chem.*, 1934, **47**, 315.

Helenine.

See Alantolactone.

Helianthrone (*Dibenzo-[a,o]-perylene-7:16-dione*)

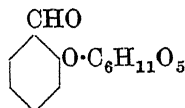


C₂₈H₁₄O₂ MW, 382

Steel-blue needles from xylene. Decomp. at 250°. Spar. sol. most org. solvents → brownish-yellow sols. with green fluor. Sol. conc. H₂SO₄ → green col.

Scholl, Mansfield, *Ber.*, 1910, **43**, 1735.

Helicin (*Salicylaldehyde glucoside, glucosido-salicylaldehyde*)



C₁₃H₁₆O₇ MW, 284

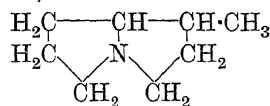
Obtained from salicin by ox. with HNO₃. Needles from H₂O. M.p. 174-5°. Sol. H₂O, EtOH, hot Et₂O. Spar. sol. Et₂O. $[\alpha]_D^{20}$ -60-43°. Hyd. → salicylaldehyde + glucose. Red. → salicin. Sol. conc. H₂SO₄ → red sol. Hyd. by emulsin.

Penta-acetyl: m.p. 142°. $[\alpha]_D^{20}$ -37° in Me₂CO.

Michael, *Am. Chem. J.*, 1879, **1**, 309.

Schiff, *Ann.*, 1870, **154**, 19.

Heliotridane (*Octahydro-1-methyl-2-pyrrolo-[1:2-a]-pyrrole*)



C₈H₁₅N MW, 125

Liq. B.p. 165-7°. D₄²⁰ 0.902. n_D²⁰ 1.4638.

B.HAuCl₄: m.p. 199-200°.

Picrate: m.p. 233-4°.

Picrolonate: m.p. 162-3°.

Styphnate: m.p. 196-7°.

Menshikov, Shdanovich, *Ber.*, 1936, **69**, 1799.

Adams, Rogers, *J. Am. Chem. Soc.*, 1941, **63**, 228.

Prelog, Zalán, *Helv. Chim. Acta*, 1944, **27**, 531.

Heliotridene

C₈H₁₃N MW, 123

Dehydration product of retronecanol. B.p. 165-7°. D₄²⁴ 0.932. n_D²⁰ 1.4807. $[\alpha]_D^{24}$ +38.9° (-149.7°).

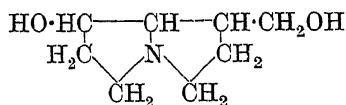
Picrate: m.p. 224-5°.

Konovalova, Otekov, *Bull. soc. chim.*, 1937, [5], **4**, 1285.

Adams, Rogers, *J. Am. Chem. Soc.*, 1941, **63**, 228.

Adams, Carmack, Mahan, *J. Am. Chem. Soc.*, 1942, **64**, 2593.

Heliotridine



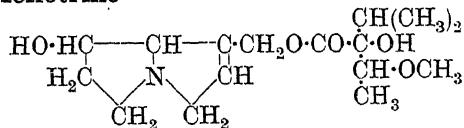
C₈H₁₅O₂N MW, 157

Cryst. M.p. 116-18°. $[\alpha]_D^{20}$ +31°.

Men'shikov, *Ber.*, 1932, **65**, 974.

Men'shikov, Kuzovkov, *Chem. Abstracts*, 1950, **44**, 1113.

Heliotrine



C₁₆H₂₇O₅N MW, 313

Alkaloid from *Heliotropium lasiocarpum*. Prisms from Me₂CO. M.p. 125-6°. Sol. H₂O, EtOH, CHCl₃. Spar. sol. Et₂O, pet. ether. $[\alpha]_D^{20}$ -3.75°. Hyd. → heliotrinic acid, m.p. 92-4°, and heliotridine.

Methiodide: m.p. 108-11°.

Men'shikov, *Ber.*, 1932, **65**, 974.

Men'shikov, Kuzovkov, *Chem. Abstracts*, 1950, **44**, 1113.

Heliotrinic Acid.

See under Heliotrine.

Heliotropin.

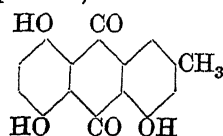
See Piperonal.

Helisterol $C_{26}H_{44}O_2$ MW, 388Isolated from petals of sunflower (*Helianthus annuus*). Rhombs. M.p. 242°. $[\alpha]_D^{20} +45.4^\circ$ in $CHCl_3$.*Diacyl*: $C_{30}H_{48}O_4$. MW, 472. Cryst. from MeOH, m.p. 139–40°. Cryst. from EtOH, m.p. 166–7°. $[\alpha]_D^{20} +58.7^\circ$ in $CHCl_3$.Tuzson, *Chem. Abstracts*, 1937, 31, 6248.**Helleborein** $C_{37}H_{56}O_{18}$ MW, 788Glycoside from *Helleborus niger* and *H. purpurascens*. Needles from EtOH. M.p. 270°. $[\alpha]_D^{25} -2.8^\circ$. Hyd. \rightarrow helleboretin (m.p. above 200°), acetic acid, glucose, and arabinose. Toxic.*Acetyl*: m.p. 129–30°.*Benzoyl*: m.p. 142°.Sieburg, *Arch. Pharm.*, 1913, 251, 154.Thaeter, *Arch. Pharm.*, 1897, 235, 414.Ossowski, Bukowiecki, *Chem. Zentr.*, 1937, II, 4056.**Helleboresin.**

See under Helleborin.

Helleboretin.

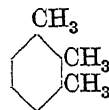
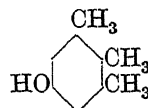
See under Helleborein.

Helleborin $C_{28}H_{36}O_6$ MW, 468Constituent of *Helleborus viridus* and *H. niger*. M.p. above 250°. Sol. $CHCl_3$. Spar. sol. Et_2O . Insol. H_2O , EtOH. Hyd. \rightarrow helleboresin (m.p. 140–50°) and glucose. Toxic.Keller, Schöbel, *Arch. Pharm.*, 1928, 266, 545.**Hellebrin** $C_{36}H_{52}O_{15}$ MW, 724Glycoside isolated from *Helleborus niger*. Cryst. from MeOH. M.p. 283–4°. $[\alpha]_D^{20} -23.4^\circ$ in 50% MeOH. Contains 1 mol. glucose and 1 mol. rhamnose.*Hepta-acetyl deriv.*: cryst. from MeOH. M.p. 165° (sinters at 159°).Karrer, *Helv. Chim. Acta*, 1943, 26, 1353.Schmutz, *Pharm. Acta Helv.*, 1947, 22, 373.Buzas, Reichstein, *Helv. Chim. Acta*, 1948, 31, 110.**Helminthosporin** (4:5:8-Trihydroxy-2-methylantranthraquinone) $C_{15}H_{10}O_5$

MW, 270

Pigment of *Helminthosporium gramineum*. Maroon needles from $CHCl_3$. M.p. 225–6°. Spar. sol. EtOH, Et_2O , Me_2CO , AcOH. Sols. are orange-red with green fluor. Zn dust dist. \rightarrow 2-methylantracene.*Triacetyl*: $C_{21}H_{16}O_8$. MW, 396. M.p. 223–4°.Charles, Raistrick, Robinson, Todd, *Biochem. J.*, 1933, 27, 499.**Helvolic Acid** (*Fumigacin*) $C_{32}H_{44}O_8$ MW, 556Antibiotic produced by *Aspergillus fumigatus* mut. *helvola*, Yaill. Cryst. M.p. 212°. $[\alpha]_D^{25} -117^\circ$ in $CHCl_3$. Sol. most org. solvents. Insol. H_2O , light petroleum.*Me ester*: cryst. from MeOH. M.p. 262°. $[\alpha]_D^{25} -133^\circ$ in $CHCl_3$. *Semicarbazone*: m.p. 212°.*Semicarbazone*: m.p. 240–50° decomp.*Dioxime*: needles. M.p. 189°.Chain, Florey, Jennings, Williams, *Brit. J. Exptl. Path.*, 1943, 24, 108.Menzel, Wintersteiner, Hoogerheide, *J. Biol. Chem.*, 1944, 152, 419.Birkinshaw, Bracken, Raistrick, *Biochem. J.*, 1945, 39, 70.Williams, *Biochem. J.*, 1952, 51, 538.**Hemellitic Acid.**

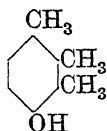
See 2:3-Dimethylbenzoic Acid.

Hemimellitene (1:2:3-Trimethylbenzene, vicinal-trimethylbenzene, hemimellitene) C_9H_{12} MW, 120M.p. -25.5° . B.p. 176.2°/760 mm., 58°/12 mm. D_4^{20} 0.8944. n_D^{25} 1.513.*Picrate*: m.p. 89.5°.Auwers, *Ann.*, 1919, 419, 116.Smith, Spillane, *J. Am. Chem. Soc.*, 1940, 62, 2639.**sym.-Hemimellitenol** (3:4:5-Trimethylphenol, 5-hydroxyhemimellitene) $C_9H_{12}O$ MW, 136

Needles from pet. ether with bluish fluor. M.p. 107°. B.p. 248–9°. Sol. most org. solvents.

Acetyl: m.p. 59–60°.*Phenylurethane*: m.p. 148–9°.*Carboxymethyl ether*: m.p. 149°.Auwers, Wieners, *Ber.*, 1925, 58, 2815.Auwers, Sauerwein, *Ber.*, 1922, 55, 2372.

unsym.-Hemimellitenol (vicinal-Hemimellitenol, 2 : 3 : 4-trimethylphenol, 4-hydroxy-hemimellitene)



$C_9H_{12}O$ MW, 136
Needles from pet. ether. M.p. 81°. B.p. 235-7°. Sol. most org. solvents.

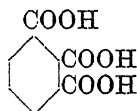
Acetyl : b.p. 239-41°.

Phenylurethane : m.p. 127°.

Auwers, Wieners, *Ber.*, 1925, 58, 2815.

Auwers, Sauerwein, *Ber.*, 1922, 55, 2372.

Hemimellitic Acid (Benzene-1 : 2 : 3-tricarboxylic acid)



$C_9H_6O_6$ MW, 210
Needles from H_2O . M.p. 223-4° (190°). Sol. H_2O . Spar. sol. Et_2O . Insol. conc. HCl. D^{20}_D 1.546.

2-Me ester : $C_{10}H_8O_6$. MW, 224. M.p. 203-5°.

1 : 3-Di-Me ester : $C_{11}H_{10}O_6$. MW, 238. M.p. 148-50°. Chloride : m.p. 84-7°.

Tri-Me ester : $C_{12}H_{12}O_6$. MW, 252. M.p. 102°.

Tri-Et ester : $C_{15}H_{18}O_6$. MW, 294. M.p. 39°.

Anhydride : $C_9H_4O_5$. MW, 192. M.p. 310° decomp. \rightarrow phthalic anhydride.

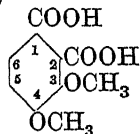
Imide : $C_9H_5O_4N$. MW, 191. M.p. 247°.

Graebe, Leonhardt, *Ann.*, 1896, 290, 226.

Hemipic Acid.

See Hemipinic Acid.

Hemipinic Acid (3 : 4-Dimethoxyphthalic acid, hemipic acid)



$C_{10}H_{10}O_6$ MW, 226

Needles + $2H_2O$. M.p. 177° (181°). Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 . Heat of comb. C_p 102.4 Cal. $k = 1.1 \times 10^{-3}$ at 25°. $FeCl_3 \cdot Aq.$ \rightarrow yellow sol. HCl \rightarrow isovanillic acid + protocatechuic acid. Hot conc. H_2SO_4 \rightarrow 1 : 2 : 5 : 6-tetrahydroxyanthraquinone.

1-Me ester : $C_{11}H_{12}O_6$. MW, 240. M.p. 138°.

2-Me ester : exists in two forms. Labile : cryst. from H_2O . M.p. 96-8°. Stable : cryst. from Et_2O . M.p. 138°.

Di-Me ester : $C_{12}H_{14}O_6$. MW, 254. M.p. 61-2°. B.p. 207°/16.5 mm.

1-Et ester : $C_{12}H_{14}O_6$. MW, 254. M.p. 147-9°.

2-Et ester : m.p. 145°.

Di-Et ester : $C_{14}H_{18}O_6$. MW, 282. M.p. 72°.

1-Amide : $C_{10}H_{11}O_5N$. MW, 225. M.p. 142°.

2-Me ester : m.p. 173-4°. 2-Et ester : m.p. 180-1°.

2-Amide : m.p. 162°.

Anhydride : $C_{10}H_8O_5$. MW, 208. M.p. 166-7°.

Imide : $C_{10}H_9O_4N$. MW, 207. M.p. 230°.

1-Nitrile : $C_{10}H_8O_4N$. MW, 207. M.p. 82°.

2-Nitrile : m.p. 207-8°.

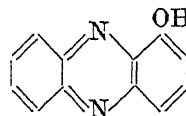
Goldschmiedt, *Monatsh.*, 1888, 9, 769.

Pschorr, Sumuleanu, *Ber.*, 1899, 32, 3411.

Perkin, *J. Chem. Soc.*, 1916, 109, 921.

Hoogewerff, van Dorp, *Rec. trav. chim.*, 1895, 14, 273.

Hemipyocyanine (1-Hydroxyphenazine)



$C_{12}H_8ON_2$ MW, 196

M.p. 158°. Sol. Py, phenol. Spar. sol. H_2O , EtOH, $CHCl_3$.

Acetyl : m.p. 120°.

Benzoyl : m.p. 173°.

Wrede, Strack, *Z. physiol. Chem.*, 1928, 177, 177.

Hemisine.

See Adrenaline.

Hendecane.

See Undecane.

Heneicosandiol-3 : 6 (3 : 6-Dihydroxyheneicosane, 1-ethyl-4-pentadecyl-tetramethyleneglycol)

$CH_3 \cdot [CH_2]_{14} \cdot CH(OH) \cdot [CH_2]_2 \cdot CH(OH) \cdot CH_2 \cdot CH_3$

$C_{21}H_{44}O_2$ MW, 328

Cryst. from EtOH. M.p. 95°.

Diacetyl : m.p. 48°.

Helferich, Köster, *Ber.*, 1923, 56, 2094.

Heneicosane

$CH_3 \cdot CH_2 \cdot [CH_2]_{17} \cdot CH_2 \cdot CH_3$

$C_{21}H_{44}$ MW, 296

White wax. M.p. 40.5°. B.p. 215°/15 mm., 129°/0.05 mm. D^{40}_D 0.778. n^{45}_D 1.4352.

Krafft, *Ber.*, 1882, 15, 1718.

Schmidt, Schoeller, Eberlein, *Ber.*, 1941, 74, 1313.

Heneicosane-1 : 1-dicarboxylic Acid (Eicosylmalonic acid)

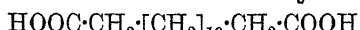
$CH_3 \cdot [CH_2]_{19} \cdot CH \begin{matrix} \nearrow COOH \\ \searrow COOH \end{matrix}$

$C_{23}H_{44}O_4$ MW, 384

M.p. 119°. Spar. sol. $CHCl_3$. Evolves CO_2 at 150°.

Mono-nitrile : $C_{23}H_{43}O_2N$. MW, 365. M.p. 87-9°.

Fileti, Gazz. chim. ital., 1910, 27, 302.

Heneicosane-1 : 21-dicarboxylic Acid
 $\text{C}_{23}\text{H}_{44}\text{O}_4$ MW, 384

Occurs as esters in Japan wax. Needles from CHCl_3 . M.p. 127.5° . Spar. sol. org. solvents.

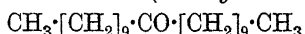
Me ester: $\text{C}_{24}\text{H}_{46}\text{O}_4$. MW, 398. M.p. 87° .

Di-Me ester: $\text{C}_{25}\text{H}_{48}\text{O}_4$. MW, 412. M.p. 71° .

Et ester: $\text{C}_{25}\text{H}_{48}\text{O}_4$. MW, 412. M.p. 83.5° .

Di-Et ester: $\text{C}_{27}\text{H}_{52}\text{O}_4$. MW, 440. M.p. 61.5° .

Flaschenträger, Halle, *Z. physiol. Chem.*, 1930, 190, 120.

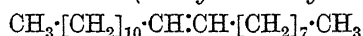
Heneicosanone-11 (Didecyl ketone)
 $\text{C}_{21}\text{H}_{42}\text{O}$ MW, 310

Needles from EtOH . Aq. M.p. 64° .

Oxime: m.p. 27.5° .

Pickard, Kenyon, *J. Chem. Soc.*, 1911, 99, 57.

Strating, Backer, Lolkema, Benninga, *Rec. trav. chim.*, 1936, 55, 903.

9-Heneicosene (1-Octyl-2-undecyl-ethylene)
 $\text{C}_{21}\text{H}_{42}$ MW, 294

M.p. $+3^\circ$. B.p. $201-2^\circ/11$ mm. D^{15}_4 0.8048.

$\text{P} + \text{HI} \rightarrow$ heneicosane.

Schaal, *Ber.*, 1907, 40, 4787.

Mai, *Ber.*, 1889, 22, 2135.

Heneicosyl 2-naphthyl Ketone.

See Behenonaphthone.

Heneicosyl phenyl Ketone.

See Behenophenone.

Hentriacontane
 $\text{C}_{31}\text{H}_{64}$ MW, 436

Constituent of many waxes. Leaflets from AcOEt . M.p. 68° . Sol. pet. ether. Spar. sol. EtOH , Et_2O , AcOEt . D^{68}_4 0.7808.

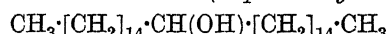
Krafft, Weilandt, *Ber.*, 1896, 29, 1323.

Krafft, *Ber.*, 1907, 40, 4783.

Heilbron, Phipers, Wright, *J. Chem. Soc.*, 1934, 1573.

Hentriacontane-1-carboxylic Acid.

See Lacceric Acid.

Hentriacontanol-16 (Dipentadecylcarbinol)
 $\text{C}_{31}\text{H}_{64}\text{O}$ MW, 452

Needles from EtOH . M.p. $84-5^\circ$. Sol. Et_2O , pet. ether, C_6H_6 . Spar. sol. EtOH , MeOH .

Kipping, *J. Chem. Soc.*, 1890, 57, 986.

Hentriacontanone.

See Palmitone.

Hentriacontene
 $\text{C}_{31}\text{H}_{62}$ MW, 434

Felted mass from Me_2CO . M.p. 64° . B.p. $295^\circ/15$ mm.

Bromide: m.p. 62° . Unstable.

Pummerer, Kranz, *Ber.*, 1929, 62, 2625.

Heparin.

Blood anticoagulant present in mammalian lung, liver, etc. Heparin is a polysulphuric ester derived from a polysaccharide composed of *d*-glucuronic acid and acetylated glucosamine residues (mucoitin). $[\alpha]^{20}_D +65-70^\circ$. Gives cryst. brucine and Ba salts. Used for blood transfusions, vascular surgery, and thrombosis.

Jorpes, *Z. physiol. Chem.*, 1943, 278, 7.

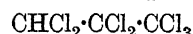
Jorpes, *Heparin: its Chemistry, Physiology and Applications in Medicine*; London, 1939.

Percival, *Quarterly Reviews of the Chemical Society* (London), 1949, Vol. III, 4, 383.

Heptachloroanthracene
 $\text{C}_{14}\text{H}_3\text{Cl}_7$ MW, 419.5

Yellow needles. M.p. above 350° . Sol. PhNO_2 , ligroin. Spar. sol. CHCl_3 , hot toluene. Insol. EtOH , Et_2O , AcOH , C_6H_6 . Sublimes. Ox. \rightarrow pentachloroanthraquinone.

Diehl, *Ber.*, 1878, 11, 176.

1 : 1 : 1 : 2 : 2 : 3 : 3-Heptachloropropane
 C_3HCl_7 MW, 285.5

M.p. 29.4° . B.p. $247-8^\circ$, $164^\circ/90$ mm., $150-51^\circ/50$ mm., $132^\circ/30$ mm. D^{15}_4 1.8048. Heat at $250-420^\circ \rightarrow \text{CCl}_3\cdot\text{CCl}\cdot\text{CCl}_2 + \text{HCl}$. Alc. KOH \rightarrow hexachloropropylene.

Farlow, *Organic Syntheses*, 1937, XVII, 58.

1 : 1 : 1 : 2 : 3 : 3 : 3-Heptachloropropane
 C_3HCl_7 MW, 285.5

M.p. $11-11.5^\circ$. B.p. 249° , $165^\circ/90$ mm. D^{15}_4 1.7921. n^{25}_D 1.5427. Alc. KOH \rightarrow hexachloropropylene.

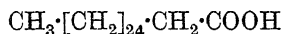
Prins, *J. prakt. Chem.*, 1914, 89, 417; D.R.F., 261,689, (*Chem. Zentr.*, 1913, II, 394).

Heptacosane
 $\text{C}_{27}\text{H}_{56}$ MW, 380

Constituent of tobacco oil and many waxes. Pearly leaflets from AcOEt . M.p. 59.5° . B.p. $270^\circ/15$ mm. Spar. sol. Et_2O . Insol. EtOH . D^{60}_4 0.780. n^{25}_D 1.4345.

Gluud, *Ber.*, 1919, 52, 1051.

Lipp, Casimir, *J. prakt. Chem.*, 1919, 99, 256.

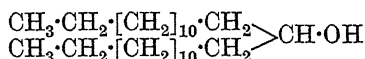
Heptacosanic Acid (*Carboceric acid*)
 $\text{C}_{27}\text{H}_{54}\text{O}_2$ MW, 410

Present as ester in Chinese and Montan waxes. Needles from AcOEt. M.p. 82°.

Me ester: $\text{C}_{29}\text{H}_{56}\text{O}_2$. MW, 424. Cryst. from MeOH. M.p. 64°. B.p. 265–8°.

Tropsch, Kreutzer, *Chem. Abstracts*, 1922, 16, 2111.

Gascard, *Compt. rend.*, 1920, 170, 1328.

Heptacosanol-14 (14-*Hydroxyheptacosane*, *di-n-tridecylcarbinol*)
 $\text{C}_{27}\text{H}_{56}\text{O}$ MW, 396

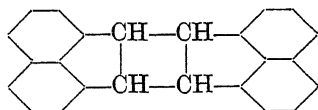
Found in traces in apple skin wax. M.p. 80–1°. Very sol. CHCl_3 . Sol. Me_2CO , MeOH, pet. ether, hot EtOH. Insol. H_2O .

Jacobson, *J. Am. Chem. Soc.*, 1911, 33, 2050.

Grün, Ulbrich, Krczil, *Z. angew. Chem.*, 1926, 39, 421.

Heptacosanone-14.

See Myristone.

Heptacyclene (*Di-perinaphthylencyclobutane*)
 $\text{C}_{24}\text{H}_{16}$ MW, 304

α -Form:

Needles from C_6H_6 . M.p. 306–7°. Sol. hot PhNO_2 . Insol. cold conc. H_2SO_4 . $\text{K}_2\text{Cr}_2\text{O}_7$ in AcOH \rightarrow naphthalic anhydride.

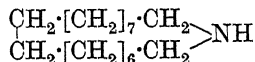
Picrate: m.p. 225–7° decomp.

β -Form:

Prisms or plates from C_6H_6 . M.p. 232–4°. Sol. CHCl_3 , C_6H_6 . Spar. sol. EtOH, Et₂O, AcOH. Sol. hot conc. H_2SO_4 . $\text{Na}_2\text{Cr}_2\text{O}_7$ in AcOH \rightarrow naphthalic anhydride.

Picrate: m.p. 215–16°.

Dziewoński, Paschalski, *Ber.*, 1914, 47, 2680.

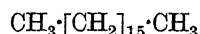
Heptadecamethyleneimine
 $\text{C}_{17}\text{H}_{35}\text{N}$ MW, 253

Cryst. M.p. 67–68°. pK 9.27.

Ruzicka, Kobelt, Hafliger, Prelog, *Helv. Chim. Acta*, 1949, 32, 544.

Heptadecanal.

See Heptadecyl Aldehyde.

Heptadecane
 $\text{C}_{17}\text{H}_{36}$ MW, 240

M.p. 22°. B.p. 303°, 223°/100 mm., 187.5°/30 mm., 159–63°/11 mm. D_4^{25} 0.7777. n_D^{25} 1.4356.

Semmler, Feldstein, *Ber.*, 1914, 47, 2691.

Kraft, *Ber.*, 1882, 15, 1702.

Schmidt, Schoeller, Eberlein, *Ber.*, 1941, 74, 1313.

Heptadecane-1 : 1-dicarboxylic Acid.

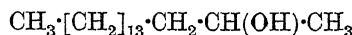
See Cetylmalonic Acid.

Heptadecanoic Acid.

See Heptadecylic Acid.

Heptadecanol-1.

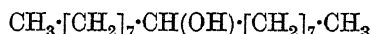
See Heptadecyl Alcohol.

Heptadecanol-2 (*Methylpentadecylcarbinol*)
 $\text{C}_{17}\text{H}_{36}\text{O}$ MW, 256

Plates. M.p. 54° (35°). B.p. 140°/0.5 mm. n_D^{27} 1.4407.

Gascard, *Ann. chim.*, 1921, 15, 332.

Kuhn, Köhler, Köhler, *Z. physiol. Chem.*, 1936, 242, 171.

Heptadecanol-9 (*Di-n-octylcarbinol*, 9-*hydroxyheptadecane*)
 $\text{C}_{17}\text{H}_{36}\text{O}$ MW, 256

Plates from EtOH.Aq. M.p. 61°. Sol. most org. solvents. Insol. H_2O .

Kipping, *J. Chem. Soc.*, 1893, 63, 457.

Messer, *Chem. News*, 1929, 138, 292.

Heptadecanone-2.

See Methyl pentadecyl Ketone.

Heptadecanone-9.

See Di-n-octyl Ketone.

Heptadecatetraene (*Aplotaxene*)
 $\text{C}_{17}\text{H}_{28}$ MW, 232

Constituent of certain root oils. B.p. 153–5°/11 mm. D_4^{21} 0.8310. n_D^{21} 1.483. Red. \rightarrow heptadecatriene (*dihydro-aplotaxene*), b.p. 154–7°/11 mm., D_4^{21} 0.8177, n_D^{21} 1.471.

Semmler, Feldstein, *Ber.*, 1914, 47, 2690.

Heptadecatriene.

See under Heptadecatetraene.

Heptadecene.

See Heptadecylene.

Heptadecenoic Acid.

See Heptadecylenic Acid.

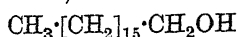
Heptadecenylcatechol.

See Glutarhengol.

Heptadecylacetanilide.

See under Heptadecylaniline.

Heptadecyl Alcohol (*Heptadecanol-1, 1-hydroxyheptadecane*)



$\text{C}_{17}\text{H}_{36}\text{O}$ MW, 256

Cryst. from Me_2CO . M.p. 54° . Sol. EtOH, Et_2O .

p-Nitrobenzoate: m.p. 54° .

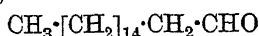
Stearate: plates. M.p. 64.7° .

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, 20, 531.

Gascard, *Ann. chim.*, 1921, 15, 347.

Webster, Schaefer, *Chem. Abstracts*, 1940, 34, 2784.

Heptadecyl Aldehyde (*Margaric aldehyde, heptadecanal*)



$\text{C}_{17}\text{H}_{34}\text{O}$ MW, 254

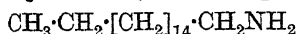
Needles from pet. ether. M.p. 36° . Cryst. + $10\text{C}_6\text{H}_5\text{OH}$ from abs. EtOH. M.p. 52° . B.p. $204^\circ/26$ mm. Sol. Et_2O , CHCl_3 , C_6H_6 . Spar. sol. EtOH, Me_2CO , AcOEt. Decolourises KMnO_4 . Long standing \rightarrow trimeric form, m.p. $77-8^\circ$. Ox. \rightarrow heptadecylic acid.

Semicarbazone: m.p. 108° . Sol. EtOH. Spar. sol. CHCl_3 , C_6H_6 . Insol. Et_2O , pet. ether.

Oxime: m.p. 89.5° .

Le Sueur, *J. Chem. Soc.*, 1904, 85, 832.

Heptadecylamine (*1-Aminoheptadecane*)



$\text{C}_{17}\text{H}_{37}\text{N}$ MW, 255

Cryst. M.p. 49° . B.p. $335-40^\circ/760$ mm., $128^\circ/0.5$ mm. Sol. EtOH, Et_2O . Insol. H_2O . Non-volatile in steam.

B.HCl: m.p. 162.5° (158°).

N-Acetyl: m.p. 62° .

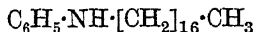
N-Benzoyl: leaflets from C_6H_6 . M.p. 91° .

Nageli, Grüntuch, Lendorff, *Helv. Chim. Acta*, 1929, 12, 236.

v. Braun, Sobocki, *Ber.*, 1911, 44, 1473.

Briggs, De Ath, Ellis, *J. Chem. Soc.*, 1942, 61.

Heptadecylaniline (*N-Phenylheptadecylamine*)



$\text{C}_{23}\text{H}_{41}\text{N}$ MW, 331

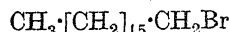
Plates from EtOH, rapidly changing to needles. M.p. $42-3^\circ$. B.p. $285-6^\circ/35$ mm. Sol. Et_2O , Me_2CO , CHCl_3 , AcOEt, C_6H_6 , pet. ether. Spar. sol. cold EtOH. Insol. HCl.

B.HCl: plates from pet. ether. M.p. $99-100^\circ$. Hyd. by hot H_2O .

N-Acetyl: N-heptadecylacetanilide. $\text{C}_{25}\text{H}_{43}\text{ON}$. MW, 373. Needles from MeOH.Aq. M.p. $42-3^\circ$.

Le Sueur, *J. Chem. Soc.*, 1910, 97, 2435.

Heptadecyl bromide (*1-Bromoheptadecane*)



$\text{C}_{17}\text{H}_{35}\text{Br}$ MW, 319

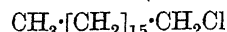
M.p. 32° . B.p. $193-200^\circ/10$ mm.

v. Braun, Irmisch, *Ber.*, 1932, 65, 881.

Heptadecylcatechol.

See Hydrolaccol and Hydrothitsiol.

Heptadecyl chloride (*1-Chloroheptadecane*)

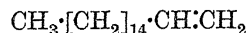


$\text{C}_{17}\text{H}_{35}\text{Cl}$ MW, 274.5

Cryst. M.p. 24° . B.p. $192-5^\circ/10$ mm.

v. Braun, Sobocki, *Ber.*, 1911, 44, 1473.

1-Heptadecylene (*Heptadecene-1, n-pentadecylethylene*)



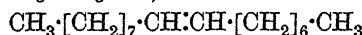
$\text{C}_{17}\text{H}_{34}$ MW, 238

M.p. 11.2° (-4°). B.p. $157^\circ/10$ mm. D_4^{20} 0.7854. n_D^{20} 1.4438.

Kozacik, Reid, *J. Am. Chem. Soc.*, 1938, 60, 2436.

Schmidt, Schoeller, Eberlein, *Ber.*, 1941, 74, 1313.

8-Heptadecylene (*Heptadecene-8, sym.-n-heptyl-n-octyl-ethylene*)



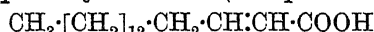
$\text{C}_{17}\text{H}_{34}$ MW, 238

B.p. $160^\circ/9.5$ mm. D^{10} 0.7977.

Mai, *Ber.*, 1889, 22, 2135.

Messer, *Chem. News*, 1929, 138, 292.

2-Heptadecylenic Acid (*2-Heptadecenoic acid*)



$\text{C}_{17}\text{H}_{32}\text{O}_2$ MW, 268

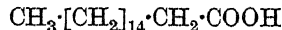
Cryst. from Me_2CO . M.p. 57.5° . Sol. Et_2O .

Amide: m.p. $110-110.5^\circ$.

p-Bromoanilide: m.p. $115-16^\circ$.

Lauer, Gensler, Miller, *J. Am. Chem. Soc.*, 1941, 63, 1153.

Heptadecylic Acid (*Margaric acid, heptadecanoic acid, heptadecoic acid*. See also Margaric Acid)



$\text{C}_{17}\text{H}_{34}\text{O}_2$ MW, 270

Plates from pet. ether. M.p. $60-1^\circ$. B.p. $227^\circ/100$ mm. D^{20} 0.8532. n_D^{20} 1.4342. Sol. Et_2O . Spar. sol. EtOH. Dist. of Ba salt \rightarrow methyl hexadecyl ketone.

Me ester: $\text{C}_{18}\text{H}_{36}\text{O}_2$. MW, 284. Plates from EtOH. M.p. 29° . Sol. Et_2O , C_6H_6 .

Et ester: $\text{C}_{19}\text{H}_{38}\text{O}_2$. MW, 298. Plates from EtOH.Aq. M.p. 28° (24°). Sol. Et_2O . Insol. H_2O .

Phenyl ester: $\text{C}_{23}\text{H}_{38}\text{O}_2$. MW, 346. M.p. 37° .

Amide: $\text{C}_{17}\text{H}_{35}\text{ON}$. MW, 269. Plates from EtOH. M.p. 108° . Sol. EtOH. Spar. sol. cold Et_2O .

Nitrile: $C_{17}H_{33}N$. MW, 251. Cryst. from EtOH. B.p. $208^{\circ}/10$ mm. Sol. hot EtOH, Et_2O . Spar. sol. cold EtOH.

Le Sueur, *J. Chem. Soc.*, 1904, **85**, 836.

Krafft, *Ber.*, 1879, **12**, 1672.

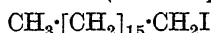
Levene, West, *J. Biol. Chem.*, 1913, **16**, 477.

Bömer, Limprich, *Chem. Zentr.*, 1912, **II**, 703.

Fierz-David, Küster, *Helv. Chim. Acta*, 1939, **22**, 82.

Prosternik, *Chem. Abstracts*, 1948, **42**, 3318.

Heptadecyl iodide (1-Iodoheptadecane)



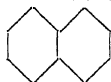
$C_{17}H_{35}I$ MW, 366

Leaflets from Me_2CO . M.p. 33.6° . B.p. $158-9^{\circ}/0.5$ mm.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, **20**, 531.

Webster, Schaefer, *Chem. Abstracts*, 1940, **34**, 2784.

Heptadecyl-1-naphthylamine (1-N-Naphthylheptadecylamine)



$C_{27}H_{43}N$ MW, 381

Cryst. from EtOH. M.p. $53-5^{\circ}$. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 ; pet. ether. Insol. H_2O , dil. HCl .

B, HCl : plates from pet. ether. M.p. $96-7^{\circ}$. N -Benzenesulphonyl: needles from EtOH. M.p. $66-8^{\circ}$.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 831.

Heptadecyl-2-naphthylamine (2-N-Naphthylheptadecylamine).

Plates from EtOH. M.p. $60-1^{\circ}$. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. pet. ether. Insol. H_2O , HCl .

B, HCl : needles from $CHCl_3$ -pet. ether. M.p. $170-1^{\circ}$.

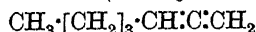
N -Benzenesulphonyl: needles from EtOH. M.p. $51-2^{\circ}$.

Le Sueur, *J. Chem. Soc.*, 1911, **99**, 828.

Heptadecyl phenyl Ketone.

See Stearophenone.

1 : 2-Heptadiene (n-Butylallene)



C_7H_{12} MW, 96

B.p. $105-6^{\circ}$. D_4^{18} 0.7306. n_D^{18} 1.432.

Bouis, *Compt. rend.*, 1926, **183**, 133.

1 : 4-Heptadiene (1-Methylene-3-propylidene-propane, 4-propylidene-1-butylene, 1-vinyl-2-pentene)



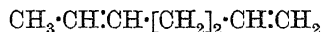
C_7H_{12} MW, 96

B.p. 92° (101°). D_4^{20} 0.7270 (0.7176). n_D^{20} 1.4370 (1.420).

Shoemaker, Boord, *J. Am. Chem. Soc.*, 1931, **53**, 1505.

Karasev, *J. Gen. Chem. U.S.S.R.*, 1940, **10**, 1699, (*Chem. Abstracts*, 1941, **35**, 3223).

1 : 5-Heptadiene (1-Methylene-4-ethylidene-butane)

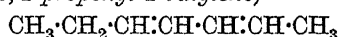


C_7H_{12} MW, 96

B.p. $94-94.5^{\circ}$. n_D^{20} 1.4199.

Levy, Cope, *J. Am. Chem. Soc.*, 1944, **66**, 1684.

2 : 4-Heptadiene (1-Propylidene-2-butylene, sym.-methyl- α -butenyl-ethylene, 1-methyl-1 : 3-hexadiene, 1-propenyl-1-butylene)



C_7H_{12} MW, 96

B.p. 107° . D_4^{15} 0.7341. $n_D^{21.5}$ 1.4486.

Reif, *Ber.*, 1908, **41**, 2744.

Prévost, *Compt. rend.*, 1926, **182**, 853.

1 : 5-Heptadienol-4.

See Propenylallylcarbinol.

1 : 6-Heptadienol-4.

See Diallylcarbinol.

2 : 4-Heptadienone-6 (Crotonylideneacetone, β -butenylideneacetone, methyl 1 : 3-pentadienyl ketone, 1-aceto-1 : 3-pentadiene, 6-ketoheptadiene-2 : 4)



$C_7H_{10}O$ MW, 110

B.p. $88^{\circ}/28$ mm., $78^{\circ}/16$ mm. D_4^{15} 0.8990. n_D^{15} 1.5195. Resinifies on standing in air.

Oxime: m.p. $90-2^{\circ}$.

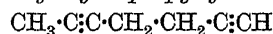
Semicarbazone: m.p. $157-8^{\circ}$.

Phenylhydrazone: m.p. $70-1^{\circ}$.

Auwers, Eisenlohr, *J. prakt. Chem.*, 1911, **84**, 65.

Meerwein, *Ann.*, 1908, **358**, 87.

1 : 5-Heptadi-yne (1-Methynyl-3-propynyl-propane, 1-acetylenyl-3-propynyl-ethane)

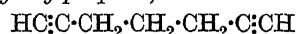


C_7H_8 MW, 92

B.p. $26-7^{\circ}/30$ mm. D_4^{21} 0.8100. n_D^{21} 1.452. Alc. $AgNO_3 \rightarrow$ white ppt. $Cu_2Cl_2 \rightarrow$ yellow ppt.

Urion, *Compt. rend.*, 1927, **185**, 1286.

1 : 6-Heptadi-yne (1 : 5-Dimethynylpentane, 1 : 3-diacetylenylpropane)

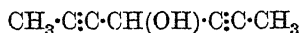


C_7H_8 MW, 92

B.p. 112° . D_4^{17} 0.8164. n_D^{17} 1.451. Gives ppts. with Cu_2Cl_2 , $HgCl_2$, $AgNO_3$.

Lespieau, Journaud, *Compt. rend.*, 1929, **188**, 1410.

2 : 5-Heptadi-ynol-4 (*Dipropynylcarbinol, diacetylenylisopropyl alcohol, 4-hydroxyheptadi-yn-2 : 5*)



$\text{C}_7\text{H}_8\text{O}$ MW, 108
Leaflets from CCl_4 . M.p. 105–6°. Sublimes in vacuum.

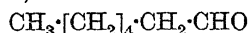
Jozitsch, Lebedew, *J. Russ. Phys.-Chem. Soc.*, 1910, 42, 1494.

Viguier, *Compt. rend.*, 1911, 153, 957.

Heptahydroxyflavone.

See Hibiscetin.

n-Heptaldehyde (*Oenanthaldehyde, cenanthol, enanthaldehyde*)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114
M.p. –43.3°. B.p. 152.8°, 79.3°/86 mm., 66.9°/41 mm., 59.6°/30 mm., 44.4°/8.96 mm. D_4^{15} 0.82162, D_4^{20} 0.8495. n_D^{20} 1.42571. $\text{CrO}_3 \rightarrow$ n-heptylic acid. $\text{H} + \text{Pt}$ in $\text{AcOH} \rightarrow$ n-heptyl alcohol.

Oxime: plates from EtOH. M.p. 57–8° (50°). B.p. 195°, 100.5°/14 mm. Al_2O_3 at 340–60° \rightarrow n-heptylic nitrile.

Cyanhydrin: see under 1-Hydroxycaprylic Acid.

Semicarbazone: m.p. 109°.

3 : 5-Dinitrophenylsemicarbazone: m.p. 141–2°.

o-Tolylsemicarbazone: m.p. 122–3°.

Phenylhydrazone: b.p. 202.5–203°.

p-Nitrophenylhydrazone: m.p. 73°.

Diethylacetal: b.p. 204–5°/774 mm. D^{17} 0.836.

Sherrill, *J. Am. Chem. Soc.*, 1930, 52, 1991.

Sabatier, Mailhe, *Compt. rend.*, 1914, 158, 986.

Krafft, *Ber.*, 1877, 10, 2035.

Heptamethylene.

See Cycloheptane.

Heptamethylene bromide.

See 1 : 7-Dibromoheptane.

Heptamethylene chloride.

See 1 : 7-Dichloroheptane.

Heptamethylenediamine (1 : 7-Diaminoheptane)



$\text{C}_7\text{H}_{16}\text{N}_2$ MW, 130
Needles from EtOH. M.p. 28–9°. B.p. 223–5°. *B,2HCl*: needles from EtOH. Decomp. at about 250°.

NN-Dibenzoyl: cryst. from EtOH. M.p. 124°.

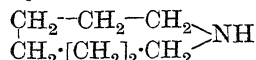
NN-Di-benzenesulphonyl: m.p. 104°.

v. Braun, Müller, *Ber.*, 1905, 38, 2206.

Heptamethylene Glycol.

See Heptandiol-1 : 7.

Heptamethyleneimine



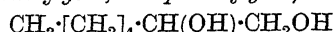
$\text{C}_7\text{H}_{15}\text{N}$ MW, 113
B.p. 75–7°/30 mm. D_4^{21} 0.8955. n_D^{21} 1.4740. ρ_K 9.77.

Ruzicka, Kobelt, Hafiger, Prelog, *Helv. Chim. Acta*, 1949, 32, 544.

Heptandial.

See Pimelic Dialdehyde.

Heptandiol-1 : 2 (1 : 2-Dihydroxyheptane, n-amylethylene glycol, 1-heptene glycol)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132
B.p. 127.5–128.5°/15 mm., 128–30°/11 mm. $\text{HCl} \rightarrow$ 1-chloro-2-hydroxyheptane.

d.

B.p. 90°/1 mm. (93–4°/1 mm.). $[\alpha]_D^{25} + 16.81^\circ$ in EtOH.

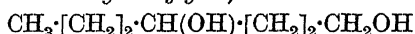
Di-phenylurethane: m.p. 109° (111–12°). $[\alpha]_D^{25} + 12.14^\circ$ in EtOH.

Hershberg, *Helv. Chim. Acta*, 1934, 17, 357.

v. Braun, Schirmacher, *Ber.*, 1923, 56, 1847.

Levene, Walti, *J. Biol. Chem.*, 1932, 98, 737.

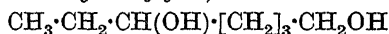
Heptandiol-1 : 4 (1 : 4-Dihydroxyheptane, 1-n-propyltetramethylene glycol)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132
B.p. 240–5°/750 mm., 126.5–128.5°/4 mm. Misc. with H_2O . D_4^{20} 0.9559. n_D^{25} 1.4510. *Diacetyl*: b.p. 249–52°/748 mm., 113–113.5°/1 mm. D_4^0 1.0135, D_4^{20} 0.9934. n_D^{25} 1.4268. *α-Naphthylurethane*: cryst. from ligroin. M.p. 81–2°.

Bray, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2105.

Heptandiol-1 : 5 (1 : 5-Dihydroxyheptane, 1-ethylpentamethylene glycol)



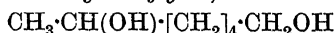
$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132
B.p. 135–6°/11 mm., 126–8°/1.8 mm. Sol. most org. solvents. Insol. H_2O . D_4^{20} 0.9705. n_D^{25} 1.4571.

Di-p-nitrobenzoyl: m.p. 82–3°.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, 47, 1102.

Paul, *Bull. soc. chim.*, 1935, [5], 2, 311.

Heptandiol-1 : 6 (1 : 6-Dihydroxyheptane, 1-methylhexamethylene glycol)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 94-7°/1 mm.

Phenylurethane : m.p. 97-8°.

Hill, Adkins, *J. Am. Chem. Soc.*, 1938, 60, 1033.

Heptandiol-1 : 7 (1 : 7-*Dihydroxyheptane*, *heptamethylene glycol*)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

M.p. 22.5° (19°). B.p. 262°, 172°/35 mm., 148-9°/10 mm. Sol. H_2O , EtOH. Spar. sol. Et_2O . Hygroscopic. HBr at 130-40° \longrightarrow 1 : 7-dibromoheptane.

Di-Me ether : $\text{C}_9\text{H}_{20}\text{O}_2$. MW, 160. B.p. 201° (189-90°), 108°/38 mm. D_4^{20} 0.8705, D_4^{15} 0.8606. n_D^{25} 1.4126.

Di-Et ether : $\text{C}_{11}\text{H}_{24}\text{O}_2$. MW, 188. B.p. 226°, 129°/35 mm. D_4^{20} 0.8786, D_4^{15} 0.853.

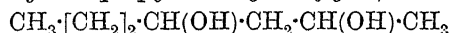
Diacetyl : b.p. 274°. D_4^{20} 1.0219.

Di-phenylurethane : m.p. 137° (134°).

Dionneau, *Ann. chim.*, 1915, 3, 247.

Müller, Rölz, *Monatsh.*, 1927, 48, 736.

Heptandiol-2 : 4 (2 : 4-*Dihydroxyheptane*, 1-methyl-3-n-propyltrimethylene glycol)



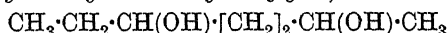
$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 107-8°/8 mm. D_4^{20} 0.926. n_D^{25} 1.4386.

Di-phenylurethane : m.p. 101°.

Stutsman, Adkins, *J. Am. Chem. Soc.*, 1939, 61, 3303.

Heptandiol-2 : 5 (2 : 5-*Dihydroxyheptane*, 1-methyl-4-ethyltetramethylene glycol)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

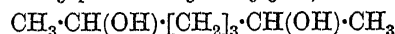
B.p. 132°/18.5 mm. Hot dil. $\text{H}_2\text{SO}_4 \longrightarrow$ 2-methyl-5-ethyltetrahydrofuran.

Diacetyl : b.p. 121-4°/11 mm. Insol. H_2O .

Di-phenylurethane : m.p. 147°.

Wohlgemuth, *Ann. chim.*, 1914, 2, 435.

Heptandiol-2 : 6 (2 : 6-*Dihydroxyheptane*, 1 : 5-dimethylpentamethylene glycol)

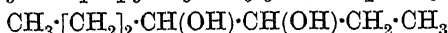


$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

B.p. 128°/30 mm. $\text{H}_2\text{SO}_4 \longrightarrow$ 2 : 6-dimethyl-tetrahydropyran.

Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1360.

Heptandiol-3 : 4 (3 : 4-*Dihydroxyheptane*, 1-ethyl-2-n-propylethylene glycol, 3-heptene glycol)



$\text{C}_7\text{H}_{16}\text{O}_2$ MW, 132

Solid form.

M.p. 103-4° (98-9°). B.p. 212°/761 mm. Sol. H_2O and most org. solvents. n_D^{25} 1.4420.

Di-p-nitrobenzoyl : m.p. 157.5-158.5°.

Dict. of Org. Comp.—II.

Liquid form.

B.p. 109°/15 mm. D_4^{23} 0.9430. n_D^{25} 1.4420.

Pierce, Adams, *J. Am. Chem. Soc.*, 1925, 47, 1101.

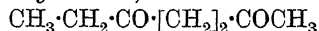
Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, 34, 303.

Wiemann, *Bull. soc. chim.*, 1935, 2, 1209.

Heptandione-2 : 4.

See Butyrylacetone.

Heptandione-2 : 5 (2 : 5-*Diketohexane*, *acetylpropionyl ethane*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

B.p. 90°/21 mm.

Semicarbazone : m.p. 231°.

Hughes, Lions, Maunsell, Wilkinson, *J. Proc. Roy. Soc. N.S. Wales*, 1938, 71, 406.

Heptandione-2 : 6 (2 : 6-*Diketohexane*, sym.-*diacetopropane* 1 : 3-*diacetylpropane*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

Cryst. from ligroin. M.p. 33-4°. B.p. 221-4°/764 mm. slight decomp., 96.5-97°/10-11 mm. Sol. H_2O , EtOH, Et_2O , C_6H_6 . D_4^{27} 0.93986. n_D^{27} 1.42767. Reduces hot Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. Hot dil. $\text{H}_2\text{SO}_4 \longrightarrow$ 1-methyl-1-cyclohexenone-3.

Dioxime : prisms from ligroin. M.p. 89°.

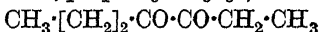
Disemicarbazone : m.p. 215°.

Di-p-nitrophenylhydrazone : m.p. 182-3°.

Fargher, Perkin, *J. Chem. Soc.*, 1914, 105, 1361.

Harries, *Ber.*, 1914, 47, 787.

Heptandione-3 : 4 (3 : 4-*Diketohexane*, *ethyl propyl diketone*, *propionylbutyryl*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

B.p. 147°/732 mm. D_4^{20} 0.885.

3-*Oxime* : b.p. 145°/60 mm. Insol. H_2O .

Dioxime : occurs in Algerian rue oil. Cryst. from EtOH. M.p. 167-8°. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , C_6H_6 , ligroin.

Fileti, Ponzio, *J. prakt. Chem.*, 1897, 55, 194.

Ponzio, Borelli, *Gazz. chim. ital.*, 1902, 32, 421.

Naves, *Chem. Abstracts*, 1939, 33, 5990.

Heptandione-3 : 5 (3 : 5-*Diketohexane*, *di-propionylmethane*)



$\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128

B.p. 172-3°/711 mm., 78-80°/30 mm. D_4^{20} 0.9445.

Cu salt : m.p. 209-10°.

Fischer, Bartholomäus, *Ber.*, 1912, 45, 1983.

Adams, Hauser, *J. Am. Chem. Soc.*, 1944, 66, 1220.

n-Heptane

C_7H_{16} MW, 100
M.p. — 90–65°. B.p. 98–35°/760 mm. D_4^{20} 0.68378, D_4^{25} 0.67963. n_D^{15} 1.39002, n_D^{20} 1.38777, n_D^{25} 1.38553.

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, 53, 1948.

Karvonen, *Chem. Abstracts*, 1931, 25, 2412.

Edgar, Calingaert, *J. Am. Chem. Soc.*, 1929, 51, 1540.

Orlov, Glinskikh, Ignatovitch, *J. Applied Chem., U.S.S.R.*, 1935, 8, 1170.

Heptane-1-carboxylic Acid.

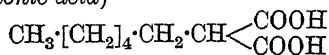
See n-Caprylic Acid.

Heptane-4-carboxylic Acid.

See Dipropylacetic Acid.

Heptane-1 : 7-dial.

See Pimelic Dialdehyde.

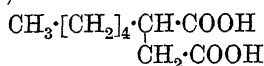
Heptane-1 : 1-dicarboxylic Acid (n-Hexylmalonic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Cryst. from C_6H_6 . M.p. 103–5°.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 150–5°/20 mm. D_4^{21} 0.9577. n_D^{21} 1.4278.

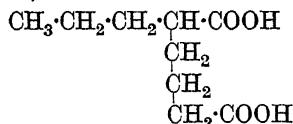
v. Braun, *Ber.*, 1934, 67, 224.

Heptane-1 : 2-dicarboxylic Acid (n-Amyl-succinic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

M.p. 77°.

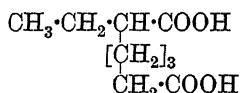
Ziegler, Grimm, Willer, *Ann.*, 1940, 542, 90.

Heptane-1 : 4-dicarboxylic Acid (1-Propyladipic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

M.p. 55–9°. $k = 4.2 \times 10^{-5}$ at 24.4°.

Mellor, *J. Chem. Soc.*, 1901, 79, 131.

Heptane-1 : 5-dicarboxylic Acid (1-Ethyl-pimelic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

M.p. 41.5–43°. B.p. 260–5°/82 mm.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 198–200°/83 mm.

Dianilide: cryst. from C_6H_6 . M.p. 145°.

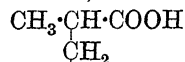
Crossley, Perkin, *J. Chem. Soc.*, 1894, 65, 990.

Carter, *J. Am. Chem. Soc.*, 1928, 50, 1967.

Mellor, *J. Chem. Soc.*, 1901, 79, 131.

Heptane-1 : 7-dicarboxylic Acid.

See Azelaic Acid.

Heptane-2 : 4-dicarboxylic Acid (1-Methyl-3-propylglutaric acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Exists in two modifications.

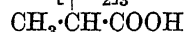
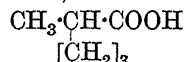
(i) M.p. 101–2°. $k = 5.9 \times 10^{-5}$ at 25°.

(ii) Needles from ligroin. M.p. 51–3°. $k = 5.4 \times 10^{-5}$ at 25°.

Bischoff, Tigerstedt, *Ber.*, 1890, 23, 1940.

Heptane-2 : 5-dicarboxylic Acid.

See 1-Methyl-4-ethyladipic Acid.

Heptane-2 : 6-dicarboxylic Acid (1 : 5-Dimethylpimelic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Exists in two modifications.

(i) Prisms from H_2O . M.p. 81–81.5°. Sol. EtOH, Et₂O, C_6H_6 , CHCl_3 . Spar. sol. ligroin. 100 parts H_2O dissolve 1.17 parts at 15°. $k = 3.44 \times 10^{-5}$ at 25°.

Dianilide: m.p. 183–4°.

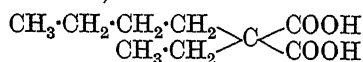
(ii) Cryst. from H_2O . M.p. 76–76.5°. Sol. EtOH, Et₂O, C_6H_6 , CHCl_3 . Spar. sol. ligroin. 100 parts H_2O dissolve 2.206 parts at 15°. $k = 3.43 \times 10^{-5}$ at 25°.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 195–6°/100 mm. D_4^{21} 0.9817.

Dianilide: m.p. 154–5°.

Kipping, *J. Chem. Soc.*, 1895, 67, 143, 149.

Perkin, Prentice, *J. Chem. Soc.*, 1891, 59, 831.

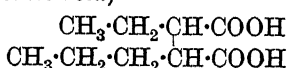
Heptane-3 : 3-dicarboxylic Acid (Ethyl-butylmalonic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Needles from H_2O . M.p. 116°. $k = 1.163 \times 10^{-2}$ at 25°. Heat \rightarrow 1-ethylcaproic acid.

Di-Et ester: $\text{C}_{13}\text{H}_{24}\text{O}_4$. MW, 244. B.p. 235–45°.

Raper, *J. Chem. Soc.*, 1907, 91, 1837.

Heptane-3 : 4-dicarboxylic Acid (1-Ethyl-2-propylsuccinic acid)

$\text{C}_9\text{H}_{16}\text{O}_4$ MW, 188

Exists in two modifications.

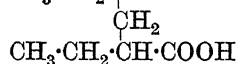
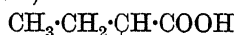
(i) M.p. 178–9°.

Di-Et ester : $C_{13}H_{24}O_4$. MW, 244. B.p. 134–5°/16 mm.

(ii) M.p. 97–8°.

Fichter, *Ann.*, 1908, 361, 388.

Heptane-3 : 5-dicarboxylic Acid (1 : 3-Diethylglutaric acid)



$C_9H_{16}O_4$ MW, 188

Exists in two modifications.

(i) M.p. 119.5–120°. Sol. EtOH, Et₂O, CHCl₃, Me₂CO, C₆H₆. Mod. sol. ligroin. 100 parts H₂O dissolve 0.8095 parts at 19°. $k = 5.5 \times 10^{-5}$ at 25°.

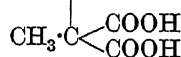
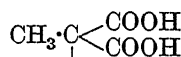
(ii) M.p. 93.5–94.5°. 100 parts H₂O dissolve 1.5280 parts at 19°. $k = 5.95 \times 10^{-5}$ at 25°.

Reformatski, *Chem. Zentr.*, 1902, II, 107.

Heptane-4 : 4-dicarboxylic Acid.

See Dipropylmalonic Acid.

Heptane-2 : 2 : 6 : 6-tetracarboxylic Acid



$C_{11}H_{16}O_8$ MW, 276

M.p. 210–11° decomp. Sol. EtOH. Spar. sol. H₂O, Et₂O, CHCl₃, C₆H₆. $k = 3.7 \times 10^{-3}$ at 25°. Heat \rightarrow heptane-2 : 6-dicarboxylic acid.

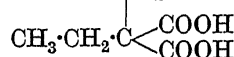
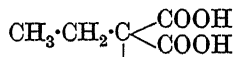
Tetra-Et ester : $C_{19}H_{32}O_8$. MW, 388. B.p. 238–40°/30 mm., 220–30°/20 mm.

Perkin, Prentice, *J. Chem. Soc.*, 1891, 59, 829.

Bischoff, *Ber.*, 1895, 28, 2828.

Noyes, *Am. Chem. J.*, 1898, 20, 793.

Heptane-3 : 3 : 5 : 5-tetracarboxylic Acid



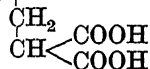
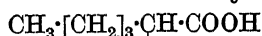
$C_{11}H_{16}O_8$ MW, 276

Cryst. from Et₂O. Heat at 163° \rightarrow 1 : 3-diethylglutaric acid.

Tetra-Et ester : $C_{19}H_{32}O_8$. MW, 388. M.p. 61°. B.p. 195°/12 mm.

Dressel, *Ann.*, 1890, 256, 186.

Heptane-1 : 1 : 3-tricarboxylic Acid

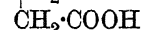
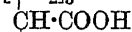
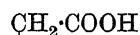


$C_{10}H_{16}O_6$ MW, 232

Cryst. from Et₂O. M.p. 144°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 782.

Heptane-1 : 3 : 7-tricarboxylic Acid



$C_{10}H_{16}O_6$ MW, 232

Free acid not isolated.

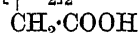
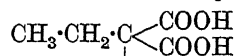
Tri-Et ester : $C_{16}H_{28}O_6$. MW, 316. B.p. 147–8°/0.15° mm.

Anhydride : $C_{10}H_{14}O_5$. MW, 214. Nodules from C₆H₆. M.p. 72–3°. B.p. 250–60°/0.2 mm.

Haworth, Mavin, *J. Chem. Soc.*, 1933, 1015.

Openshaw, Robinson, *J. Chem. Soc.*, 1937, 941.

Heptane-1 : 5 : 5-tricarboxylic Acid



$C_{10}H_{16}O_6$ MW, 232

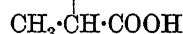
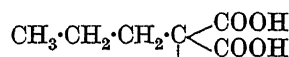
M.p. 86–8°. Heat \rightarrow heptane-1 : 5-dicarboxylic acid.

Tri-Et ester : $C_{16}H_{28}O_6$. MW, 316. B.p. 189–91°/20 mm.

Mellor, *J. Chem. Soc.*, 1901, 79, 132.

Carter, *J. Am. Chem. Soc.*, 1928, 50, 1969.

Heptane-2 : 4 : 4-tricarboxylic Acid



$C_{10}H_{16}O_6$ MW, 232

M.p. 167–8° decomp. Sol. H₂O, Et₂O. $k = 1.02 \times 10^{-2}$ at 15°. Heat \rightarrow 1-methyl-3-propylglutaric acid.

Tri-Et ester : $C_{16}H_{28}O_6$. MW, 316. B.p. 300–1°.

Bischoff, Tigerstedt, *Ber.*, 1890, 23, 1937.

Heptanol-1.

See *n*-Heptyl Alcohol.

Heptanol-2.

See Methyl-*n*-amylcarbinol.

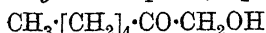
Heptanol-3.

See Ethyl-*n*-butylcarbinol.

Heptanol-4.

See Dipropylcarbinol.

1-Heptanolone-2 (*Hydroxymethyl n-amyl ketone, 1-hydroxy-2-ketoheptane, caproylcarbinol*)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 95°/20 mm. Reduces cold Fehling's.

Osazone : m.p. 245–6° decomp.

Levene, Walti, *J. Biol. Chem.*, 1932, **98**, 736.

Linnell, Roushdi, *Quart. J. Pharm. Pharmacol.*, 1939, **12**, 252.

1-Heptanolone-6 (*1-Hydroxy-6-ketoheptane, methyl 5-hydroxyamyl ketone*)

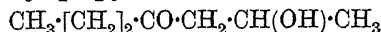


$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 119–22°/9 mm.

Franke *et al.*, *Monatsh.*, 1936, **69**, 167.

2-Heptanolone-4 (*2-Hydroxy-4-ketoheptane, 2-hydroxydipropyl ketone*)

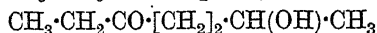


$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 101°/24 mm. D 0.930. n_D^{20} 1.4300.

Stutsman, Adkins, *J. Am. Chem. Soc.*, 1939, **61**, 3303.

2-Heptanolone-5 (*Ethyl 3-hydroxy-n-butyl ketone, 2-hydroxy-5-ketoheptane*)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

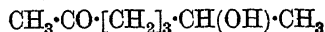
B.p. 86.5°/11 mm. Dist. \rightarrow 2-methyl-5-ethyl-2 : 3-dihydrofuran. NaHg \rightarrow heptandiol-2 : 5.

Oxime : b.p. 149–50°/13 mm.

Phenylurethane : m.p. 79°.

Wohlgemuth, *Ann. chim.*, 1914, **2**, 432.

2-Heptanolone-6 (*Methyl 4-hydroxy-n-amyl ketone, methyl-3-acetopropylcarbinol, 2-hydroxy-6-ketoheptane*)

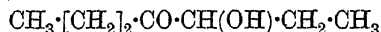


$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 117°/20 mm. $\text{CrO}_3 \rightarrow$ heptandione-2 : 6
NaHg \rightarrow heptandiol-2 : 6.

Fargher, Perkin, *J. Chem. Soc.*, 1914, **105**, 1359.

3-Heptanolone-4 (*Ethylbutyrylcarbinol, propyl 1-hydroxypropyl ketone, 3-hydroxy-4-ketoheptane*)



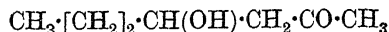
$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 181–2°, 86–7°/26 mm., 75–6°/18 mm.
 D_4^{20} 0.9309.

Semicarbazone : m.p. 117–18°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 576.

4-Heptanolone-2 (*Methyl 2-hydroxy-n-amyl ketone, 4-hydroxy-2-ketoheptane, propylacetonylcarbinol*)

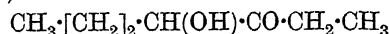


$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 95°/12 mm. $D_4^{19.5}$ 0.9296. $n_D^{19.5}$ 1.4357.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 911.
Grignard, Dubien, *Ann. chim.*, 1924, **2**, 288.

4-Heptanolone-3 (*Ethyl 1-hydroxybutyl ketone, propylpropionylcarbinol, 4-hydroxy-3-ketoheptane*)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

B.p. 176–7°, 83–5°/26 mm., 74–5°/18 mm.
 D_4^{20} 0.9235.

Semicarbazone : m.p. 121–2°.

Vénus-Daniloff, *Bull. soc. chim.*, 1928, **43**, 578.

Heptanone-2.

See Methyl n-amyl Ketone.

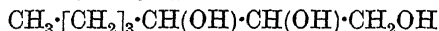
Heptanone-3.

See Ethyl n-butyl Ketone.

Heptanone-4.

See Butyrone.

Heptantriol-1 : 2 : 3 (*1-n-Butylglycerol, 1 : 2 : 3-trihydroxyheptane*)



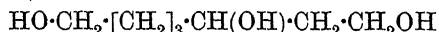
$\text{C}_7\text{H}_{16}\text{O}_3$ MW, 148

M.p. 52–4°. B.p. 175–175.5°/17 mm. Hygroscopic. Bitter taste.

Triacetyl : b.p. 174°/21 mm.

Delaby, *Compt. rend.*, 1922, **175**, 1153.

Heptantriol-1 : 3 : 7 (*1 : 3 : 7-Trihydroxyheptane*)



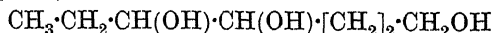
$\text{C}_7\text{H}_{16}\text{O}_3$ MW, 148

B.p. 202–4°/11 mm. n_D^{20} 1.4725.

Triacetyl : b.p. 184–6°/11 mm.

Hinz, Meyer, Schücking, *Ber.*, 1943, **76**, 676.

Heptantriol-1 : 4 : 5 (*1 : 4 : 5-Trihydroxyheptane*)



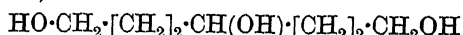
$\text{C}_7\text{H}_{16}\text{O}_3$ MW, 148

B.p. 161–2°/4 mm. D_4^{11} 1.084. n_D^{18} 1.47691.

Triacetyl : b.p. 169–70°/12 mm. D_4^{18} 1.076. n_D^{18} 1.43928.

Paul, *Compt. rend.*, 1940, **211**, 645.

Heptantriol-1 : 4 : 7 (*1 : 4 : 7-Trihydroxyheptane*)

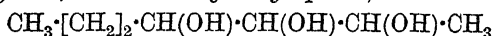


$\text{C}_7\text{H}_{16}\text{O}_3$ MW, 148

Viscous liq. with sweet taste. B.p. 230–2°/25 mm. D_4^{20} 1.084, D_4^{18} 1.075. n_D^{18} 1.4738. Hot dil. $H_2SO_4 \rightarrow$ 2-(3-hydroxypropyl)-tetrahydrofuran.

Hamonet, *Ann. chim.*, 1918, 10, 26.

Heptantriol-2 : 3 : 4 (1-Methyl-3-n-propylglycerol, 2 : 3 : 4-trihydroxyheptane)



$C_7H_{16}O_3$ MW, 148

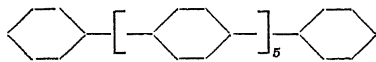
B.p. 162–4°/25 mm.

Delaby, Morel, *Compt. rend.*, 1925, 180, 1409.

Heptantrione.

See Diacetylacetone.

p-Heptaphenyl (p-Septiphenyl)



$C_{42}H_{30}$ MW, 534

M.p. 545°. Sublimes.

Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, 146, 29.

1 : 3 : 5-Heptatriene (1-Vinyl-3-propylidene-propylene, 1-methylene-4-ethylidene-2-butylene, sym.-vinylpropenylethylene)

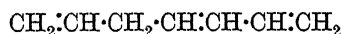


C_7H_{10} MW, 94

Colourless liq. B.p. 113–14°. D_4^{20} 0.764. n_D 1.50786.

Auwers, Westermann, *J. prakt. Chem.*, 1923, 105, 373.

1 : 3 : 6-Heptatriene (sym.-Vinylallylethylene, 1-allylbutadiene-1 : 3, 1 : 3-divinylpropylene)

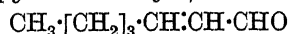


C_7H_{10} MW, 94

B.p. 115°. Partially polymerises on boiling. Br \rightarrow hexabromide.

Saytzeff, *Ann.*, 1877, 185, 144.

1-Heptenal (2-Butylacrolein, 1-heptenic aldehyde, 3-propylcrotonaldehyde)



$C_7H_{12}O$ MW, 112

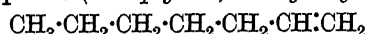
B.p. 165–7°. D_4^{17} 0.864. n_D^{17} 1.4468.

Semicarbazone : m.p. 169°.

p-Nitrophenylhydrazone : m.p. 154°.

Delaby, Guillot-Allegre, *Compt. rend.*, 1931, 192, 1467.

1-Heptene (1-Heptylene, n-amylethylene)



C_7H_{14} MW, 98

B.p. 93.7–93.8°/771 mm., 90.5–90.8°/720 mm. D_4^{20} 0.6973. n_D^{20} 1.3996.

Dibromide : 1 : 2-dibromoheptane. $C_7H_{14}Br_2$. MW, 258. Bp. 116°/25 mm. D_4^{20} 1.5180. n_D^{20} 1.5022.

Glycol : see Heptandiol-1 : 2.

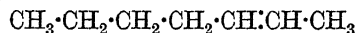
Wilkinson, *J. Chem. Soc.*, 1931, 134, 3057.

Waterman, De Kok, *Rec. trav. chim.*, 1933, 52, 298.

Herschberg, *Helv. Chim. Acta*, 1934, 17, 356.

van Pelt, Wibaut, *Rec. trav. chim.*, 1941, 60, 55.

2-Heptene (2-Heptylene, sym.-methylbutylethylene)

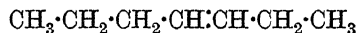


C_7H_{14} MW, 98

B.p. 98.5°. Ox. \rightarrow acetic and valeric acids.

Schorlemmer, Thorpe, *Ann.*, 1883, 217, 150.

3-Heptene (3-Heptylene, sym.-ethylpropylethylene)



C_7H_{14} MW, 98

B.p. 95.8°/768 mm (94°). D_4^{20} 0.7016. n_D^{20} 1.40419. Ox. \rightarrow propionic and butyric acids.

Glycol : see Heptandiol-3 : 4.

Prévost, *Compt. rend.*, 1928, 187, 946.

Mathus, Gibon, *Bull. soc. chim. Belg.*, 1925, 34, 303.

Griffith, *J. Chem. Soc.*, 1945, 715.

Heptene-carboxylic Acid.

See Octenic Acid.

1-Heptenic Acid (1-Hexene-1-carboxylic acid)



$C_7H_{12}O_2$ MW, 128

B.p. 225–8°, 120–2°/11 mm. D_4^{20} 0.9575. n_D^{20} 1.4488. $k = 1.5 \times 10^{-5}$ at 25°. Ox. \rightarrow valeric acid.

Et ester : $C_9H_{16}O_2$. MW, 156. B.p. 81–6°/12 mm.

Rupe, Ronus, Lotz, *Ber.*, 1902, 35, 4268.

2-Heptenic Acid (2-Hexene-1-carboxylic acid, 2-butylidenepropionic acid)

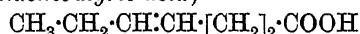


$C_7H_{12}O_2$ MW, 128

B.p. 226–8°. Spar. sol. H_2O . Volatile in steam.

Fittig, Schmidt, *Ann.*, 1889, 255, 77.

3-Heptenic Acid (3-Hexene-1-carboxylic acid, 3-propylidenepropionic acid)



$C_7H_{12}O_2$ MW, 128

B.p. 98–100°/5 mm. D_4^{15} 0.949. n_D^{15} 1.4418.

Me ester : b.p. 106.5°/4 mm.

Chloride : b.p. 66.5°/14 mm.

Treff, Werner, *Ber.*, 1935, 68, 640.

Hunsdiecker, *Ber.*, 1942, 75, 455.

4-Heptenic Acid (3-Propenylbutyric acid, 4-ethylidene-n-valeric acid, 2-hexene-6-carboxylic acid)

$\text{CH}_3\cdot\text{CH}:\text{CH}\cdot[\text{CH}_2]_3\cdot\text{COOH}$
 $\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128
 B.p. 222-4°, 117°/11 mm. D_4^{20} 0.9496. n_D^{20} 1.4444. Volatile in steam. Ox. \rightarrow acetic and glutaric acids.

Ciamician, Silber, *Ber.*, 1908, 41, 1075.
 v. Braun, Sobiecki, *Ber.*, 1911, 44, 1047.

5-Heptenic Acid (1-Hexene-6-carboxylic acid, 4-vinylvaleric acid)

$\text{CH}_2\cdot\text{CH}:[\text{CH}_2]_4\cdot\text{COOH}$
 $\text{C}_7\text{H}_{12}\text{O}_2$ MW, 128
 M.p. -6.5°. B.p. 225-7°/760 mm., 125°/15 mm. $\text{D}_4^{14.9}$ 0.9515. $n_D^{14.9}$ 1.4404. Ox. \rightarrow adipic acid.

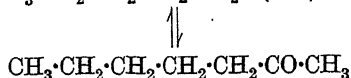
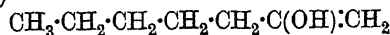
p-Toluidide: m.p. 59-6°.

Gaubert, Linstead, Rydon, *J. Chem. Soc.*, 1937, 1971.

Heptenic Aldehyde.

See Heptenal.

1-Heptenol-2 (Enol form of methyl n-amyl ketone)

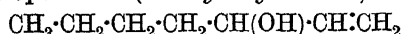


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114
 Me ether: $\text{C}_8\text{H}_{16}\text{O}$. MW, 128. B.p. 144-5°. D_0^{20} 0.8252. $n_D^{15.5}$ 1.4284. Dil. $\text{H}_2\text{SO}_4 \rightarrow$ methyl n-amyl ketone.

Et ether: $\text{C}_9\text{H}_{18}\text{O}$. MW, 142. B.p. 161-161.5°. D_0^{20} 0.822, $\text{D}_0^{15.5}$ 0.8125. $n_D^{15.5}$ 1.4274.

Moureu, *Bull. soc. chim.*, 1904, 31, 522.

1-Heptenol-3 (n-Butylvinylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114
 d-.

B.p. 153-5°.

Formyl: b.p. 155-7°. D_4^{20} 0.8754. n_{589}^{20} 1.4225. $[\alpha]_{589}^{20}$ -17.83°.

Benzoyl: b.p. 152-3°/18 mm. D_4^{20} 1.0033. n_{589}^{20} 1.5038. $[\alpha]_{589}^{20}$ +41.47°.

Acid phthalate: m.p. 50-2°. $[\alpha]_D^{20}$ +12.6° in EtOH.

l-.

B.p. 153-5°, 83°/15 mm. D_4^{20} 0.8360. n_D^{20} 1.4337. $[\alpha]_{589}^{20}$ -26.20°. Catalytic red. \rightarrow d-ethylbutylcarbinol.

Acetyl: b.p. 165-7°. D_4^{20} 0.8682. n_{589}^{20} 1.4200. $[\alpha]_{589}^{20}$ +4.36°.

Acid phthalate: m.p. 50-2°. $[\alpha]_D^{20}$ -12.6° in EtOH.

dl-.

B.p. 153-5°. Passed over Cu at 320° \rightarrow ethyl butyl ketone.

Acid phthalate: m.p. 56-7°.

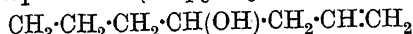
p-Nitrobenzoyl: m.p. 24-5°.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 1169.

Delaby, Dumoulin, *Bull. soc. chim.*, 1926, 39, 1578.

Johnson, Kenyon, *J. Chem. Soc.*, 1932, 722.

1-Heptenol-4 (Propylallylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114
 l-.

B.p. 59-60°/20 mm. $\text{D}_4^{22.1}$ 0.8384. n_D^{18} 1.4345. $[\alpha]_{5461}^{20.5}$ -7.21°.

Acid phthalate: m.p. 39-40°. $[\alpha]_{5461}$ -31.9° in EtOH.

dl-.

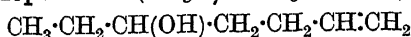
B.p. 152°/743 mm., 66°/20 mm. D_4^{20} 0.8374. n_D^{20} 1.4342.

Acid phthalate: m.p. 39-40°.

Consden, Duveen, Kenyon, *J. Chem. Soc.*, 1938, 2104.

Henze, Allen, Leslie, *J. Org. Chem.*, 1942, 7, 326.

1-Heptenol-5 (Ethyl-γ-butenylcarbinol)

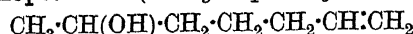


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 60-61.5°/11 mm. D_4^{18} 0.8447. n_D^{18} 1.4369. Spar. sol. H_2O . Misc. with most org. solvents.

Helferich, *Ber.*, 1919, 52, 1810.

1-Heptenol-6 (Methyl-4-pentenylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

Liq. with resinous odour. B.p. 64-5°/13 mm. D_4^{18} 0.8484. n_D^{18} 1.4387. Spar. sol. H_2O . Misc. with most org. solvents.

Helferich, Malkomes, *Ber.*, 1922, 55, 706.

Gaubert, Linstead, Rydon, *J. Chem. Soc.*, 1937, 1971.

2-Heptenol-1 (2-n-Butylallyl alcohol, 2-hexenylcarbinol, 2-heptenyl alcohol)



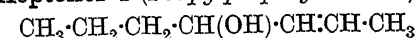
$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 177-9°. D_4^{20} 0.8421. n_D^{20} 1.4410.

Acetyl: b.p. 192-4°. D_4^{18} 0.8915. n_D^{18} 1.4314.

Bouis, *Ann. chim.*, 1928, 9, 427.

2-Heptenol-4 (Propylpropenylcarbinol)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114
 d-.

B.p. 63-5°/15 mm. D_4^{18} 0.839. n_D^{18} 1.4381 (n_D^{17} 1.5271). $[\alpha]_{5461}^{17}$ -5.44°.

Benzoyl: b.p. 158°/16 mm. $\text{D}_4^{15.5}$ 0.9908. n_D^{20} 1.5046. $[\alpha]_{5498}^{20}$ +6.47°.

Me ether: b.p. 135.7°. n_D^{20} 1.4169. $[\alpha]_{6438}^{25.5} + 3.73^\circ$.

Acid phthalate: m.p. 74–5°. $[\alpha]_{4358}^{16} + 46.4^\circ$ in EtOH.

l.

Acetyl: b.p. 74°/16 mm. D_4^{21} 0.8815. n_D^{17} 1.4270. $[\alpha]_{6438}^{21} - 14.96^\circ$.

Acid phthalate: m.p. 75°. $[\alpha]_{5461}^{16} - 22.5^\circ$ in EtOH.

dl.

B.p. 152–4°, 64°/14 mm. $D_4^{14.4}$ 0.8422. n_D^{18} 1.4380.

Acetyl: b.p. 168–70°.

p-Nitrobenzoyl: m.p. 40–1°.

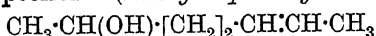
Acid phthalate: m.p. 72.5°.

Reif, *Ber.*, 1908, 41, 2742.

Auwers, Westermann, *Ber.*, 1921, 54, 2993.

Arcus, Kenyon, *J. Chem. Soc.*, 1938, 312.

2-Heptenol-6 (*Methyl-3-pentenylcarbinol*)

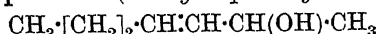


$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

B.p. 62–4°/12 mm. n_D^{19} 1.4429. $[\alpha]_D^{19} + 8.31^\circ$.

Fischer, Wiedemann, Robertson, *Ann.*, 1935, 520, 52.

3-Heptenol-2 (*Methyl-1-pentenylcarbinol*)



$\text{C}_7\text{H}_{14}\text{O}$ MW, 114

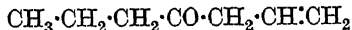
B.p. 66–7°/16 mm. D_4^{17} 0.834. n_D^{18} 1.4391.

p-Nitrobenzoyl: m.p. 29.5°.

Acid phthalate: m.p. 67°.

Arcus, Kenyon, *J. Chem. Soc.*, 1938, 689.

1-Heptenone-4 (*Propyl allyl ketone, ethylvinylacetone*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

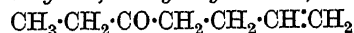
B.p. 146–7°, 54–5°/20 mm. Isomerises readily to 2-heptenone-4. $\text{HBr} \rightarrow$ 2-bromoheptanone-4.

Oxime: b.p. 92–3°/13 mm. Spar. sol. H_2O .

Semicarbazone: plates from EtOH.Aq. M.p. 110°.

Blaise, *Bull. soc. chim.*, 1905, 33, 42.

1-Heptenone-5 (*Ethyl γ -butenyl ketone, 4-propionyl-1-butylene, methylallylacetone*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Liq. with unpleasant odour. B.p. 46–7°/12 mm. $D_4^{18.3}$ 0.8487. $n_D^{18.3}$ 1.4254. Spar. sol. H_2O . Misc. with most org. solvents.

Semicarbazone: plates from EtOH.Aq. M.p. 82–3°.

Helferich, *Ber.*, 1919, 52, 1809.

1-Heptenone-6 (*Methyl 4-pentenyl ketone, 5-aceto-1-pentene, γ -butenylacetone*)



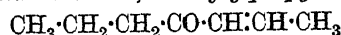
$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Liq. with unpleasant odour. B.p. 41–3°/10 mm. D_4^{18} 0.8673. n_D^{18} 1.4350. Spar. sol. H_2O . Misc. with most org. solvents.

Semicarbazone: needles from EtOH.Aq. M.p. 108°.

Helferich, Malkomes, *Ber.*, 1922, 55, 705.

2-Heptenone-4 (*Propyl propenyl ketone, ethylethylideneacetone, 1-butyrylpropylene*)



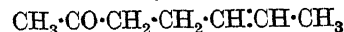
$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

B.p. 156–7°, 74–5°/12 mm.

Semicarbazone: cryst. from MeOH.Aq. M.p. 147°.

Blaise, *Bull. soc. chim.*, 1905, 33, 45.

2-Heptenone-6 (*Methyl 3-pentenyl ketone, β -butenylacetone, crotonylacetone, 5-aceto-2-pentene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

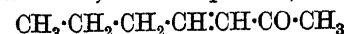
B.p. 152–5°, 42–3°/9 mm. D_4^{20} 0.8446. n_D^{20} 1.4292.

Semicarbazone: plates. M.p. 104.5–105.5° (97°).

Braun, Gossel, *Ber.*, 1924, 57, 377.

Kimel, Cope, *J. Am. Chem. Soc.*, 1943, 65, 1992.

3-Heptenone-2 (*Methyl 1-pentenyl ketone, butylideneacetone, 1-aceto-1-pentene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Exists in *cis* and *trans* forms which are not interconvertible.

Cis:

B.p. 70°/15 mm. D_4^{23} 0.8555. n_D^{23} 1.4505.

Semicarbazone: m.p. 152°.

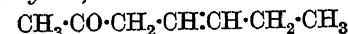
Trans:

B.p. 62°/15 mm. D_4^{20} 0.8445. n_D^{20} 1.4430.

Semicarbazone: silvery plates. M.p. 128°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 914.

3-Heptenone-6 (*Methyl 2-pentenyl ketone, 1-aceto-2-pentene, α -butenylacetone, sym.-ethylacetonyl-ethylene*)



$\text{C}_7\text{H}_{12}\text{O}$ MW, 112

Sweet-smelling liq. B.p. 61–2°/20 mm. D_4^{21} 0.8618. n_D^{21} 1.4290. Boiling 20% $\text{H}_2\text{SO}_4 \rightarrow$ *trans*-3-heptenone-2.

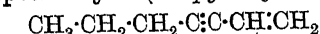
Semicarbazone: white plates. M.p. 109–10°.

Eccott, Linstead, *J. Chem. Soc.*, 1930, 914.

2-Heptenyl Alcohol.

See 2-Heptenol-1.

1-Hepten-3-yne (*Propylvinylacetylene*)



C_7H_{10} MW, 94

B.p. 44.3–47°/75 mm. D_4^{25} 0.7671. n_D^{25} 1.4520.

Anzilotti, Vogt, *J. Am. Chem. Soc.*, 1939, 61, 572.

Heptoic Acid.

See *n*-Heptylic Acid.

Heptoprene (2-*n*-Heptyl-1:3-butadiene, 2-heptylerythrene, 3-methylene-1-decylene, butadienylhexane, 2-nonenylethylene)

$$\text{CH}_3\text{---}[\text{CH}_2]_5\text{---}\overset{\text{CH}_2}{\underset{|}{\text{C}}}\text{---}\text{CH}\text{---}\text{CH}\text{---}\text{CH}_2$$

 $\text{C}_{11}\text{H}_{20}$ MW, 152

B.p. 52–4°/5 mm. D_4^{20} 0.7796. n_D^{20} 1.4511.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, 55, 2815.

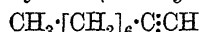
Heptoylacetic Acid.

See 2-Ketopelargonic Acid.

Heptoylresorcinol.

See Heptylresorcinol.

n-Heptylacetylene (1-Nonyne)



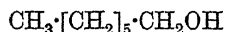
C_9H_{16} MW, 124

B.p. 149–51°, 51°/8 mm. D_4^{20} 0.765. n_D^{20} 1.426. Sol. most org. solvents. Insol. H_2O .

Truchet, *Ann. chim.*, 1931, 16, 410.

Bourguel, *Ann. chim.*, 1925, 3, 211, 383.

n-Heptyl Alcohol (Heptanol-1, 1-hydroxyheptane)



$\text{C}_7\text{H}_{16}\text{O}$ MW, 116

M.p. –34.1°. B.p. 176.3°. D_4^{20} 0.83622, D_4^{15} 0.82601. n_D^{15} 1.42310. KHSO_4 at 145° → diheptyl ether: at 175° → heptylene.

Acetyl: *n*-heptyl acetate. B.p. 191.5°/758.5 mm. D_4^{20} 0.8891.

p-Nitrobenzoyl: m.p. 7.9°. B.p. 147–55°/5 mm. D_4^{20} 1.0973. n_D^{20} 1.5122.

Phenylurethane: m.p. 60°.

p-Nitrophenylurethane: m.p. 102°.

Naphthylurethane: m.p. 62°.

Clarke, Dreger, *Organic Syntheses*, Collective Vol. I, 298.

Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, 55, 4207.

Natta, *Giorn. chim. ind. applicata*, 1930, 12, 13.

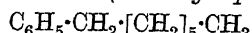
n-Heptylamine.

See 1-Amino-*n*-heptane.

Heptylaminoethyl Alcohol.

See *N*-2-Hydroxyethylheptylamine.

n-Heptylbenzene (1-Phenylheptane)



$\text{C}_{13}\text{H}_{20}$ MW, 176

B.p. 240° (235°), 108–10°/10 mm. D_4^{20} 0.8570. n_D^{20} 1.4865.

Sabatier, Mailhe, *Compt. rend.*, 1918, 158, 834.

Heptyl bromide.

See Bromoheptane.

2-*n*-Heptyl-1:3-butadiene.

See Heptoprene.

3-Heptylbutyric Acid.

See 4-Ketoundecylic Acid.

Heptyl chloride.

See Chloroheptane.

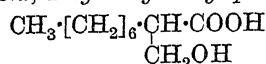
Heptylene.

See Heptene.

n-Heptyl fluoride.

See 1-Fluoroheptane.

1-*n*-Heptylhydracrylic Acid (Nonanol-2-carboxylic acid, 1-hydroxymethyl-pelargonic acid)



$\text{C}_{10}\text{H}_{20}\text{O}_3$ MW, 188

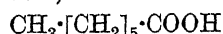
Cryst. from pet. ether. M.p. 47–8°. Sol. EtOH, Et₂O. Spar. sol. pet. ether. Insol. H_2O .

Et ester: $\text{C}_{12}\text{H}_{24}\text{O}_3$. MW, 216. B.p. 165–6°/22 mm.

Phenylurethane: m.p. 105°.

Blaise, Luttringer, *Bull. soc. chim.*, 1905, 33, 651.

***n*-Heptylic Acid** (Heptoic acid, *œnanthylic acid*, *œnanthic acid*)



$\text{C}_7\text{H}_{14}\text{O}_2$ MW, 130

Oily liq. M.p. –9°. B.p. 222–45°, 115–16°/11 mm. D_4^{20} 0.93338, D_4^{15} 0.92099. n_D^{15} 1.42219. $k = 1.42 \times 10^{-5}$.

Me ester: $\text{C}_8\text{H}_{16}\text{O}_2$. MW, 144. B.p. 172.1°. D_4^{15} 0.8806. n_D^{15} 1.41366.

Et ester: $\text{C}_9\text{H}_{18}\text{O}_2$. MW, 158. M.p. –66.1°. B.p. 188.6°. D_4^{20} 0.88619, D_4^{15} 0.87297. n_D^{15} 1.41286.

Chloride: $\text{C}_7\text{H}_{13}\text{OCl}$. MW, 148.5. M.p. –83.8°. B.p. 125.2°. D_4^{20} 0.98079, D_4^{15} 0.96645. n_D^{15} 1.43037.

Anhydride: $\text{C}_{14}\text{H}_{26}\text{O}_3$. MW, 242. M.p. –12.4°. B.p. 164°/12.5 mm. D_4^{20} 0.93356, D_4^{15} 0.92146. n_D^{15} 1.43283.

Amide: $\text{C}_7\text{H}_{15}\text{ON}$. MW, 129. Needles from EtOH. M.p. 96°.

Nitrile: $\text{C}_7\text{H}_{13}\text{N}$. MW, 111. B.p. 183–4°/765 mm. D_4^{20} 0.8107.

Anilide: m.p. 70–1°.

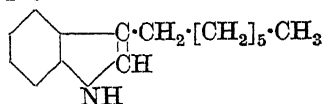
Deffet, *Bull. soc. chim. Belg.*, 1931, 40, 385.

Rogers, *J. Am. Pharm. Assocn.*, 1923, 12, 503.

Guerbet, *Bull. soc. chim.*, 1912, 11, 168.

Ruhoff, *Organic Syntheses*, 1936, XVI, 39.

3-*n*-Heptylindole



$\text{C}_{15}\text{H}_{21}\text{N}$

MW, 215

Red liq. B.p. 179–82°/3 mm.

Korczyński, Brydowna, Kierzek, *Gazz. chim. ital.*, 1926, 56, 907.

Heptyl iodide.

See Iodoheptane.

sym.-n-Heptyl-n-octyl-ethylene.

See Heptadecylene-8.

Heptylpennaldic Acid.

See Penaldic-K Acid.

Heptylpenicillin.

See Penicillin-K.

Heptylpenicilloic Acid.

See Penicilloic-K Acid.

Heptylpenillic Acid.

See Penillic-K Acid.

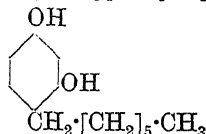
Heptylpenilloaldehyde.

See Penilloaldehyde-K.

Heptylpenilloic Acid.

See Penilloic-K Acid.

4-n-Heptylresorcinol (2:4-Dihydroxyheptylbenzene, 2:4-dihydroxyphenylheptane)



$C_{13}H_{20}O_2$ MW, 208

M.p. 73–74.5°. B.p. 186–8°/6–7 mm.

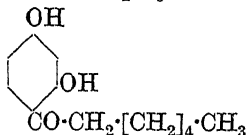
Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, 48, 1692.

Dohme, U.S.P., 1,717,098, (*Chem. Abstracts*, 1929, 23, 3717).

Heptylpropionic Acid.

See 3-Ketocaproic Acid.

4-n-Heptylresorcinol (Hexyl 2:4-dihydroxyphenyl ketone, heptylresorcinol)

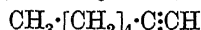


$C_{13}H_{18}O_3$ MW, 222

M.p. 48–50°. B.p. 204–6°/6–7 mm.

Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, 48, 1692.

1-Heptyne (Oenanthylidene, n-amylacetylene)



C_7H_{12} MW, 96

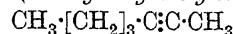
F.p. –80–93°. B.p. 99–78°/760 mm., 26°/10 mm. D_4^{20} 0.7338. n_D^{20} 1.4084. Red. \rightarrow n-heptane. $NH_3 \cdot AgNO_3 \rightarrow$ white ppt. $NH_3 \cdot Cu_2Cl_2 \rightarrow$ yellow ppt. Ox. with $SeO_2 \rightarrow$ 1-heptyn-3-ol.

Bodroux, *Compt. rend.*, 1939, 208, 1022.

Campbell, Campbell, *Proceedings of the Indiana Academy of Science*, 1940, 50, 123, (*Chem. Abstracts*, 1941, 35, 5457).

Henne, Greenlee, *J. Am. Chem. Soc.*, 1945, 67, 484.

2-Heptyne (Methylbutylacetylene)



C_7H_{12} MW, 96

B.p. 111–13°/750 mm. (111.5–112.5°). D_4^{20} 0.7632, D_4^{21} 0.748. n_D^{20} 1.4208. Heat with H_2O at 325° \rightarrow methyl n-amyl ketone + ethyl n-butyl ketone.

Béhal, *Ann. chim.*, 1888, 15, 427.

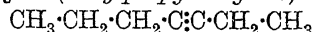
Desgrez, *Ann. chim.*, 1894, 3, 234.

Gredy, *Compt. rend.*, 1933, 197, 327.

Mulliken, Wakeman, Gerry, *J. Am. Chem. Soc.*, 1935, 57, 1605.

Thorn, Hennion, Nieuwland, *J. Am. Chem. Soc.*, 1936, 58, 796.

3-Heptyne (Ethylpropylacetylene)



C_7H_{12} MW, 96

B.p. 105–6° (106–7°). D_4^{25} 0.7337. n_D 1.415. H_2SO_4 or $HCl \rightarrow$ butyrene. $HgCl_2 \rightarrow$ white ppt.

Lespieau, Wiemann, *Bull. soc. chim.*, 1929, 45, 635.

Béhal, *Ann. chim.*, 1888, 75, 415.

Faworski, *J. prakt. Chem.*, 1895, 51, 558.

Bourguet, *Ann. chim.*, 1925, 3, 191, 325.

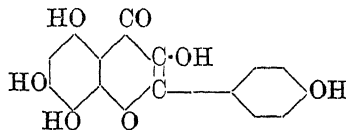
1-Heptyne-1-aldehyde.

See Amylpropionic Aldehyde.

1-Heptyne-1-carboxylic Acid.

See n-Amylpropionic Acid.

Herbacetin (3:5:7:8:4'-Pentahydroxyflavone)



$C_{15}H_{10}O_7$ MW, 302

Aglucone of herbacitrin. Yellow cryst. + $1H_2O$ from EtOH.Aq. M.p. 280–3° (279–81°). $FeCl_3 \rightarrow$ dull green col. Conc. $H_2SO_4 \rightarrow$ yellow col. with no fluor. Deep red ppt. with lead tetra-acetate.

Penta-acetyl: needles from EtOH. M.p. 192–3° (189–91°).

8-Me ether: see Tambuletin.

7:8:4'-Tri-Me ether: see Tambulin.

3:5:8:4'-Tetra-Me ether: $C_{19}H_{18}O_7$ MW, 358. Yellow cryst. from EtOH. M.p. 269–70°.

3:7:8:4'-Tetra-Me ether: yellow plates + $2H_2O$ from AcOH. M.p. anhyd. 160–2°. $FeCl_3 \rightarrow$ green col.

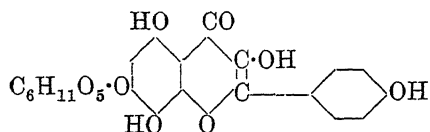
Penta-Me ether: $C_{20}H_{20}O_7$ MW, 372. Needles from MeOH.Aq. M.p. 156–8°.

7-Glucoside: see Herbacitrin.

Goldsworthy, Robinson, *J. Chem. Soc.*, 1938, 56.

Ranagaswami, Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1939, 9A, 133, (*Chem. Abstracts*, 1939, 33, 5396).

Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1947, 25A, 417.

Herbacitrin $C_{21}H_{20}O_{12}$

MW, 464

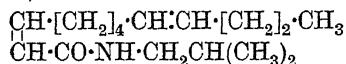
7-Glucoside of herbacetin. Pigment of the cotton flowers, *Gossypium herbaceum* and *G. indicum*. Yellow needles from Py.Aq. M.p. 247–9°. Red ppt. with lead tetra-acetate. $FeCl_3 \rightarrow$ green col.

Octa-acetyl deriv.: colourless needles from Et_2O . M.p. 214–16°.

Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1939, 9A, 365, (*Chem. Abstracts*, 1940, 34, 107).

Neclakantam, Seshadri, *Proc. Indian Acad. Sci.*, 1937, 5A, 357, (*Chem. Abstracts*, 1937, 31, 6246).

Herculin (1 : 7-Undecadiene-1-carboxylic isobutylamide)

 $C_{16}H_{29}ON$

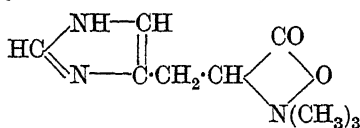
MW, 251

Insecticide from bark of the prickly ash (*Zanthoxylum clavaherculis*). Cryst. from light petroleum. M.p. 59–60°. Sol. usual org. solvents. Spar. sol. light petroleum. Insol. H_2O . Pungent odour.

Jacobson, *J. Am. Chem. Soc.*, 1948, 70, 4234.

See also Raphael, Sondheimer, *J. Chem. Soc.*, 1950, 115.

Hercynin (Histidine betaine)

 $C_9H_{15}O_2N_3$

MW, 197

Present in numerous fungi, e.g. *Boletus edulis*, Bull. Not known in free state.

B_2HAuCl_4 : orange-yellow cryst. from dil. HCl. M.p. 184°.

Mono-picrate: m.p. 201°.

Di-picrate: cryst. from EtOH. M.p. anhyd. 213–14°.

Picrolonate: orange-yellow needles. M.p. 229–30°.

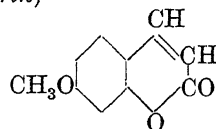
Engeland, Kutscher, *Chem. Zentr.*, 1913, I, 28.

Winterstein, Reuter, *Z. physiol. Chem.*, 1913, 86, 234.

Barger, Ewins, *J. Chem. Soc.*, 1911, 99, 2340.

Küng, *Z. physiol. Chem.*, 1914, 91, 249.

Herniarin (Umbelliferone methyl ether, 7-methoxycoumarin)

 $C_{10}H_8O_2$

MW, 160

Present in leaves of *Herniaria hirsuta* Linn. and *Eupatorium azapana*. Leaflets from H_2O or MeOH. M.p. 117–18°. Sol. EtOH, Et_2O . Spar. sol. H_2O . Sol. conc. H_2SO_4 with blue fluor. Sol. alkalis.

Oxime: needles from H_2O . M.p. 138°.

Phenylhydrazone: yellow needles from EtOH. M.p. 115°.

Tiemann, Reimer, *Ber.*, 1879, 12, 996.

v. Pechmann, Graeger, *Ber.*, 1901, 34, 383.

Dey, Rao, Seshadri, *J. Indian Chem. Soc.*, 1935, 12, 140.

Heroin (Diacetylmorphine, diamorphine)

 $C_{21}H_{23}O_5N$

MW, 369

Cryst. from MeOH. M.p. 171° (173°). B.p. 272–4°/12 mm. Sol. $CHCl_3$, C_6H_6 , hot EtOH. Prac. insol. H_2O . Sol. dil. acids and caustic alkalis. Used in medicine as the hydrochloride. Powerful narcotic causing less mental depression than morphine.

B, HCl : m.p. 231–2°. Sol. H_2O , EtOH. $[\alpha]_D^{20} - 153^\circ$ in H_2O , ($c = 1.699$).

Methiodide: needles. M.p. 252° decomp. $[\alpha]_D^{25} - 107^\circ$ in H_2O .

Knorr, Hörlein, Staubach, *Ber.*, 1909, 52, 3514.

Tiffeneau, *Bull. soc. chim.*, 1915, 17, 109.

Herpestine

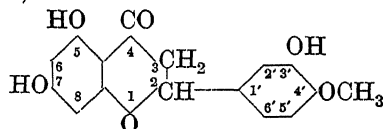
 $C_{34}H_{46}O_2N_2$

MW, 514

Alkaloid of *Monniera cuneifolia*. Cryst. M.p. 116–18°.

Basu, Pakrai, *Quart. J. Pharm. Pharmacol.*, 1947, 20, 137, (*Chem. Abstracts*, 1948, 42, 1025).

Hesperetin (5 : 7 : 3'-Trihydroxy-4'-methoxyflavanone)

 $C_{16}H_{14}O_6$

MW, 302

Plates from EtOH.Aq. M.p. 227–8° (225–6°.) Very sol. EtOH. Sol. Et_2O . Spar. sol. $CHCl_3$, C_6H_6 . Insol. H_2O .

7 : 3'-*Diacetyl*: m.p. 103–5°. $FeCl_3 \rightarrow$ purplish brown col.

Triacetyl: m.p. 80–2°, after sintering at 75°. *Tetra-acetyl*: yellow cryst. from EtOH-AcOEt. M.p. 127°.

Oxime: needles or plates. M.p. 229–30° decomp.

7-Glucoside: glucohesperetin. $C_{22}H_{24}O_{11}$. MW, 464. By hyd. of hesperidin. Cryst. + $1H_2O$. M.p. 206°. $[\alpha]_D^{20} - 53.9^\circ$ in Py. **Hexaacetyl**: m.p. 151–2°. $[\alpha]_D^{20} - 23.7^\circ$ in Py.

Asahina, Shinoda, Inubuse, *Chem. Abstracts*, 1928, 22, 2946.

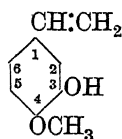
Shinoda, Kawagoye, *Chem. Abstracts*, 1929, 23, 2957.

Zemplén, Bogнар, *Ber.*, 1942, 75, 1043.

Hesperetinic Acid.

See Isoferulic Acid.

Hesperetol (3-Hydroxy-4-methoxy-1-vinylbenzene, 3-hydroxy-4-methoxystyrene)



$C_9H_{10}O_2$

MW, 150

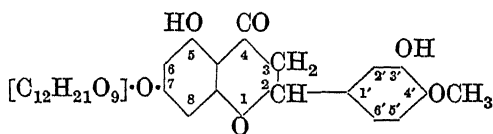
Cryst. M.p. 57°. Very sol. EtOH, Et₂O. Spar. sol. H₂O. Carmine-red col. with conc. H₂SO₄.

Tiemann, Will, *Ber.*, 1881, 14, 967.

Hesperidene.

See Limonene.

Hesperidin (Citrus-hesperidin, hesperetin-1-rhamnosido-d-glucose)



$C_{28}H_{34}O_{15}$

MW, 610

Constituent of most citrus fruits and Vitamin P. Needles from MeOH.Aq. or AcOH. M.p. 251–2° (decomp. at 254°). Very sol. Py. Sol. EtOH, AcOH. Insol. Et₂O, CHCl₃, C₆H₆, CS₂. Hyd. \rightarrow hesperetin, rhamnose and glucose. Ba(OH)₂ \rightarrow isoferulic acid.

Diacetyl: needles from AcOH.Aq. M.p. 142–3°. $[\alpha]_D^{21} - 32.9^\circ$.

King, Robertson, *J. Chem. Soc.*, 1931, 1704.

Asahina, Inubuse, *Chem. Abstracts*, 1929, 23, 3475.

Mager, *Z. physiol. Chem.*, 1942, 274, 109 (Review).

Heteratisine

$C_{22}H_{33}O_5N$

MW, 391

Alkaloid from atis root. Cryst. from C₆H₆. M.p. 262–7° decomp. Sol. MeOH. $[\alpha]_D^{27} + 40^\circ$ in MeOH.

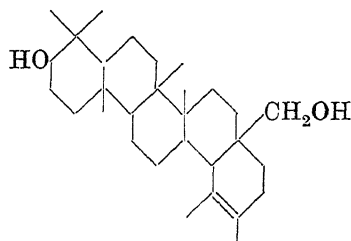
Hydrochloride: m.p. 265–70° decomp.

Jacobs, Craig, *J. Biol. Chem.*, 1942, 143, 605.

Heteroauxine.

See 3-Indolylacetic Acid.

Heterobetulin



Probable structure

$C_{30}H_{50}O_2$

MW, 442

Plates from C₆H₆-EtOH. M.p. 267–8° (sinters at 260°). $[\alpha]_D^{20} + 11.59^\circ$. Sol. EtOH, AcOH, C₆H₆. Spar. sol. Me₂CO.

Formyl deriv.: leaflets from AcOH. M.p. 284–5°. $[\alpha]_D^{20} + 44.52^\circ$.

Diacetyl deriv.: leaflets from EtOH. M.p. 248–9°. $[\alpha]_D^{20} + 28.29^\circ$.

Dibenzoyl deriv.: needles from AcOH. M.p. 222–8°. $[\alpha]_D^{20} + 35.49^\circ$.

Di-p-bromobenzoyl deriv.: needles from AcOH. M.p. 253° (sinters at 200°). $[\alpha]_D^{23} + 40.16^\circ$.

Dischendorfer, Grillmayer, *Monatsh.*, 1926, 47, 423.

Lardelli, Krüsi, Jeger, Ruzicka, *Helv. Chim. Acta*, 1948, 31, 1815.

Heterolupeol.

See ψ -Taraxasterol.

Heteroxanthine.

See 7-Methylxanthine.

Hetisine

$C_{20}H_{27}O_3N$

MW, 329

Alkaloid from atis root. Cryst. from C₆H₆. M.p. 253–6° decomp. $[\alpha]_D^{25} + 13.7^\circ$ in EtOH. Se \rightarrow pimanthrene.

Hydrochloride: m.p. 325° decomp.

Jacobs, Craig, *J. Biol. Chem.*, 1942, 143, 605.

Jacobs, Huebner, *J. Biol. Chem.*, 1947, 170, 189.

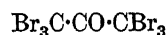
Hexa.

See Hexamethylenetetramine.

Hexabenzobenzene.

See Coronene.

Hexabromoacetone (Hexabromopropanone)



C_3OBr_6

MW, 532

Prisms from CHCl₃. M.p. 107–9°. Very sol. CS₂, CHCl₃, Et₂O, C₆H₆. Insol. H₂O. Decomp. by C₂H₅OH.

Weidel, Gruber, *Ber.*, 1877, 10, 1145.

Levy, Jedlicka, *Ann.*, 1888, 249, 80.

Hexabromoacetylacetone (1:1:1:5:5:5-Hexabromopentandione-2:4, 1:1:1:5:5:5-hexabromo-2:4-diketopentane)

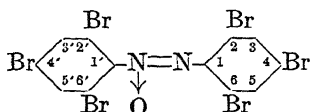


$\text{C}_5\text{H}_2\text{O}_2\text{Br}_6$ MW, 574

Needles from abs. Et_2O . M.p. 107–8°. Decomp. by $\text{C}_2\text{H}_5\text{OH}$.

Combes, *Ann. chim. phys.*, 1887, 12, 236.

2:4:6:2':4':6'-Hexabromoazoxybenzene

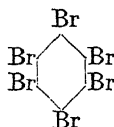


$\text{C}_{12}\text{H}_4\text{ON}_2\text{Br}_6$ MW, 672

Reddish-yellow leaflets from C_6H_6 - EtOH . M.p. 215° decomp. Spar. sol. most org. solvents.

v. Pechmann, Nold, *Ber.*, 1898, 31, 564.

Hexabromobenzene

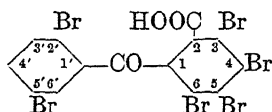


C_6Br_6 MW, 552

Needles from C_6H_6 . M.p. 306° (316°). Spar. sol. Et_2O , EtOH . Sol. pet. ether, CHCl_3 , C_6H_6 , boiling AcOH .

Eckert, Steiner, *Monatsh.*, 1915, 36, 279.

3:4:5:6:2':5'-Hexabromobenzophenone-2-carboxylic Acid (o-[2:5-Dibromobenzoyl]-2:3:4:5-tetrabromobenzoic acid)

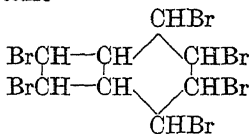


$\text{C}_{14}\text{H}_4\text{O}_3\text{Br}_6$ MW, 700

Cryst. from AcOH . M.p. 218–19°.

Hofmann, *Monatsh.*, 1915, 36, 821.

2:3:4:5:7:8-Hexabromobicyclo-[4:2:0]-octane

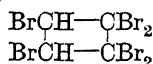


$\text{C}_8\text{H}_8\text{Br}_6$ MW, 584

Cryst. M.p. 155–6°.

Reppe, Schichting, Klager, Toepel, *Ann.*, 1948, 560, 1.

Hexabromocyclobutane



$\text{C}_4\text{H}_2\text{Br}_6$ MW, 530

Plates from C_6H_6 . M.p. 186–5°. Sol. Me_2CO , CHCl_3 , C_6H_6 . Spar. sol. EtOH , Et_2O , pet. ether. Willstätter, Bruce, *Ber.*, 1907, 40, 3999.

Hexabromocyclohexane.

See Benzene hexabromide.

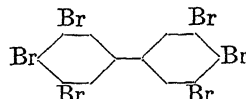
Hexabromocyclohexantrione-1:3:5.

See Hexabromophloroglucinol.

Hexabromodiketopentane.

See Hexabromoacetylacetone.

3:4:5:3':4':5'-Hexabromodiphenyl

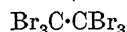


$\text{C}_{12}\text{H}_4\text{Br}_6$ MW, 628

M.p. 248°. Sol. AcOH , C_6H_6 . Mod. sol. EtOH . $\text{HNO}_3 \rightarrow$ 2:2'-dinitro deriv.

van Roosmalen, *Rec. trav. chim.*, 1934, 53, 373.

Hexabromoethane (Perbromoethane)



C_2Br_6 MW, 504

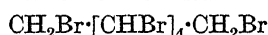
Prisms. Decomp. at 200–10° without melting. Spar. sol. Et_2O , EtOH . Sol. CS_2 .

Biltz, *Ber.*, 1902, 35, 1530.

Mouneyrat, *Bull. soc. chim.*, 1898, 19, 177.

Dussol, *Bull. soc. chim.*, 1925, 37, 161.

1:2:3:4:5:6-Hexabromo-n-hexane

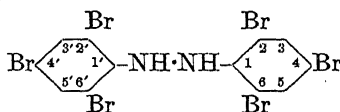


$\text{C}_6\text{H}_8\text{Br}_6$ MW, 560

M.p. 78°. Alc. $\text{KOH} \rightarrow$ dl-mannitol.

Pace, *Chem. Abstracts*, 1927, 21, 1964.

2:4:6:2':4':6'-Hexabromohydrazobenzene



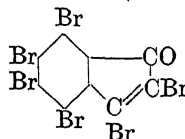
$\text{C}_{12}\text{H}_6\text{N}_2\text{Br}_6$ MW, 658

Needles from EtOH . Aq. M.p. 126–7°. Sol. conc. H_2SO_4 with red col.

v. Pechmann, Nold, *Ber.*, 1898, 31, 564.

Hunter, Sly, *J. Am. Chem. Soc.*, 1932, 54, 3350.

Hexabromoindone-3 (Perbromoindone)



C_9OBr_6 MW, 604

Yellow needles. M.p. 195–6°. Sol. AcOH , C_6H_6 . Insol. Et_2O , pet. ether.

Anilide: red needles. M.p. 224° decomp.

Zincke, *Ann.*, 1924, 435, 172.

Hexabromonaphthalene

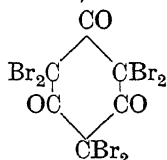
Hexabromonaphthalene

$C_{10}H_2Br_6$ MW, 602

- (i) Cryst. from toluene. M.p. 269°.
- (ii) Needles from toluene. M.p. 312°.

Zelinsky, Turowa-Pollak, *Ber.*, 1929, 62, 1659.

Hexabromophloroglucinol (*Hexabromocyclohexantrione-1:3:5*)

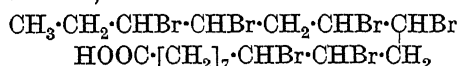


$C_6O_3Br_6$ MW, 600

Plates from CS_2 -pet. ether. M.p. 146-7°. Very sol. Et_2O , $CHCl_3$, hot $AcOH$, C_6H_6 .

Zinke, Kegel, *Ber.*, 1890, 23, 1729.

Hexabromostearic Acid (*Linolenic acid hexabromide*)



$C_{18}H_{30}O_2Br_6$ MW, 758

α -Form:

Cryst. from dioxan. M.p. 181-9°. Spar. sol. $EtOH$, $AcOH$, $CHCl_3$, C_6H_6 . $Zn \rightarrow \alpha$ - and β -linolenic acids. Forms alkaloid salts.

Me ester: $C_{19}H_{32}O_2Br_6$. MW, 772. M.p. 157-8°.

Et ester: $C_{20}H_{34}O_2Br_6$. MW, 786. M.p. 151.5-152.5°.

Propyl ester: $C_{21}H_{36}O_2Br_6$. MW, 800. M.p. 144-6°.

n-Butyl ester: $C_{22}H_{38}O_2Br_6$. MW, 814. M.p. 143°.

Quinine salt: m.p. 169°.

Strychnine salt: m.p. 224-6°.

Morphine salt: m.p. 185°.

Narcotine salt: m.p. 184°.

β -Form:

M.p. 169-70°. $Zn \rightarrow \beta$ -linolenic acid.

Et ester: m.p. 114-15°.

γ -Form:

Needles from C_6H_6 . M.p. 195-6° decomp. Sol. hot $EtOH$, hot $AcOH$. Spar. sol. $EtOH$, Et_2O , $AcOH$, $CHCl_3$, pet. ether. Insol. H_2O .

Coffey, *J. Chem. Soc.*, 1921, 119, 1308, 1410.

Erdmann, Bedford, *Ber.*, 1909, 42, 1329.

Stanfield, Schierz, *J. Am. Chem. Soc.*, 1932, 54, 4358.

Vincente, West, *Chem. Abstracts*, 1928, 22, 4105.

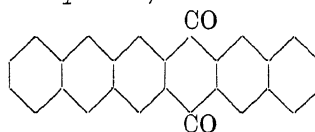
Heiduschka, Lüft, *Arch. Pharm.*, 1919, 257, 50.

McCutcheon, *Organic Syntheses*, 1942, XXII, 82.

Kass, Nichols, Burr, *J. Am. Chem. Soc.*, 1941, 63, 1060.

653 3:4:5:6:2':5'-Hexachlorobenzophenone-2-carboxylic Acid

6:15-Hexacenedione (2:3-Benz-6:7-naphtha-anthraquinone)

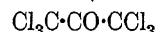


$C_{26}H_{14}O_2$ MW, 358

Orange yellow. M.p. 295-310°. $H_2SO_4 \rightarrow$ green \rightarrow blue-green.

Clar, *Ber.*, 1942, 75, 1283.

Hexachloroacetone (*Hexachloropropanone*)



C_3OCl_6 MW, 265

M.p. -2°. B.p. 202-4°. $D_4^{25} 1.7444$. Slightly sol. H_2O giving a monohydrate, m.p. 15°. H_2O at 120° $\rightarrow CHCl_3 + CCl_3 \cdot COOH$. $NH_3 \rightarrow CHCl_3 + CCl_3 \cdot CO \cdot NH_2$.

Cloëz, *Ann. chim. phys.*, 1886, 9, 202.

Zaharia, *Chem. Zentr.*, 1896, I, 100.

Hexachloroacetylacetone (1:1:1:5:5:5-Hexachloropentandione-2:4, 1:1:1:5:5:5-hexachloro-2:4-diketopentane)

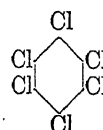


$C_5H_2O_2Cl_6$ MW, 307

B.p. 190-5°/20 mm.

Combes, *Ann. chim. phys.*, 1887, 12, 236.

Hexachlorobenzene



C_6Cl_6 MW, 285

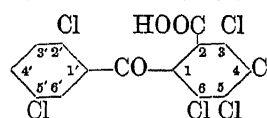
Needles from C_6H_6 - $EtOH$. M.p. 227°. B.p. 309-10°/725 mm. $D_4^{25} 2.044$, $D_4^{26} 1.5691$. Sublimes in long needles. Sol. Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. $EtOH$.

Graebe, *Ann.*, 1891, 263, 30.

Fichter, Glantzstein, *Ber.*, 1916, 49, 2477.

Dvornikoff, Sheets, Zienty, *J. Am. Chem. Soc.*, 1946, 68, 142.

3:4:5:6:2':5'-Hexachlorobenzophenone-2-carboxylic Acid (o-[2:5-Dichlorobenzoyl]-2:3:4:5-tetrachlorobenzoic acid)



$C_{14}H_4O_3Cl_6$ MW, 433

Cryst. from $MeOH$. M.p. 238-9°. Sol. $EtOH$. Hot conc. $H_2SO_4 \rightarrow$ 1:2:3:4:5:8-hexachloroanthraquinone.

Chloride: $C_{14}H_3O_3Cl_7$. MW, 451.5. Cryst. from $AcOH$. M.p. 181-4°.

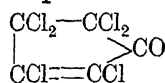
Hofmann, *Monatsh.*, 1915, 36, 813.

Hexachlorocyclohexane.

See Benzene hexachloride.

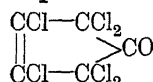
Hexachlorocyclohexenedione-3 : 5.

See Hexachlororesorcinol.

Hexachlorocyclopentenone-3 C_5OCl_6

MW, 289

Plates. M.p. 28°. B.p. 162-3°/75 mm., 250.5-251°/740.5 mm. D_4^{20} 1.7616. n_D^{20} 1.56626.

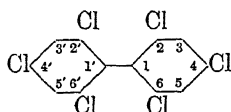
Zinke, Küster, *Ber.*, 1890, 23, 2213.**Hexachlorocyclopentenone-4** C_5OCl_6

MW, 289

Cryst. from EtOH or AcOH. M.p. 92°. B.p. 148°/75 mm. Very sol. Et₂O, CHCl₃, C₆H₆. Sol. EtOH, AcOH. Sublimes in plates.

Zinke, Küster, *Ber.*, 1890, 23, 2213.**Hexachlorodiketopentane.**

See Hexachloroacetylacetone.

2 : 4 : 6 : 2' : 4' : 6'-Hexachlorodiphenyl $C_{12}H_4Cl_6$

MW, 361

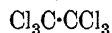
M.p. 112°. Sol. AcOH, C₆H₆. Mod. sol. EtOH. Insol. ligroin.

van Roosmalen, *Rec. trav. chim.*, 1934, 53, 373.

Ullmann, *Ann.*, 1904, 332, 56.**3 : 4 : 5 : 3' : 4' : 5'-Hexachlorodiphenyl.**

M.p. 198°. Sol. AcOH, C₆H₆. Mod. sol. EtOH. Sublimes. $HNO_3 \rightarrow$ 2 : 2'-dinitro deriv.

van Roosmalen, *Rec. trav. chim.*, 1934, 53, 372.

Hexachloroethane (Perchloroethane) C_2Cl_6

MW, 237

Exists in three cryst. modifications. Rhombohedra from EtOH-Et₂O. M.p. 186.8-187.4° (sealed tube). B.p. 185.5°/776.7 mm. Heat of comb. C_p 110 Cal.

Hofmann, Seiler, *Ber.*, 1905, 38, 3058.Miller, *Ind. Eng. Chem.*, 1925, 17, 1182.

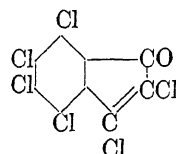
Frydlander, *Rev. prod. chim.*, 1934, 37, 737; 1935, 38, 33 (Review).

Mkryan, Babayan, *Chem. Abstracts*, 1943, 37, 5694.

1 : 2 : 3 : 4 : 5 : 6-Hexachloro-*n*-hexane $C_6H_8Cl_6$

MW, 293

Cryst. from pet. ether. M.p. 137.5°. B.p. 180-5°/30 mm. $[\alpha]_D + 18.5^\circ$ in C₆H₆.

Mourques, *Compt. rend.*, 1890, 111, 112.**Hexachloroindone-3 (Perchloroindone)** C_5OCl_6

MW, 337

Golden-yellow leaflets from EtOH or AcOH. M.p. 148-9°. Sol. CS₂, hot EtOH, hot AcOH. Spar. sol. Et₂O, CHCl₃, C₆H₆, pet. ether.

Oxime : m.p. 255° decomp.

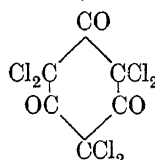
Zinke, Pfaffendorf, *Ann.*, 1912, 394, 22.Zinke, Fuchs, *Ber.*, 1893, 26, 521.**Hexachloroperylene** $C_{20}H_6Cl_6$

MW, 459

Yellow cryst. from PhNO₂. M.p. 356-7°. Very sol. aniline, Py, xylene, boiling PhNO₂. Spar. sol. EtOH, Et₂O, Me₂CO, AcOH. Sol. conc. H₂SO₄ with blue col.

Zinke, Pongratz, Funke, *Ber.*, 1925, 58, 332.

Zinke, Funke, Lorber, *Ber.*, 1927, 60, 580.

Hexachlorophloroglucinol (Hexachloro-cyclohexantrione-1 : 3 : 5) $C_6O_3Cl_6$

MW, 333

Plates. M.p. 48°. B.p. 268-9°, 150-1°/18-20 mm. Very sol. Et₂O, CHCl₃, CS₂, C₆H₆. NH₃ \rightarrow dichloroacetamide.

Zinke, Kegel, *Ber.*, 1889, 22, 1473; 1890, 23, 230.

1 : 1 : 1 : 2 : 3 : 3-Hexachloropropane $C_3H_2Cl_6$

MW, 251

B.p. 216°, 145°/90 mm. D_4^{24} 1.6980. n_D^{17} 1.5250. Alc. KOH \rightarrow 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, 89, 417; D.R.P., 261,689, (*Chem. Zentr.*, 1913, II, 394).

1 : 1 : 2 : 2 : 3 : 3-Hexachloropropane $C_3H_2Cl_6$

MW, 251

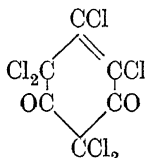
B.p. 218.5°. D_4^{24} 1.7137. n_D^{18} 1.5262. Alc. KOH \rightarrow 1 : 1 : 2 : 3 : 3-pentachloropropylene.

Prins, *J. prakt. Chem.*, 1914, 89, 422.

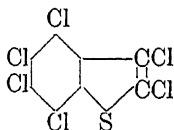
Hexachloropropylene (*Hexachloropropene*)

C_3Cl_6 MW, 249
B.p. 209–10°, 122–3°/50 mm., 99°/15 mm.
 D_4^{20} 1.7652. n_D^{20} 1.5091. Hot conc. $\text{H}_2\text{SO}_4 \rightarrow$
trichloroacrylic acid.

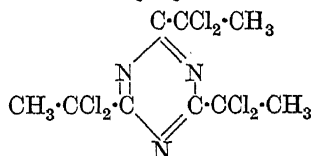
Böeseken, van der Scheer, de Voogt,
Rec. trav. chim., 1915, 34, 78.
Fritsch, *Ann.*, 1897, 297, 314.

Hexachlororesorcinol (*Hexachlorocyclohexenedione-3 : 5*)

$\text{C}_6\text{O}_2\text{Cl}_6$ MW, 317
Plates or prisms from AcOH. M.p. 115°.
B.p. 159–60°/13–15 mm. Sol. Et_2O , CHCl_3 ,
 C_6H_6 . Spar. sol. pet. ether.
Zincke, Fuchs, *Ber.*, 1892, 25, 2687.

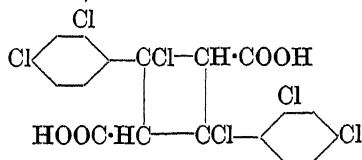
Hexachlorothionaphthene

$\text{C}_8\text{Cl}_6\text{S}$ MW, 341
Needles from ligroin. M.p. 158°.
Barger, Ewins, *J. Chem. Soc.*, 1908, 93,
2088.

Hexachlorotriethylcyanidine

$\text{C}_9\text{H}_9\text{N}_3\text{Cl}_6$ MW, 372
Polymer of 1 : 1-dichloropropionitrile. Plates
from EtOH. M.p. 73.5°. Insol. H_2O . Sol.
7.17 parts EtOH at 26°. Decomp. on heating.
 $\text{NH}_3 \rightarrow$ dichloropropionamide. $\text{K}_2\text{S} \rightarrow$ tri-
thioacetylcyanidine.

Otto, Voigt, *J. prakt. Chem.*, 1887, 36, 79.
Troeger, Hornung, *J. prakt. Chem.*, 1898,
57, 357.

Hexachlorotruaxillic Acid (2 : 4-Dichloro-2 : 4-di[2 : 4-dichlorophenyl]-cyclobutane-1 : 3-dicarboxylic acid)

$\text{C}_{18}\text{H}_{10}\text{O}_4\text{Cl}_6$ MW, 503

 α -Form :

Needles from EtOH. M.p. 316°. Dist. \rightarrow
2 : 4 : β -trichlorocinnamic acid.

Di-Me ester : $\text{C}_{20}\text{H}_{14}\text{O}_4\text{Cl}_6$. MW, 531. Needles
from AcOH. M.p. 215°. Spar. sol. hot EtOH.

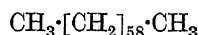
Di-Et ester : $\text{C}_{22}\text{H}_{18}\text{O}_4\text{Cl}_6$. MW, 559. Cryst.
from CHCl_3 . M.p. 178°.

 γ -Form :

Needles from EtOH. M.p. 285°. Sol. EtOH,
AcOH, hot C_6H_6 . Dist. \rightarrow 2 : 4 : β -trichloro-
cinnamic acid.

Di-Me ester : needles from EtOH. M.p. 180–
2°. Sol. hot. MeOH, EtOH.

Krauss, *Ber.*, 1904, 37, 219.

Hexacontane

$\text{C}_{60}\text{H}_{122}$ MW, 842
Cryst. from butyl acetate. M.p. 98.5–99.3°.
B.p. 250°.

Carothers, Hill, Kirby, Jacobson, *J. Am. Chem. Soc.*, 1930, 52, 5279.

Hexacosandioic Acid.

See Tetracosane-1 : 24-dicarboxylic Acid.

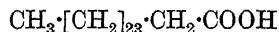
Hexacosane

$\text{C}_{26}\text{H}_{54}$ MW, 366
Occurs in chrysalis oil. Cryst. from Et_2O .
M.p. 56.4° (59–60°). B.p. 262°/15 mm., 205°/1
mm., 169°/0.05 mm. D_4^{20} 0.7780. n_D^{25} 1.43332.
Sol. C_6H_6 . Spar. sol. EtOH.

Levene, West, van der Scheer, *J. Biol. Chem.*, 1915, 20, 528.

Garner, van Bibber, King, *J. Chem. Soc.*,
1931, 1537.

Whitmore *et al.*, *J. Am. Chem. Soc.*, 1945,
67, 2059.

Hexacosanic Acid

$\text{C}_{26}\text{H}_{52}\text{O}_2$ MW, 396
Constituent of various oils and waxes, *e.g.*,
beeswax, Chinese insect wax, montan wax. M.p.
87.7–87.9° (88–9°). D_4^{100} 0.8198. n_D^{100} 1.4301.
Me ester : $\text{C}_{27}\text{H}_{54}\text{O}_2$. MW, 410. M.p. 62°.
B.p. 286°/15 mm.

Et ester : $\text{C}_{28}\text{H}_{56}\text{O}_2$. MW, 424. M.p. 59.5–
59.8°.

Amide : m.p. 105–7°.

Anhydride : $\text{C}_{52}\text{H}_{102}\text{O}_3$. MW, 774. M.p.
89.3–89.5°. D_4^{100} 0.8188. n_D^{100} 1.4337.

Nitrile : pentacosyl cyanide. $\text{C}_{26}\text{H}_{51}\text{N}$. MW,
377. M.p. 61–2°.

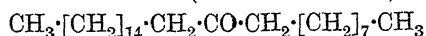
Levene, Taylor, *J. Biol. Chem.*, 1924, 59,
905.

Bleyberg, Ulrich, *Ber.*, 1931, 64, 2512.

Helz, Bosworth, *J. Biol. Chem.*, 1936,
116, 203.

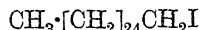
Hexacosanol.

See Ceryl Alcohol.

Hexacosanone-9 (9-Ketohexacosane) $\text{C}_{26}\text{H}_{52}\text{O}$ MW, 380

Cryst. from MeOH. M.p. 67–8°.

Oxime: m.p. 40–1°.

Whitmore et al., *J. Am. Chem. Soc.*, 1945, 67, 2059.**Hexacosyl iodide** (Ceryl iodide, iodohehexosane) $\text{C}_{26}\text{H}_{53}\text{I}$ MW, 492

M.p. 58.2–58.5°.

 α -Form.

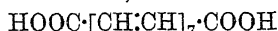
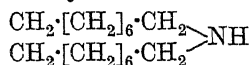
M.p. 54.4°.

 β -Form.

M.p. 59.1°.

Bleyberg, Ulrich, *Ber.*, 1931, 64, 2512.Francis, Collins, Piper, *Proc. Roy. Soc.*, 1937, A158, 691.**Hexacyanogen.**

See Cyanuric cyanide.

Hexadecaheptaene-dioic Acid (Tetradecaheptaene-1:14-dicarboxylic acid, 1:5:10:14-apocrocetin, descrocetin) $\text{C}_{16}\text{H}_{16}\text{O}_4$ MW, 272Red tablets from Py. M.p. above 300°. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ blue col.*Di-Me ester*: orange plates from AcOH. M.p. 236° (evacuated tube).*Di-Et ester*: orange plates from AcOH. M.p. 217°. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ blue.Kuhn et al., *Ber.*, 1937, 70, 1318.**Hexadecamethyleneimine** $\text{C}_{16}\text{H}_{31}\text{N}$ MW, 239

Cryst. M.p. 57–58°. pK 9.29.

Ruzicka, Kobelt, Hafliger, Prelog, *Helv. Chim. Acta*, 1949, 32, 544.**Hexadecanal.**

See Palmitic Aldehyde.

n-Hexadecane (Cetane) $\text{C}_{16}\text{H}_{34}$ MW, 226Cryst. from Me_2CO . M.p. 18–13°. B.p. 105–10°/0.1 mm. D_4^{20} 0.77387. n_{D}^{20} 1.43242.Carey, Smith, *J. Chem. Soc.*, 1933, 346.Levene, *Organic Syntheses*, 1935, XV, 27.**Hexadecanethiol.**

See Cetyl Mercaptan.

Hexadecanol-1.

See Cetyl Alcohol.

Hexadecanol-3.

See Ethyltridecylcarbinol.

Hexadecanone-2.

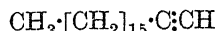
See Methyl tetradecyl Ketone.

Hexadecanone-3.

See Ethyl tridecyl Ketone.

1-Hexadecenoic Acid.

See Gaidic Acid

Hexadecylacetylene (Cetylacetylene, octadecyne-1) $\text{C}_{18}\text{H}_{34}$ MW, 250Cryst. from EtOH. M.p. 22.5° (26°). B.p. 180°/15 mm. D_4^{20} 0.8696.Picon, *Compt. rend.*, 1919, 169, 32.Krafft, Reuter, *Ber.*, 1892, 25, 2248.**Hexadecyl Alcohol.**

See Cetyl Alcohol.

Hexadecylamine.

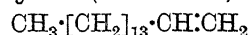
See Cetylamine.

Hexadecyl bromide.

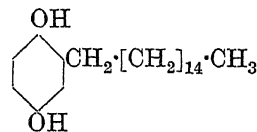
See Cetyl bromide.

Hexadecyl chloride.

See Cetyl chloride.

1-Hexadecylene (Hexadecene, cetylene, cetene) $\text{C}_{16}\text{H}_{32}$ MW, 224M.p. 2.2°. B.p. 157.5°/15 mm., 152–4°/13 mm. D_4^{20} 0.7812. n_{D}^{20} 1.4410.Waterman, van't Spijker, van Westen, *Rec. trav. chim.*, 1929, 48, 1103.Landa, *Bull. soc. chim.*, 1928, 43, 1087.Roberti, Minervini, Berti, *Chem. Abstracts*, 1942, 36, 5767.**Hexadecylenic Acid.**

See Gaidic Acid.

Hexadecylhydroquinone (2:5-Dihydroxyhexadecylbenzene, hexadecylquinol, cetylhydroquinone) $\text{C}_{22}\text{H}_{38}\text{O}_2$ MW, 334Cryst. from pet. ether. M.p. 112°. $\text{Ag}_2\text{O} \rightarrow$ hexadecylbenzoquinone, m.p. 83°.*Di-Me ether*: b.p. 210°/0.5 mm.*Di-Et ether*: b.p. 219°/0.1 mm.Cook, Heilbron, Lewis, *J. Chem. Soc.*, 1942, 660.**Hexadecylic Acid.**

See Palmitic Acid.

Hexadecylic Aldehyde.

See Palmitic Aldehyde.

Hexadecyl iodide.

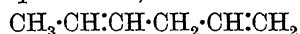
See Cetyl iodide.

Hexadecyne.

See Tetradecylacetylene.

1 : 3-Hexadienal.

See Sorbic Aldehyde.

1 : 2-Hexadiene (*Propylallene, butylidene-ethylene*) C_6H_{10} MW, 82B.p. 78°. D^{17}_4 0.7198. n^{27}_D 1.4298. Does not form Cu deriv. $\text{HgCl}_2 \rightarrow$ white ppt.Bouis, *Ann. chim.*, 1928, 9, 441.Bourguet, Piaux, *Bull. soc. chim.*, 1932, 51, 1047.**1 : 3-Hexadiene** (*3-Propylidene-propylene, 1-vinylbutylene-1, 1-ethyl-1 : 3-butadiene*) C_6H_{10} MW, 82B.p. 64.5–65.5°. D^{19}_4 0.6925. n^{19}_D 1.4060.*Tetrabromide*: 1 : 2 : 3 : 4-tetrabromohexane. M.p. 19°.Prévost, *Bull. soc. chim.*, 1941, 8, 89.**1 : 4-Hexadiene** (*1-Vinyl-2-butylene, 1-methyl-1 : 4-pentadiene*) C_6H_{10} MW, 82B.p. 72.3–72.5°. D^{19}_4 0.7057. n^{19}_D 1.4402.Prévost, *Bull. soc. chim.*, 1941, 8, 89.**1 : 5-Hexadiene.**

See Diallyl.

2 : 4-Hexadiene.

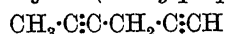
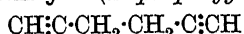
See Dipropenyl.

2 : 4-Hexadiene-2-carboxylic Acid.

See 1-Methylsorbic Acid.

1 : 5-Hexadienol-3.

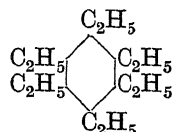
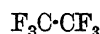
See Vinylallylcarbinol.

2 : 4-Hexadienol-1 (*3-Propenylallyl alcohol, 4-ethylidenecrotonyl alcohol, sorbyl alcohol*) $\text{C}_6\text{H}_{10}\text{O}$ MW, 98Needles. M.p. 30.5–31.5°. B.p. 76–7°/12 mm. D^{23}_4 0.8967. n^{23}_D 1.4971. Volatile in steam.*Diphenylurethane*: cryst. from pet. ether. M.p. 78–9°.*3 : 5-Dinitrobenzoyl*: yellow needles from pet. ether. M.p. 85°.Reichstein, Ammann, Trivelli, *Helv. Chim. Acta*, 1932, 15, 264.Ou Kiun-Houo, *Ann. chim.*, 1940, 13, 175.**1 : 4-Hexadi-yne** (*Methylpropargylacetylene*) C_6H_6 MW, 78B.p. 78–83°. D^{19}_4 0.825.Griner, *Ann. chim.*, 1902, 26, 352.**1 : 5-Hexadi-yne** (*Dipropargyl*) C_6H_6 MW, 78

Dict. of Org. Comp.—II.

B.p. 87.5–88.5°/758 mm. n^{23}_D 1.4380–1.4382. Sol. ord. org. solvents. Insol. H_2O . Unstable. Resinifies.Raphael, Sondheimer, *J. Chem. Soc.*, 1950, 120.**2 : 4-Hexadi-yne.**

See Dimethyldiacetylene.

Hexa-ethylbenzene $\text{C}_{18}\text{H}_{30}$ MW, 246Cryst. from EtOH. M.p. 129°. B.p. 298°. D^{130}_4 0.830.Wertyporoch, Firla, *Ann.*, 1933, 500, 293.Koch, Steinbrink, *Chem. Abstracts*, 1939, 33, 150.**Hexafluoroethane** C_2F_6 MW, 138M.p. –106.3°. B.p. –79 to –78.6°. Crit. temp. 19.7°. 28.3 parts dissolve in 100 parts abs. EtOH. 66.2 parts dissolve in 100 parts CCl_4 . Supports comb. of Na and Mg.Swarts, *Bull. soc. chim. Belg.*, 1933, 42, 114.Ruff, Bretschneider, *Z. anorg. allgem. Chem.*, 1933, 210, 173, (*Chem. Abstracts*, 1933, 27, 2131).Frigidaire Corporation, B.P. 389,619, (*Chem. Zentr.*, 1933, II, 131).**Hexahydroacetanilide.**

See under Cyclohexylamine.

Hexahydroacetophenone.

See Acetocyclohexane.

Hexahydro-o-aminoethylbenzene.

See 2-Ethylcyclohexylamine.

Hexahydro-o-aminophenol.

See 2-Aminocyclohexanol.

Hexahydroaniline.

See Cyclohexylamine.

Hexahydroanisole.

See under Cyclohexanol.

Hexahydroanthracene $\text{C}_{14}\text{H}_{16}$ MW, 184

Needles from 50% EtOH. M.p. 60–1°. Very sol. EtOH.

Clemmensen, *Ber.*, 1914, 47, 685. **β -Hexahydroanthracene** $\text{C}_{14}\text{H}_{16}$ MW, 184Plates. M.p. 66.5°. B.p. 303–6°. Very sol. hot Et_2O , AcOH, C_6H_6 .Godchot, *Ann. chim. phys.*, 1907, 12, 504.

γ -Hexahydroanthracene $C_{14}H_{16}$ MW, 184

Plates. M.p. 63°. B.p. 290°. Very sol. EtOH, Et₂O, C₆H₆. HNO₃ \rightarrow anthracene-9:10-dihydride.

Godchot, *Ann. chim. phys.*, 1907, 12, 504.

Hexahydroanthrahydroquinone

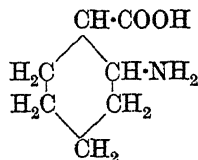
 $C_{14}H_{16}O_2$ MW, 216

White needles from EtOH. M.p. 229–30°.

Diacyl: white needles from EtOH. M.p. 212–14° (215–16°).

Skita, *Ber.*, 1925, 58, 2695; *Ber.*, 1927, 60, 2526.

Hexahydroanthranilic Acid (*o*-Aminohexahydrobenzoic acid, aminocyclohexane-*o*-carboxylic acid)

 $C_7H_{13}O_2N$ MW, 143

Needles from dil. EtOH. M.p. 274° decomp. Prac. insol. EtOH, Et₂O. HNO₂ \rightarrow hexahydroalicyclic acid.

B.HCl: m.p. 203–4° (188–90°).

Et ester: $C_9H_{17}O_2N$. MW, 171. B.p. 148–51°/30 mm. Sol. H₂O, EtOH. Decomp. on standing in air. *Hydrochloride*: m.p. 156°. Sol. H₂O.

Amide: $C_7H_{14}ON_2$. MW, 142. Needles. M.p. 153–4°. Sol. H₂O. Insol. Et₂O, C₆H₆. *Hydrobromide*: m.p. 257–9°.

Einhorn, Meyenberg, *Ber.*, 1894, 27, 2470.

Einhorn, Bull, *Ann.*, 1897, 295, 207.

Houben, Pfau, *Ber.*, 1916, 49, 2298.

Hexahydroanthraquinone

 $C_{14}H_{14}O_2$ MW, 214

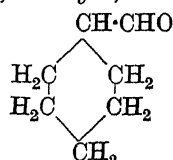
Yellow needles from MeOH. M.p. 170° (175°).

Dibromide: yellow prisms from MeOH. M.p. 118°.

Diacyl: cryst. from AcOH or EtOH. M.p. 204–6°.

Skita, *Ber.*, 1925, 58, 2694; 1927, 60, 2526.

Hexahydrobenzaldehyde (*Aldehydocyclohexane, cyclohexyl aldehyde*)

 $C_7H_{12}O$ MW, 112

B.p. 159.3°, 75–8°/20 mm. D_4^{20} 0.945. n_D^{20} 1.4495.

Diethylacetal: b.p. 109–10°/20 mm.

Oxime: needles from pet. ether. M.p. 90–1°.

Hydrochloride: m.p. 107–8° decomp.

Semicarbazone: cryst. from H₂O. M.p. 169–70° (176°).

Wallach, Isaac, *Ann.*, 1906, 347, 331.

Wood, Comley, *J. Soc. Chem. Ind.*, 1923, 42, 249t.

Darzens, Lévy, *Compt. rend.*, 1937, 204, 272.

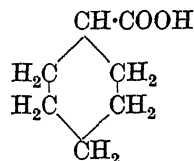
Hexahydrobenzanilide.

See under Cyclohexylamine.

Hexahydrobenzene.

See Cyclohexane.

Hexahydrobenzoic Acid (*Cyclohexane-carboxylic acid*)

 $C_7H_{12}O_2$ MW, 128

Prisms. M.p. 29–30°. B.p. 232–3°, 105–6°/4 mm., 115–17°/13 mm. D_4^{25} 1.0251. n_D^{25} 1.4520. $k = 1.32 \times 10^{-5}$ at 25°. Very sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O.

Me ester: $C_8H_{14}O_2$. MW, 142. B.p. 183°, 73°/15 mm. D_4^{15} 0.9954. n_D^{15} 1.45372.

Et ester: $C_9H_{16}O_2$. MW, 156. B.p. 196, 82–3°/12 mm. D_4^{15} 0.9672. n_D^{15} 1.45012.

Chloride: hexahydrobenzoyl chloride. $C_7H_{11}OCl$. MW, 146.5. B.p. 179–80° (184°), 76°/17 mm. D_4^{15} 1.0962. n_D^{15} 1.47662.

Amide: hexahydrobenzamide. $C_7H_{13}ON$. MW, 127. Prisms from H₂O. M.p. 185–6°. Very sol. EtOH, Et₂O.

Anhydride: $C_{14}H_{22}O_3$. MW, 238. Cryst. M.p. 25°. B.p. 280–3°. D_4^{15} 1.0585. n_D^{15} 1.48189.

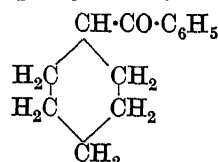
Nitrile: hexahydrobenzonitrile. $C_7H_{11}N$. MW, 109. B.p. 184–5°, 75–7°/16 mm. D_4^{25} 0.913. n_D^{25} 1.453.

Lumsden, *J. Chem. Soc.*, 1905, 87, 90.

Hiers, Adams, *J. Am. Chem. Soc.*, 1926, 48, 2392.

Grignard, Bellet, Courtot, *Ann. chim.*, 1919, 12, 368.

Hexahydrobenzophenone (*Benzoylcyclohexane, cyclohexyl phenyl ketone*)

 $C_{13}H_{16}O$ MW, 188

Needles from pet. ether. M.p. 59–60° (54°).

Semicarbazone: m.p. 175° (168–9°).

Oxime: *syn*-. needles from EtOH. M.p. 158.

Anti-. prisms from EtOH. M.p. 111°.

2 : 4-Dinitrophenylhydrazone : m.p. 192°.

Moureu, Mignonac, *Ann. chim.*, 1920, 14, 335.

Meyer, Scharvin, *Ber.*, 1897, 30, 1942.

Sidorova, Tsukervanik, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 2073.

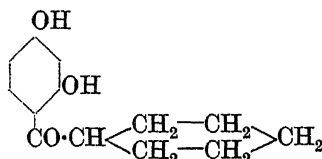
Hexahydrobenzoylaminoacetic Acid.

See Hexahydrohippuric Acid.

Hexahydrobenzoylglycine.

See Hexahydrohippuric Acid.

4-Hexahydrobenzoylresorcinol (*Cyclohexyl 2:4-dihydroxyphenyl ketone, 2:4-dihydroxybenzoylcyclohexane, β-resorcyl-cyclohexane*)



$C_{13}H_{16}O_3$

MW, 220

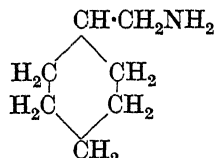
Cryst. from $CHCl_3$ -ligroin. M.p. 115.5–116°. B.p. 200–2°/4 mm.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2040.

Hexahydrobenzyl Alcohol.

See Cyclohexylcarbinol.

Hexahydrobenzylamine (*Cyclohexylmethylamine, ω-aminohexahydrotoluene*)



$C_7H_{15}N$

MW, 113

B.p. 163.5°. D_4^{14} 0.8747 (D_4^{20} 0.8702). n_D^{18} 1.4646.

N-Benzoyl: cryst. from EtOH.Aq. M.p. 98° (107–8°).

B.HCl: plates from H_2O . M.p. about 254°.

B.HAuCl₄: yellow needles. M.p. 183°.

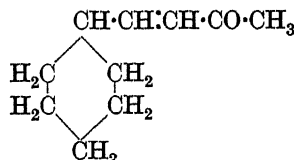
Picrate: yellow plates. M.p. about 184–6°.

Wallach, *Ann.*, 1907, 353, 298.

Gutt, *Ber.*, 1907, 40, 2068.

Skita, *Ber.*, 1924, 57, 1977.

Hexahydrobenzylideneacetone (*1-Cyclohexyl-2-acetylcyclohexene, methyl hexahydrostyryl ketone, ω-acetohexahydrostyrene*)



$C_{10}H_{16}O$

MW, 152

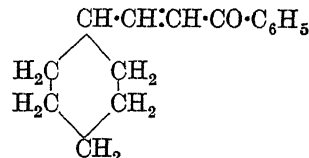
B.p. 230–2°, 112–16°/17 mm., 103°/9 mm.

Semicarbazone : m.p. 168°.

Kon, *J. Chem. Soc.*, 1926, 1798.

Hexahydrobenzylideneacetophenone

(*Hexahydrobenzalacetophenone, ω-benzoylhexahydrostyrene, phenyl hexahydrostyryl ketone*)



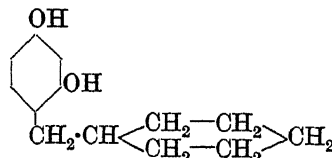
$C_{15}H_{18}O$

MW, 214

Needles from EtOH. M.p. 167–8°. Very sol. Et_2O , Me_2CO . Sol. EtOH.

Frézouls, *Compt. rend.*, 1912, 154, 1707.

4-Hexahydrobenzylresorcinol (*2:4-Dihydroxy-ω-cyclohexyltoluene, cyclohexyl-2:4-dihydroxyphenyl-methane, 2:4-dihydroxybenzyl-cyclohexane*)



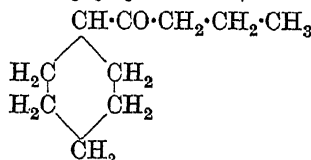
$C_{13}H_{18}O_2$

MW, 206

Cryst. from $CHCl_3$. M.p. 116.5–117.5°.

Talbot, Adams, *J. Am. Chem. Soc.*, 1927, 49, 2040.

Hexahydrobutyrophenone (*Propyl cyclohexyl ketone, butyrylcyclohexane*)



$C_{10}H_{18}O$

MW, 154

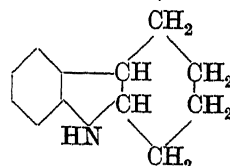
B.p. 94°/13 mm.

Semicarbazone : m.p. 155°.

Douris, *Compt. rend.*, 1913, 157, 57.

Darzens, Rost, *Compt. rend.*, 1911, 153, 774.

Hexahydrocarbazole (Carbazoline)



$C_{12}H_{15}N$

MW, 173

Cis:

Needles from EtOH. M.p. 99°. B.p. 280°/769 mm. Sol. EtOH, Et_2O , C_6H_6 , dil. HCl.

Acetyl : m.p. 98°.

Benzoyl: colourless needles from EtOH. M.p. 106°. B.p. 270°/10 mm.

Picrate: yellow needles. M.p. 166°.

Trans:

Colourless needles from EtOH. M.p. 127°. B.p. 286°/769 mm. Readily sol. dil. HCl.

Acetyl: long needles from EtOH.Aq. M.p. 113°.

Benzoyl: colourless needles from EtOH. M.p. 133°.

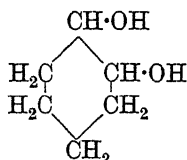
Picrate: yellow needles from EtOH. M.p. 179°.

Gurney, Perkin, Plant, *J. Chem. Soc.*, 1927, 130, 2676.

Hexahydrocarvacrol.

See Carvomenthol.

Hexahydrocatechol (*Cyclohexane-1:2-diol*, 1:2-dihydroxycyclohexane)



$C_6H_{12}O_2$ MW, 116

Cis:

Cryst. from Et₂O. M.p. 98°. B.p. 116°/13 mm.

Acetone comp.: b.p. 182°, 78°/24 mm. D_4^{20} 0.980. n_D^{20} 1.4479.

Benzaldehyde comp.: b.p. 151–2.5°/14 mm. n_D^{25} 1.5332.

Diacetyl: b.p. 118°/13 mm. $D_4^{19.5}$ 1.0836. $n_D^{19.5}$ 1.4429.

Monobenzoyl: b.p. 139–40°/0.5 mm.

Dibenzoyl: m.p. 63.5°.

Di-p-nitrobenzoyl: pale yellow. M.p. 128.5°.

Di-3:5-dinitrobenzoyl: m.p. 169°.

Di-phenylurethane: m.p. 185°.

Trans:

d.

l-Menthoxycetyl: m.p. 126–7°. $[\alpha]_D$ –32.7° in EtOH.

l.

M.p. 113–14°. $[\alpha]_D$ –46.5° in H₂O.

Di-p-nitrobenzoyl: pale yellow. M.p. 126.5°. $[\alpha]_D$ –25.5° in CHCl₃.

Di-3:5-dinitrobenzoyl: m.p. 160°. $[\alpha]_D$ –83° in CHCl₃.

l-Menthoxycetyl: m.p. 64°. $[\alpha]_D$ –91.7° in EtOH.

dl.

Cryst. from Me₂CO. M.p. 104°. B.p. 117°/13 mm.

Diacetyl: b.p. 113°/11.5 mm. D_4^{20} 1.077. n_D^{20} 1.4464.

Monobenzoyl: m.p. 92–3°. B.p. 200–5°/35 mm.

Dibenzoyl: m.p. 94.5°.

Di-p-nitrobenzoyl: pale yellow. M.p. 149–50°. *Di-3:5-dinitrobenzoyl*: pale yellow. M.p. 179°.

Di-phenylurethane: m.p. 212°.

Rothstein, *Ann. chim.*, 1930, 14, 461.

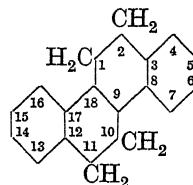
Auwers, Dersch, *J. prakt. Chem.*, 1930, 124, 235.

Lindemann, Lange, *Ann.*, 1930, 483, 31.

Schering-Kahlbaum, D.R.P., 574,838, (*Chem. Abstracts*, 1933, 27, 4540).

Wilson, Read, *J. Chem. Soc.*, 1935, 1269.

1:2:9:10:11:18-Hexahydrochrysene



$C_{18}H_{18}$

MW, 234

Cis:

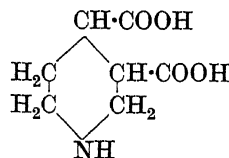
Prisms from EtOH. M.p. 75°. B.p. 208°/12 mm.

Trans:

Prisms from butanol–EtOH. M.p. 115°. B.p. 223°/12 mm.

Ramage, Robinson, *J. Chem. Soc.*, 1933, 609.

Hexahydrocinchomeronic Acid (*Piperidine-3:4-dicarboxylic acid*)



$C_7H_{11}O_4N$

MW, 173

Mixture of *cis* and *trans*. Cryst. from H₂O. M.p. 256° decomp. Spar. sol. H₂O.

B,HCl: m.p. 237° decomp. Very spar. sol. H₂O. Sol. EtOH.

B,HAuCl₄: m.p. 205° decomp.

Heat with KOH → stable form. Also obtained in a similar manner from leuponic acid (*q.v.*).

Stable form: Cryst. from H₂O. M.p. 268–70° decomp. 275° (rapid heat.).

B,HCl: m.p. 240–2° decomp. Very sol. H₂O.

B,HAuCl₄: m.p. 205° decomp.

Koenigs, Wolff, *Ber.*, 1896, 29, 2187.

Koenigs, *Ber.*, 1897, 30, 1326.

Hexahydrocresol.

See Methylcyclohexanol.

Hexahydrocumene.

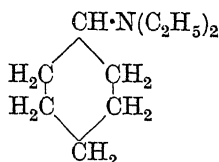
See Isopropylcyclohexane.

Hexahydro- ψ -cumene.

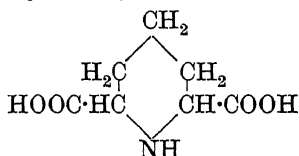
See 1:2:4-Trimethylcyclohexane.

Hexahydrocymene.

See Menthane.

Hexahydrodiethylaniline (*Diethylcyclohexylamine*) $C_{10}H_{21}N$ MW, 155B.p. 191° (193°), $80^{\circ}/15$ mm. D_4^{20} 0.872.Picrate: cryst. M.p. $91-2^{\circ}$.Darzens, *Compt. rend.*, 1909, 149, 1003.Skita, Berendt, *Ber.*, 1919, 52, 1527.**Hexahydrodiphenyl.**

See Phenylcyclohexane.

Hexahydrodipicolinic Acid (*Piperidine-2:6-dicarboxylic acid*) $C_7H_{11}O_4N$ MW, 173

Two forms. (1) Cryst. from H_2O . M.p. 281° decomp. Sol. H_2O . Spar. sol. EtOH. Prac. insol. Et_2O , C_6H_6 . (2) Plates + $1H_2O$ from H_2O or EtOH.Aq. Anhyd. at 134° . M.p. about 258° . Spar. sol. EtOH.

Di-Et ester: $C_{11}H_{19}O_4N$. MW, 229. B.p. $155-6^{\circ}/11$ mm. D_4^{25} 1.0748. n_D^{25} 1.4581.

Diamide: $C_7H_{13}O_2N_3$. MW, 171. Two forms corresponding to those of the acids. (1) Prisms from H_2O . M.p. $225-6^{\circ}$ corr. Sol. hot H_2O , EtOH. (2) Leaflets + $1H_2O$. Anhyd. at 190° . M.p. $228-9^{\circ}$ corr.

N-Me: see Scopolinic Acid.

Singer, McElvain, *J. Am. Chem. Soc.*, 1935, 57, 1137.Schmidt, *Ber.*, 1916, 49, 165.Hess, *ibid.*, 2337.Fischer, *Ber.*, 1901, 34, 2545.**Hexahydrodurene.**

See 1:2:4:5-Tetramethylcyclohexane.

Hexahydroethylaniline.

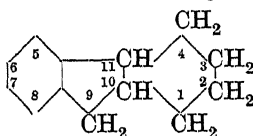
See N-Ethylcyclohexylamine.

Hexahydroethylcresol.

See Methylcyclohexanol.

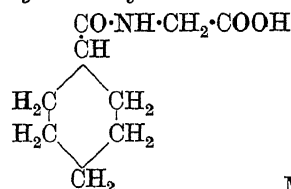
Hexahydroethyltoluene.

See Methylcyclohexane.

1:2:3:4:10:11-Hexahydrofluorene $C_{13}H_{16}$

MW, 172

Constituent of certain coal oils. Oily liq. with violet fluor. B.p. $240-50^{\circ}$, $137^{\circ}/15$ mm. D_4^{20} 0.9880. n_D^{20} 1.5448. Sol. Et_2O , AcOH, C_6H_6 , $CHCl_3$. Spar. sol. EtOH, pet. ether. Insol. H_2O . Spar. volatile in steam. Polymerises on long boiling. Ox. \rightarrow acetic, propionic, adipic and oxalic acids.

Pictet, Ramseyer, *Ber.*, 1911, 44, 2491.Pictet, *Ann. chim. phys.*, 1918, [9], 10, 275, 303.Cook, Hewett, *J. Chem. Soc.*, 1933, 1098.Harradence, Lions, *J. Proc. Roy. Soc. N.S. Wales*, 1939, 72, 284.**Hexahydrohippuric Acid** (*Hexahydrobenzoylglycine, hexahydrobenzoylaminoacetic acid*) $C_9H_{15}O_3N$ MW, 185

Needles from H_2O . M.p. 152° . Sol. H_2O , EtOH, hot Et_2O .

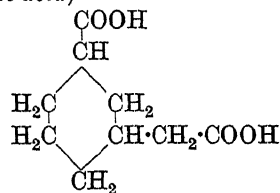
Me ester: $C_{10}H_{17}O_3N$. MW, 199. Needles. M.p. $100-1^{\circ}$.

Et ester: $C_{11}H_{19}O_3N$. MW, 213. Needles. M.p. $75-6^{\circ}$.

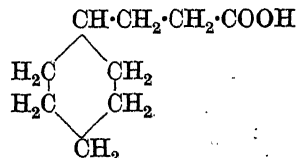
Amide: $C_9H_{16}O_2N_2$. MW, 184. Cryst. from H_2O . M.p. $195-6^{\circ}$.

Godchot, *Bull. soc. chim.*, 1911, 9, 262.**Hexahydrohomocatechol.**

See 4-Methylcyclohexandiol-1:2.

Hexahydrohomoisophthalic Acid (*3-Carboxycyclohexylacetic acid, 3-carboxymethylhexahydrobenzoic acid*) $C_9H_{14}O_4$ MW, 186

Needles from H_2O . M.p. 158° . Sol. Me_2CO . Spar. sol. C_6H_6 , pet. ether. Stable to cold $KMnO_4$. Distilled over $Ca(OH)_2 \rightarrow$ bicyclo-1:2:3-octanone-6.

Komppa, Hirn, *Ber.*, 1903, 36, 3611.**Hexahydro-hydrocinnamic Acid** (*2-Hexahydrophenylpropionic acid, 2-cyclohexylpropionic acid*) $C_9H_{16}O_2$

MW, 156

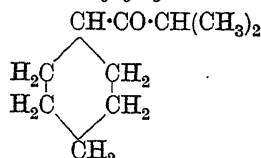
B.p. 275–8°, 143.5°/11 mm. D_4^{20} 0.9966. n_D^{20} 1.4634. $k = 1.34 \times 10^{-5}$.

Amide: $C_9H_{17}ON$. MW, 155. Needles from MeOH. M.p. 120°.

Ipatiew, *Ber.*, 1909, 42, 2097.

Zelinsky, *Ber.*, 1908, 41, 2676.

Hexahydroisobutyrophenone (*Isopropyl cyclohexyl ketone, isobutyrylcyclohexane*)



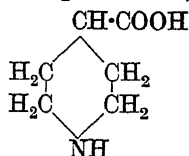
$C_{10}H_{18}O$

MW, 154

B.p. 83°/11 mm.

Faworski, Charitonowa, *J. prakt. Chem.*, 1913, 88, 695.

Hexahydroisonicotinic Acid (*Piperidine-4-carboxylic acid, isonipecotic acid*)



$C_6H_{11}O_2N$

MW, 129

Needles from H_2O . M.p. above 320°. Sol. H_2O . Insol. EtOH.

B, HCl : m.p. 293° decomp.

Me ester: $C_7H_{13}O_2N$. MW, 143. *Hydrochloride*: m.p. 169°.

B_2, H_2PtCl_6 : m.p. 239–40° decomp.

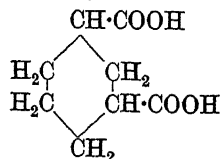
Nitroso deriv.: needles. M.p. 101°.

p-Toluenesulphonyl: m.p. 170°.

Freudenberg, *Ber.*, 1918, 51, 1673.

Hanousek, Prelog, *Chem. Abstracts*, 1932, 26, 5302.

Hexahydroisophthalic Acid (*Cyclohexane-1:3-dicarboxylic acid*)



$C_8H_{12}O_4$

MW, 172

Cis:

Needles from conc. HCl. M.p. 187–9°. Very sol. H_2O , EtOH, C_6H_6 . Sol. Et₂O. Spar. sol. pet. ether. $k = 5.34 \times 10^{-5}$ at 25°. Conc. HCl at 180° → *trans*-form.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. B.p. 263°, 148°/20 mm. D_4^{20} 1.0997. n_D^{20} 1.4568.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 288°, 142°/11 mm. D_4^{20} 1.045. n_D^{20} 1.452.

Anhydride: $C_8H_{10}O_3$. MW, 154. B.p. 304°.

Dianilide: m.p. 298–9°.

Trans:

dl-.

Needles from H_2O . M.p. 148°. Sol. hot H_2O . $k = 3.45 \times 10^{-5}$ at 25°. Heat with CH_3COCl → anhydride of *cis*-form.

Di-Me ester: b.p. 139°/20 mm. D_4^{20} 1.1095. n_D^{20} 1.4577.

Di-Et ester: b.p. 142°/12 mm. D^{20} 1.047. $n_{H_2}^{20}$ 1.453.

d-.

M.p. 134°. $[\alpha]_D^{22} + 23.46^\circ$.

l-.

M.p. 134°. $[\alpha]_D^{22} - 23.10^\circ$.

Böeseken, Peek, *Rec. trav. chim.*, 1925, 44, 841.

Goodwin, Perkin, *J. Chem. Soc.*, 1905, 87, 848.

Baeyer, Villiger, *Ann.*, 1893, 276, 259.

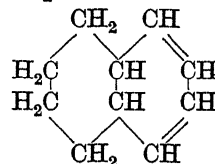
Willstätter, Jaquet, *Ber.*, 1918, 51, 777.

Skita, Rössler, *Ber.*, 1939, 72, 265.

Hexahydromesitylene.

See 1:3:5-Trimethylcyclohexane.

Hexahydronaphthalene



$C_{10}H_{14}$

MW, 134

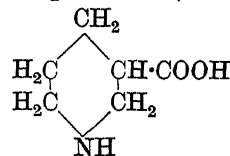
B.p. 200°, 82°/2 mm. D^{23} 0.934. $n_D^{18.4}$ 1.526.

Agrestini, *Gazz. chim. ital.*, 1882, 12, 495.

Lossen, Zander, *Ann.*, 1884, 225, 112.

Burnop, Linstead, *J. Chem. Soc.*, 1940, 720.

Hexahydronicotinic Acid (*Piperidine-3-carboxylic acid, nipecotic acid*)



$C_6H_{11}O_2N$

MW, 129

Cryst. M.p. 261° decomp. Sol. H_2O . Insol. EtOH, Et₂O.

B, HCl : cryst. M.p. 240–1° decomp.

B_2, H_2PtCl_6 : m.p. 228–9° decomp.

N-Acetyl: m.p. 289–90° decomp. *p-Toluenesulphonyl*: m.p. 167°.

Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 215–17°. Sol. H_2O , EtOH. B, HCl : m.p. 131–2°.

B_2, H_2PtCl_6 : m.p. 207–8°.

Et ester: $C_8H_{15}O_2N$. MW, 157. B.p. 102–4°/7 mm. D_{20}^{20} 1.0121. n_D^{19} 1.4592. B, HCl : m.p. 110–11°.

Nitroso deriv.: prisms from H_2O . M.p. 111–12°.

N-Me deriv.: methylpiperidine-3-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Cryst. + $1H_2O$.

M.p. anhyd. 162–3°. B, H_2PtCl_6 : prisms, m.p. 215–16°. $B, HAuCl_4$: m.p. 158–9°. *Me ester*: $C_8H_{15}O_2N$. MW, 157. Liq. Misc. with H_2O , $EtOH$, Et_2O . B, H_2PtCl_6 : m.p. 233–5°.

Freudenberg, *Ber.*, 1918, 51, 1668.

McElvain, Adams, *J. Am. Chem. Soc.*, 1923, 45, 2738.

Jahns, *Arch. Pharm.*, 1891, 229, 686.

Hexahydroperylene

$C_{20}H_{18}$ MW, 258

Leaflets. M.p. 183–4° (189°). Sublimes on careful heating. Dist. → perylene. Red sol. in conc. H_2SO_4 .

Zinke, Unterkreuter, *Monatsh.*, 1920, 40, 405.

Zinke, Schniderschitsch, *Monatsh.*, 1929, 51, 282.

Hexahydrophenanthrene

$C_{14}H_{16}$ MW, 184

Exists in two forms according to method of preparation.

(i) By hydrogen reduction. Yellowish liq. M.p. –3°. B.p. 307°, 167°/13 mm. D^{20}_D 1.043. n^{20}_D 1.580. Sol. Et_2O , $AcOH$, C_6H_6 , $CHCl_3$. Spar. sol. $EtOH$.

Picrate: m.p. 106°.

(ii) By hydriodic acid reduction. M.p. –8°. B.p. 290°. D^{20}_D 1.045. n^{20}_D 1.57. Sol. Et_2O , $AcOH$, C_6H_6 , CS_2 , pet. ether. Spar. sol. $EtOH$. Does not form a picrate.

Schmidt, Mezger, *Ber.*, 1907, 40, 4252.

Breteau, *Compt. rend.*, 1905, 140, 942.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1935, 57, 2192.

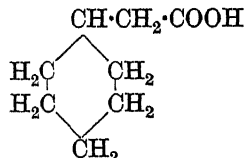
Hexahydrophenetole.

See under Cyclohexanol.

Hexahydrophenol.

See Cyclohexanol.

Hexahydrophenylacetic Acid (*Cyclohexylacetic acid*)



$C_8H_{14}O_2$ MW, 142

Needles from formic acid. M.p. 33° (27°). B.p. 244–6°, 156°/40 mm., 135°/13 mm., 117°/5 mm. D^{22}_D 0.9985, D^{18}_D 0.9671. n^{20}_D 1.438. $k = 2.36 \times 10^{-5}$. Sol. most org. solvents. Spar. sol. H_2O .

Me ester: $C_9H_{16}O_2$. MW, 156. B.p. 200–2°. D^{14}_D 0.9896. n^{15}_D 1.459.

Et ester: $C_{10}H_{18}O_2$. MW, 170. B.p. 211–12°, 100°/17 mm. D^{14}_D 0.9537. n^{15}_D 1.451.

Amide: $C_8H_{15}ON$. MW, 141. Cryst. from $MeOH.Aq$. M.p. 171–2°.

Nitrile: $C_8H_{13}N$. MW, 123. B.p. 215°. D^{18}_D 0.913. n^{18}_D 1.457.

Chloride: $C_8H_{13}OCl$. MW, 160.5. B.p. 98–100°/23 mm.

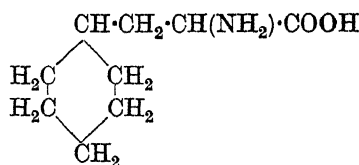
Sabatier, Murat, *Compt. rend.*, 1913, 156, 425.

Darzens, Rost, *Compt. rend.*, 1911, 153, 774.

Wallach, *Ann.*, 1908, 359, 311.

Kindler, Dschi-yin-Kwok, *Ann.*, 1943, 554, 9.

Hexahydrophenyl- α -alanine (*1-Amino-2-cyclohexylpropionic acid*, 2-cyclohexyl- α -alanine)



$C_9H_{17}O_2N$ MW, 171

l.

Needles from H_2O . M.p. 324°. $[\alpha]^{20}_D + 13.3^\circ$. Sol. H_2O , $EtOH$. Insol. Et_2O .

B.HCl: m.p. 246°. $[\alpha]^{20}_D + 13.4^\circ$.

Me ester: $C_{10}H_{19}O_2N$. MW, 185. *N-Benzoyl*: m.p. 104–5°.

Et ester: $C_{11}H_{21}O_2N$. MW, 199. B.p. 149–50°/11 mm. *Hydrochloride*: m.p. 196°.

N-Benzoyl: m.p. 124–5°. $[\alpha]^{20}_D - 12.68^\circ$.

N-p-Nitrobenzoyl: m.p. 158–9°.

d.

B.HCl: m.p. 246°. $[\alpha]^{20}_{D50.3} - 10.16^\circ$.

dl.

B.HCl: m.p. 246°.

N-Acetyl: needles. M.p. 178°.

N-Benzoyl: m.p. 182–3.5°.

Karrer, Kehl, *Helv. Chim. Acta*, 1930, 13, 58.

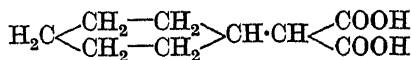
Waser, Brauchli, *Helv. Chim. Acta*, 1924, 7, 751.

Shemin, Herbst, *J. Am. Chem. Soc.*, 1939, 61, 2471.

Hexahydrophenylenediamine.

See Diaminocyclohexane.

Hexahydrophenylmalonic Acid (*Cyclohexylmalonic acid*)



$C_9H_{14}O_4$ MW, 186

Prisms from formic acid. M.p. 176–8° decomp. Sol. Et_2O . Spar. sol. H_2O , $CHCl_3$. Insol. C_6H_6 , pet. ether.

Di-Me ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 121–2°/6 mm. D^{24}_D 1.074.

Di-Et ester: $C_{13}H_{22}O_4$. MW, 242. B.p. 151–3°/16 mm. D^{20}_D 1.023. n^{20}_D 1.449.

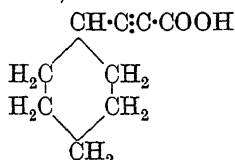
Et ester-nitrile: $C_{11}H_{17}O_2N$. MW, 195. B.p. 158–61°/24 mm.

Hope, Perkin, *J. Chem. Soc.*, 1909, 95, 1363.

Freundler, Damond, *Compt. rend.*, 1905, 141, 594.

Wagner-Jauregg, Arnold, *Ann.*, 1937, 529, 274.

Hexahydrophenylpropionic Acid (*Cyclohexylpropionic acid*)



$C_9H_{12}O_2$ MW, 152

B.p. 138–40°/6 mm.

Me ester: $C_{10}H_{14}O_2$. MW, 166. B.p. 96°/5 mm.

Et ester: $C_{11}H_{16}O_2$. MW, 180. B.p. 105°/5 mm.

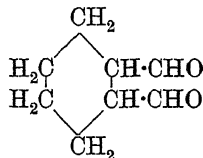
Darzens, Rost, *Compt. rend.*, 1909, 149, 682.

Jegorowa, *J. Russ. Phys.-Chem. Soc.*, 1911, 43, 1122.

2-Hexahydrophenylpropionic Acid.

See Hexahydro-hydrocinnamic Acid.

Hexahydrophthalaldehyde

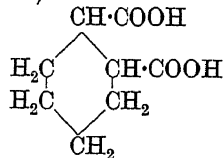


$C_8H_{12}O_2$ MW, 140

Viscous oil with stinging vapour. B.p. 92–4°/3 mm.

Reppe, Schichting, Klager, Toepel, *Ann.*, 1948, 560, 1.

Hexahydrophthalic Acid (*Cyclohexane-1:2-dicarboxylic acid*)



$C_8H_{12}O_4$ MW, 172

Cis:

Needles from EtOH. M.p. 192°. Sol. H_2O , EtOH, Et_2O , C_6H_6 . Conc. HCl at 180° \rightarrow *trans*-form.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 133°/10 mm. D_4^{20} 1.054. n_D^{20} 1.453.

Anhydride: $C_8H_{10}O_3$. MW, 154. M.p. 32°. B.p. 145°/18 mm.

Dianilide: m.p. 238°.

Trans:

dl-.

Leaflets from H_2O . M.p. 221°. Resolved by quinine into optically active components. Dist. \rightarrow anhydride of *cis*-form.

Mono-Me ester: $C_9H_{14}O_4$. MW, 186. Cryst. from C_6H_6 -pet. ether. M.p. 96°.

Di-Me ester: $C_{10}H_{16}O_4$. MW, 200. Cryst. from C_6H_6 -pet. ether. M.p. 33°.

Di-Et ester: $C_{12}H_{20}O_4$. MW, 228. B.p. 135°/11 mm. D_4^{20} 1.040. n_D^{20} 1.450.

Anhydride: $C_8H_{10}O_3$. MW, 154. Needles from Et_2O . M.p. 140°.

Monoamide: $C_8H_{13}O_3N$. MW, 171. M.p. 196°.

d-.

Cryst. powder from H_2O . M.p. 179–83°. $[\alpha]_D + 18.2^\circ$. More sol. than the *dl*- acid.

Mono-Me ester: m.p. 39°. $[\alpha]_D + 26.5^\circ$.

Di-Me ester: oil. $[\alpha]_D + 28.7^\circ$.

l-.

Cryst. powder from H_2O . M.p. 179–83°. $[\alpha]_D - 18.5^\circ$.

Mono-Me ester: m.p. 39°. $[\alpha]_D - 24.8^\circ$.

Di-Me ester: oil. $[\alpha]_D - 29.6^\circ$.

Baeyer, *Ann.*, 1890, 258, 213.

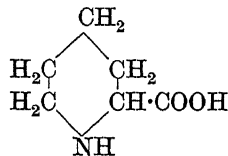
Werner, Conrad, *Ber.*, 1899, 32, 3053.

Auwers, Ottens, *Ber.*, 1924, 57, 437.

Stoermer, Steinbeck, *Ber.*, 1932, 65, 413.

Reppe *et al.*, *Ann.*, 1948, 560, 1.

Hexahdropicolinic Acid (*Piperidine-2-carboxylic acid, pipecolic acid, pipecolinic acid*)



$C_6H_{11}O_2N$ MW, 129

d-.

Plates from EtOH. M.p. 270°. $[\alpha]_D^{25} + 34.5^\circ$. Sol. H_2O , EtOH.

Tartrate: cryst. M.p. 187°.

l-.

Occurs in fruits and seeds of Leguminosæ, barley, hops, and in malt, Rhodesian teak, the edible mushroom, etc. Needles. M.p. 270°. $[\alpha]_D^{18} - 25.2^\circ$. Sol. H_2O , EtOH.Aq. Spar. sol. EtOH, Me_2CO , $CHCl_3$. Insol. Et_2O . Sublimes.

Reacts neutral.

B,HCl: m.p. 256–8° decomp. $[\alpha]_D^{18} - 5^\circ$.

Tartrate: m.p. 187°.

dl-.

Plates from H_2O . M.p. 264°. Sol. H_2O , EtOH.

Me ester: $C_7H_{13}O_2N$. MW, 143. Needles. M.p. 191°. Sol. H_2O . Spar. sol. EtOH.

Et ester: $C_8H_{15}O_2N$. MW, 157. Oil. B.p. 216–17°, 107°/20 mm.

N-Acetyl: m.p. 219° decomp.

N-Me deriv.: methylpiperidine-2-carboxylic acid. $C_7H_{13}O_2N$. MW, 143. Oil. $B, HAuCl_4$: prisms from EtOH. M.p. 227–8° decomp.

Ladenburg, *Ber.*, 1891, 24, 640.

Willstätter, *Ber.*, 1896, 29, 390.

Hess, Leibbrandt, *Ber.*, 1917, 50, 385.

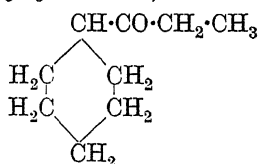
Zacharias, Thompson, Steward, *J. Am. Chem. Soc.*, 1952, 74, 2949.

Harris, Pollock, *Chemistry and Industry*, 1952, 931.

Hulme, Arthington, *Nature*, 1952, 170, 659.

Morrison, *Biochem. J.*, 1952, 50, xiv.

Hexahydropropiphenone (*Ethyl cyclohexyl ketone, propionylcyclohexane*)



$C_9H_{16}O$

MW, 140

Oil. B.p. 196°, 88–9°/19 mm. D_4^{20} 0.9105. n_D^{20} 1.4530.

Oxime: plates. M.p. 70–2° (72–3°).

Semicarbazone: plates from EtOH. M.p. 150–2° (144–50°).

Meerwein, *Ann.*, 1919, 419, 167.

Hell, Schaal, *Ber.*, 1909, 42, 2232.

Colonge, Duroux, *Bull. soc. chim.*, 1940, 7, 459.

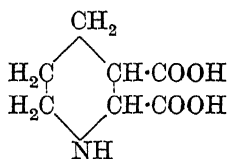
Hexahydropyrazine.

See Piperazine.

Hexahydropyridine.

See Piperidine.

Hexahydroquinolinic Acid (*Piperidine-2:3-dicarboxylic acid*)



$C_7H_{11}O_4N$

MW, 173

Cis:

M.p. 227°. Spar. sol. H_2O .

B, HCl : m.p. 239°. Very sol. H_2O .

Di-Et ester: $C_{11}H_{19}O_4N$. MW, 229. Oil. B, HCl : m.p. 204–5° decomp.

$B, HAuCl_4$: m.p. 195° decomp. Spar. sol. H_2O .

N-Nitroso: m.p. 138–9° decomp. Very sol. H_2O .

Trans:

M.p. 253° decomp. Spar. sol. H_2O .

B, HCl : m.p. 221° decomp. Very sol. H_2O .

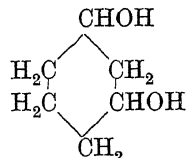
Di-Me ester: $C_9H_{15}O_4N$. MW, 201. B, HCl : m.p. 166–70° decomp.

N-Nitroso: m.p. 154° decomp.

Besthorn, *Ber.*, 1896, 29, 2662.

Adkins *et al.*, *J. Am. Chem. Soc.*, 1934, 56, 2425.

Hexahydroresorcinol (*Cyclohexandiol-1:3, resorcitol*)



$C_6H_{12}O_2$

MW, 116

Cis.

Cryst. from AcOEt or Me_2CO . M.p. 86°. Sol. H_2O , EtOH. Spar. sol. Et_2O , pet. ether, C_6H_6 . Heat. of comb. 7.248 cal./gm.

Dibenzoyl: cryst. from MeOH or pet. ether. M.p. 65.5°.

Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 154–5°.

Di-phenylacetyl: b.p. 215–17°/1 mm. D_4^{24} 1.1235. n_D^{24} 1.5390.

Di-phenylurethane: cryst. from EtOH. M.p. 213°.

Di-α-naphthylurethane: cryst. from $PhNO_2$. M.p. 245°.

Di-l-menthylurethane: cryst. from EtOH. M.p. 157°. $[\alpha]_D^{25} - 64.7^\circ$ in EtOH.

Trans.

M.p. 117°. Heat. of comb. 7.232 cal./gm.

Diacetyl: b.p. 95°/0.4 mm.

Dibenzoyl: cryst. from AcOH, EtOH or pet. ether. M.p. 123.5°.

Di-p-nitrobenzoyl: cryst. from AcOH. M.p. 176.5°.

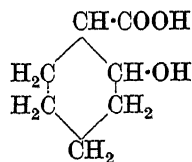
Di-phenylacetyl: needles from EtOH. M.p. 65°.

Lindermann, Baumann, *Ann.*, 1930, 477, 78.

Rothstein, *Ann. chim.*, 1930, 14, 474.

Coops, Dienske, Aten, *Rec. trav. chim.*, 1938, 57, 303.

Hexahydrosalicylic Acid (*Cyclohexanol-2-carboxylic acid, 2-hydroxyhexahydrobenzoic acid*)



$C_7H_{12}O_3$

MW, 144

α-Form:

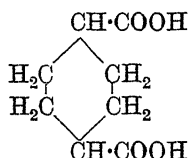
Needles from AcOEt. M.p. 111°. Sol. H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 .

Et ester: $C_9H_{16}O_3$. MW, 172. B.p. 120–1°/30 mm., 100–3°/10 mm.

p-Toluidide: m.p. 154.5–5.9°.

β-Form :

M.p. 76–8°.

Amide : m.p. 113.7–4.7°.*p*-Toluidide : m.p. 124–43°.Houben, Pfau, *Ber.*, 1916, 49, 2295.Einhorn, Meyenburg, *Ber.*, 1894, 27, 2472.Marshall, Kuck, Elderfield, *J. Org. Chem.*, 1942, 7, 444.**Hexahydroterephthalic Acid** (*Cyclohexane-1:4-dicarboxylic acid*) $C_8H_{12}O_4$

MW, 172

Cis :

Leaflets from H_2O . M.p. 170–1°. Sol. EtOH, Et_2O , $CHCl_3$, hot H_2O . Heat of comb. C_p 928.6 Cal., C_v 928.0 Cal. $k = 3 \times 10^{-6}$ at 100°. Conc. HCl at 180° \rightarrow *trans*-form.

Di-Me ester : $C_{10}H_{16}O_4$. MW, 200. M.p. 14°. B.p. 132.5°/10 mm. D_4^{20} 1.1112.

Di-Et ester : $C_{12}H_{20}O_4$. MW, 228. B.p. 151°/13 mm. D_4^{20} 1.015. $n_{D_4}^{20}$ 1.436.

Trans :

Prisms from H_2O . M.p. 312–13° (310°). Sol. EtOH, Me_2CO . Spar. sol. Et_2O , hot H_2O . Insol. $CHCl_3$. Heat of comb. C_p 929.5 Cal., C_v 928.9 Cal. $k = 2.5 \times 10^{-6}$ at 100°.

Mono-Me ester : $C_9H_{14}O_4$. MW, 186. Needles from pet. ether. M.p. 125°.

Di-Me ester : needles from Et_2O . M.p. 71°. Heat of comb. C_p 1273.9 Cal., C_v 1272.7 Cal.

Di-Et ester : D_4^{20} 1.011. $n_{D_4}^{20}$ 1.434.

Willstätter, Jacquet, *Ber.*, 1918, 51, 776.Zelinsky, Glinka, *Ber.*, 1911, 44, 2305.Stoermer, Ladewig, *Ber.*, 1914, 47, 1804.Malachowski, Jankiewicsowna, *Ber.*, 1934, 67, 1783.Fichter, Holbro, *Helv. Chim. Acta*, 1938, 21, 141.**Hexahydrothiophenol.**

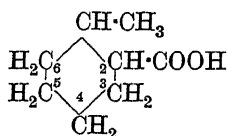
See Mercaptocyclohexane.

Hexahydrothymol.

See Menthhol.

Hexahydrotoluene.

See Methylcyclohexane.

Hexahydro-*o*-toluic Acid (1-Methylcyclohexane-2-carboxylic acid, 2-methylhexahydrobenzoic acid) $C_8H_{14}O_2$

MW, 142

"Cis" :

B.p. 236–7°, 122–3°/10 mm. D_4^{20} 1.009. n_D^{20} 1.458. $k = 1.64 \times 10^{-5}$. Conc. HCl \rightarrow

"trans"-form.

Amide : $C_8H_{15}ON$. MW, 141. Needles from MeOH.Aq. M.p. 151–3°.

Nitrile : $C_8H_{13}N$. MW, 123. B.p. 79–81°/16 mm.

Anilide : needles from pet. ether. M.p. 66–8°.

"Trans" :

Needles from C_6H_6 . M.p. 52°. B.p. 241–2°, 125°/12.5 mm. Sol. EtOH, Et_2O , $CHCl_3$, pet. ether. Spar. sol. H_2O , C_6H_6 . $k = 2.05 \times 10^{-5}$.

Me ester : $C_9H_{16}O_2$. MW, 156. B.p. 190°. D^{20} 0.9769.

Et ester : $C_{10}H_{18}O_2$. MW, 170. B.p. 203–4°/753 mm.

Chloride : $C_8H_{13}OCl$. MW, 160.5. B.p. 75–6°/15 mm. D^{20} 1.054. n_D^{20} 1.4653.

Amide : needles from H_2O . M.p. 180–1°.

Anilide : plates from C_6H_6 -pet. ether. M.p. 148°.

Zelinsky, *Ber.*, 1908, 41, 2679.Kay, Perkin, *J. Chem. Soc.*, 1905, 87, 1071.Goodwin, Perkin, *J. Chem. Soc.*, 1895, 67, 126.Markownikow, Sernow, *J. Russ. Phys.-Chem. Soc.*, 1893, 25, 632.**Hexahydro-*m*-toluic Acid** (1-Methylcyclohexane-3-carboxylic acid, 3-methylhexahydrobenzoic acid).*i.*.

B.p. 245°. D_{20}^{20} 1.007.

Me ester : $C_9H_{16}O_2$. MW, 156. B.p. 196–7°. D_{20}^{20} 0.9584.

Et ester : $C_{10}H_{18}O_2$. MW, 170. B.p. 208–10°.

Amide : $C_8H_{15}ON$. MW, 141. Leaflets from H_2O . M.p. 155–6°.

Nitrile : $C_8H_{13}N$. MW, 123. B.p. 86–7°/16 mm. D_4^{25} 0.887. n_D^{25} 1.449.

d..

B.p. 132–4°/15 mm. D_4^{20} 0.9984. n_D^{20} 1.457. $k = 1.28 \times 10^{-5}$. $[\alpha]_D^{20} + 1.25^\circ$.

Chloride : $C_8H_{13}OCl$. MW, 160.5. B.p. 80–1°/15 mm.

Amide : $C_8H_{15}ON$. MW, 141. Leaflets from MeOH.Aq. M.p. 155–6°.

Gutt, *Ber.*, 1907, 40, 2062.Zelinsky, Gutt, *Ber.*, 1908, 41, 2076.Perkin, Tattersall, *J. Chem. Soc.*, 1905, 87, 1091.Markownikow, Hagemann, *J. Russ. Phys.-Chem. Soc.*, 1893, 25, 638.Mousseron, Granger, *Compt. rend.*, 1939, 208, 1500.**Hexahydro-*p*-toluic Acid** (1-Methylcyclohexane-4-carboxylic acid, 4-methylhexahydrobenzoic acid).

Exists in two forms.

(i) *Solid*.

Leaflets from H_2O . M.p. 112–13°. B.p. 245°, 135°/16 mm. Sol. EtOH, Et_2O , CHCl_3 , pet. ether. Spar. sol. H_2O . $k = 1.11 \times 10^{-5}$.

Me ester: $\text{C}_9\text{H}_{16}\text{O}_2$. MW, 156. B.p. 192–4°. $D_{20}^{25} 0.9532$.

Et ester: $\text{C}_{10}\text{H}_{18}\text{O}_2$. MW, 170. B.p. 207–8°, 71°/2 mm.

p-Bromophenacyl ester: m.p. 135°.

Amide: $\text{C}_8\text{H}_{15}\text{ON}$. MW, 141. Plates from H_2O . M.p. 226° (221°).

Nitrile: $\text{C}_8\text{H}_{13}\text{N}$. MW, 123. B.p. 85–7°/18 mm. $D_4^{25} 0.898$. $n_D^{25} 1.448$.

(ii) *Liquid*.

B.p. 128–30°/13 mm. $D_4^{16} 1.0140$. $n_D^{15} 1.4605$.

Et ester: b.p. 64°/3 mm.

p-Bromophenacyl ester: m.p. 100°.

Amide: needles from H_2O . M.p. 163°.

Einhorn, Willstätter, *Ann.*, 1894, **280**, 157.

Willstätter, Jaquet, *Ber.*, 1918, **51**, 777.

Chou, Perkin, *J. Chem. Soc.*, 1911, **99**, 536.

Wallach, Ritter, *Ann.*, 1911, **381**, 92.

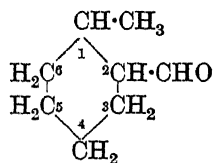
Markownikow, Sserebrajakow, *J. Russ. Phys.-Chem. Soc.*, 1893, **25**, 646.

Cooke, Macbeth, *J. Chem. Soc.*, 1939, 1245.

Delépine, Badoche, *Ann. chim.*, 1942, **17**, 179.

Gutt, *Ber.*, 1907, **40**, 2062.

Hexahydro-*o*-toluic Aldehyde (1-Methyl-2-aldehydocyclohexane, 2-methylhexahydrobenzaldehyde)



$\text{C}_8\text{H}_{14}\text{O}$

MW, 126

Liq. with camphoraceous odour. B.p. 61–2°/15 mm.

Semicarbazone: m.p. 137–8°.

Darzens, Lefébure, *Compt. rend.*, 1906, **142**, 715.

Wallach, Beschke, *Ann.*, 1906, **347**, 339.

Hexahydro-*m*-toluic Aldehyde.

Exists in two inactive and two optically active forms.

(1) B.p. 176–8°, 96–7°/50 mm. $D_0^{20} 0.9091$.

Semicarbazone: needles from EtOH. M.p. 159°.

(2) *Semicarbazone*: m.p. 135°.

(3) B.p. 176°. $D^{25} 0.904$. $n_D^{25} 1.4530$. $[\alpha]_{579} -8.97^\circ$.

(4) B.p. 178°. $D^{25} 0.902$. $n_D^{25} 1.4465$. $[\alpha]_{579} +4.16^\circ$.

Wallach, *Ann.*, 1906, **347**, 343.

Mousseron, Granger, *Compt. rend.*, 1939, **208**, 1500; 1944, **218**, 358.

Hexahydro-*p*-toluic Aldehyde (1-Methyl-4-aldehydocyclohexane, 4-methylhexahydrobenzaldehyde).

B.p. 180°, 64–5°/15 mm.

Semicarbazone: cryst. from H_2O . M.p. 154–6°.

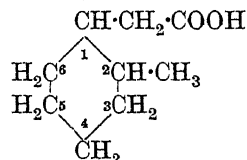
Darzens, Lefébure, *Compt. rend.*, 1906, **142**, 715.

Harding, Haworth, Perkin, *J. Chem. Soc.*, 1908, **93**, 1954.

Hexahydro-toluidine.

See Methylcyclohexylamine.

Hexahydro-*o*-tolylacetic Acid (2-Methylcyclohexylacetic acid)



$\text{C}_9\text{H}_{16}\text{O}_2$

MW, 156

Liq. with odour resembling butyric acid. B.p. 145–7°/13 mm. $D^{25} 1.012$. $n_D^{25} 1.4656$.

Chloride: $D^{25} 1.061$. $n_D^{25} 1.4738$.

Amide: $\text{C}_9\text{H}_{17}\text{ON}$. MW, 155. M.p. 149° (160–1°).

v. Braun, Münch, *Ann.*, 1928, **465**, 66.

Wallach, *Ann.*, 1912, **394**, 384.

Mousseron, Granger, Winternitz, *Compt. rend.*, 1943, **217**, 246.

Hexahydro-*m*-tolylacetic Acid (3-Methylcyclohexylacetic acid).

Active form:

B.p. 148°/18 mm. $D_4^{20} 0.9847$. $n_D^{20} 1.495$. $[\alpha]_D -9^\circ 26'$.

Me ester: $D^{25} 0.9434$. $n_D^{25} 1.4456$. $[\alpha]_{546} -5.21^\circ$.

Et ester: $\text{C}_{11}\text{H}_{20}\text{O}_2$. MW, 184. B.p. 107–10°/18 mm. $D_4^{15} 0.9322$. $n_D^{15} 1.4442$. $[\alpha]_D -7^\circ 25'$.

Inactive form:

B.p. 148°/18 mm. $D_4^{15} 0.9911$. $n_D^{15} 1.4607$. *Et ester*: b.p. 107–10°/18 mm. $D_4^{14} 0.9338$. $n_D^{14} 1.4434$.

Chloride: $\text{C}_9\text{H}_{15}\text{OCl}$. MW, 174.5. B.p. 95–6°/11 mm.

v. Braun, Teuffert, *Ber.*, 1925, **58**, 2210.

Mousseron, Granger, *Compt. rend.*, 1942, **214**, 881.

Hexahydro-*p*-tolylacetic Acid (4-Methylcyclohexylacetic acid).

Plates from aq. formic acid. M.p. 73–4°. Sol. most org. solvents.

Amide: cryst. M.p. 161–2°.

Chloride: b.p. 75°/7 mm.

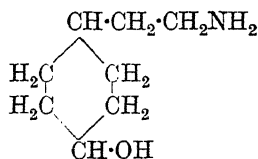
Perkin, Pope, *J. Chem. Soc.*, 1908, 93, 1080.

Wallach, Evans, *Chem. Zentr.*, 1907, II, 54.

Hexahydrotolylcarbinol.

See Methylcyclohexylcarbinol.

Hexahydrotyramine (4-[β -Aminoethyl]cyclohexanol, 4-hydroxyherahydrophenylethylamine, 4-hydroxycyclohexylethylamine)



$C_8H_{17}ON$

MW, 143

Needles. M.p. 44–52°. Sol. H_2O , EtOH, AcOEt. Spar. sol. Et_2O . Insol. pet. ether.

B, HCl : m.p. 160°.

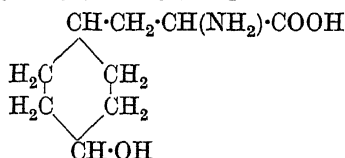
O: N-Di-p-nitrobenzoyl: m.p. 181–2°.

B_2, H_2PtCl_6 : m.p. 204–5°.

Oxalate: m.p. 211°.

Waser, Fauser, *Helv. Chim. Acta*, 1927, 10, 262.

Hexahydrotyrosine (4-Hydroxyhexahydrophenyl- α -alanine, 4-hydroxycyclohexyl- α -alanine, 1-amino-2-[4-hydroxycyclohexyl]-propionic acid)



$C_9H_{17}O_3N$

MW, 187

l.

Needles from H_2O . M.p. 285°. $[\alpha]_{D}^{20} +10.58^\circ$. Does not give Millon test.

Et ester: $C_{11}H_{21}O_3N$. MW, 215. M.p. 99–100°. B.p. 185°/11 mm. $[\alpha]_{D}^{20} -11.76^\circ$.

Hydrochloride: m.p. 201°.

B, HCl : m.p. 238°.

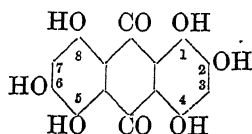
N-p-Nitrobenzoyl: m.p. 225–6°.

Waser, Brauchli, *Helv. Chim. Acta*, 1924, 7, 747.

1:2:3:5:6:7-Hexahydroxyanthraquinone.

See Rufigallic Acid.

1:2:4:5:6:8-Hexahydroxyanthraquinone



$C_{14}H_8O_8$

MW, 304

Dark green cryst. from AcOH. Sol. dil. alkalis to bluish-red sols. Conc. $H_2SO_4 \rightarrow$ bluish-violet sol.

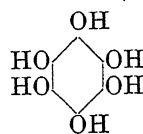
Bayer, D.R.P.s 65,453, 81,959, 86,969.

1:2:4:5:7:8-Hexahydroxyanthraquinone (Alizarinhexacyanin).

Cryst. from EtOH. Violet-blue sol. in Na_2CO_3 . Aq.; greenish-blue in $NaOH$. Aq.; blue in conc. H_2SO_4 . Ox. \rightarrow 2:5:7:8-tetrahydroxyanthradiquinone-1:4:9:10.

Bayer, D.R.P.s., 66,153, 68,114, 69,842.

Hexahydroxybenzene (Hexaphenol)



$C_6H_6O_6$

MW, 174

Needles from H_2O . Turns dark grey at 200°. Does not melt. Spar. sol. H_2O , EtOH, Et_2O , C_6H_6 . Sols. turn reddish-violet in air. Reduces $AgNO_3$. Ox. \rightarrow tetrahydroxy-p-benzoquinone. Zn dist. \rightarrow benzene + diphenyl. $FeCl_3 \rightarrow$ violet col.

Hexa-acetyl: prisms from AcOH. M.p. 203°. Insol. EtOH, Et_2O , C_6H_6 .

Hexabenzoyl: m.p. 313°.

Hexa-p-chlorobenzoyl: m.p. 328° decomp.

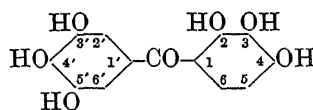
Wieland, Wishart, *Ber.*, 1914, 47, 2084.

Nietzki, Benckiser, *Ber.*, 1885, 18, 505.

Jackson, Grindley, *Am. Chem. J.*, 1895, 17, 648.

Neifert, Bartow, *J. Am. Chem. Soc.*, 1943, 65, 1770.

2:3:4:3':4':5'-Hexahydroxybenzophenone (4-Galloylpyrogallol)



$C_{13}H_{10}O_7$

MW, 278

Yellowish needles from H_2O . M.p. 272–3°.

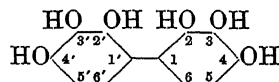
Hexa-acetyl: m.p. 132°.

Bleuler, Perkin, *J. Chem. Soc.*, 1916, 109, 541.

Hexahydroxycyclohexane.

See Inositol.

2:3:4:2':3':4'-Hexahydroxydiphenyl



$C_{12}H_{10}O_6$

MW, 250

Needles from H_2O . Darkens at 250°. M.p. above 250°. Sol. hot H_2O , hot EtOH. Spar.

sol. cold H_2O , EtOH , Et_2O , CHCl_3 , CS_2 , C_6H_6 .
 $\text{Zn} + \text{H}_2 \rightarrow$ diphenyl.

Hexa-Me ether: $\text{C}_{18}\text{H}_{22}\text{O}_6$. MW, 334. M.p. 123°.

Barth, Goldschmidt, *Ber.*, 1879, 12, 1244.

2 : 4 : 5 : 2' : 4' : 5'-Hexahydroxydiphenyl.

Free phenol not isolated.

Hexa-Me ether: needles from EtOH or AcOH . M.p. 180°. Sol. CHCl_3 . Spar. sol. EtOH , AcOH , C_6H_6 . Insol. H_2O . $\text{HI} \rightarrow$ 2 : 3 : 6 : 7-tetrahydroxydiphenylene oxide.

Fabinyi, Széki, *Ber.*, 1910, 43, 2682.

3 : 4 : 5 : 3' : 4' : 5'-Hexahydroxydiphenyl.

Cryst. from H_2O . M.p. above 300°. Sol. EtOH . Mod. sol. H_2O . Spar. sol. Et_2O , C_6H_6 .
 $\text{Zn} + \text{H}_2 \rightarrow$ diphenyl.

Hexa-Me ether: needles from EtOH . M.p. 126°. Sol. EtOH , AcOH .

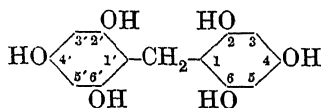
3 : 5 : 3' : 5'-*Tetra-Me ether*: $\text{C}_{16}\text{H}_{18}\text{O}_6$. MW, 306. M.p. about 190°. Spar. sol. H_2O , Et_2O .

Hexa-acetyl: needles from AcOH . M.p. 236°.

Liebermann, *Ann.*, 1873, 169, 241.

Liebermann, Herrmuth, *Ber.*, 1912, 45, 1221.

2 : 4 : 6 : 2' : 4' : 6'-Hexahydroxydiphenylmethane



$\text{C}_{13}\text{H}_{12}\text{O}_6$ MW, 264

M.p. 225° decomp. Sol. EtOH , Et_2O , AcOH .
 Prac. insol. H_2O , C_6H_6 .

Boehm, *Ann.*, 1903, 329, 269.

3 : 4 : 5 : 3' : 4' : 5'-Hexahydroxydiphenylmethane.

M.p. 241° decomp. Sol. EtOH . Insol. H_2O .

Kahl, *Ber.*, 1898, 31, 144.

Caro, *Ber.*, 1892, 25, 947.

Hexahydroxyditolyl.

See Leucophenicin.

3 : 5 : 6 : 7 : 3' : 4'-Hexahydroxyflavone.

See Quercetagenin.

3 : 5 : 7 : 8 : 3' : 4'-Hexahydroxyflavone.

See Gossypetin.

3 : 5 : 7 : 3' : 4' : 5'-Hexahydroxyflavone.

See Myricetin.

Hexahydroxyisoflavone.

See Iridenol.

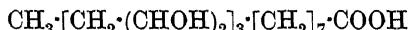
Hexahydro-xylene.

See Dimethylcyclohexane.

Hexahydro-xyleneol.

See Dimethylcyclohexanol.

8 : 9 : 11 : 12 : 14 : 15-Hexahydroxystearic Acid



$\text{C}_{18}\text{H}_{36}\text{O}_8$ MW, 380

Exists in two forms sometimes termed linusinic acid and isolinusinic acids. Both on ox. \rightarrow

azelaic acid and propionic acid. $\text{NaOH.Aq.} + \text{KClO}_3 \rightarrow$ acetic, propionic and azelaic acids.

Linusinic acid (*linusic acid*): needles from H_2O . M.p. 203°. Sol. hot H_2O , EtOH .

Isolinusinic acid (*isolinusic acid*): needles. M.p. 173°. Sol. hot H_2O . Spar. sol. EtOH , cold H_2O . Insol. Et_2O , CHCl_3 , CS_2 , C_6H_6 .

Bauer, *Chem. Umschau.*, 1924, 31, 33.

Hazura, Friedrich, *Monatsh.*, 1888, 9, 181.

Rollet, *Z. physiol. Chem.*, 1909, 62, 430.

Goldsohel, *Chem. Zentr.*, 1910, I, 1231.

Hexaiodoacetone (*Hexaiodopropanone, periodoacetone*)

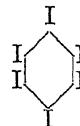


C_3OI_6 MW, 814

Bright yellow cryst. powder. M.p. 78°. $\text{H}_2\text{O} \rightarrow$ penta- and tetra-iodoacetones. Decomp. in most solvents. $\text{NaOH.Aq.} \rightarrow$ iodoform.

Lederer, D.R.P., 95,440.

Hexaiodobenzene



C_6I_6 MW, 834

Reddish-brown needles from boiling PhNO_2 . M.p. 350°. Insol. usual solvents.

Durand, Mancet, *Bull. soc. chim.*, 1935, [5], 2, 665.

Hexalin.

See Cyclohexanol.

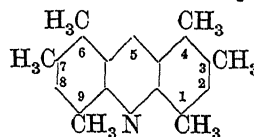
5 : 6 : 7 : 8 : 3' : 4'-Hexamethoxyflavone.

See Nobiletin.

Hexamethylacetone.

See Pivalone.

1 : 3 : 4 : 6 : 7 : 9-Hexamethylacridine



$\text{C}_{19}\text{H}_{21}\text{N}$ MW, 263

Yellow needles from EtOH , Me_2CO or ligroin. M.p. 221-2°. Sol. CHCl_3 , ligroin. Spar. sol. EtOH , Et_2O . Insol. H_2O . Sublimes. Sols. show green fluorescence. Conc. $\text{HNO}_3 \rightarrow$ di-nitro deriv.

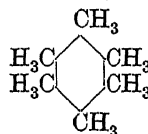
B.HCl: red cryst. Decomp. on heating.

B.HNO_3: m.p. 163-4° decomp.

Picrate: m.p. 200-2°.

Senier, Compton, *J. Chem. Soc.*, 1907, 91, 1934.

Hexamethylbenzene (*Mellitene, mellitene*)



$\text{C}_{12}\text{H}_{18}$

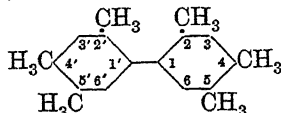
MW, 162

Needles from EtOH. M.p. 164°. B.p. 264°. Very sol. hot EtOH, C₆H₆. Sol. EtOH. Heat of comb. C₆ 1709.6 Cal. Crit. temp. 478°. Ox. → mellitic acid. HI → mesitylene + methane.

Picrate : m.p. 170°.

Smith, *Organic Syntheses*, 1930, X, 32.
Reckleben, Scheiber, *Ber.*, 1913, 46, 2363.
Cullinane, Chard, *J. Chem. Soc.*, 1945, 821.

2 : 4 : 5 : 2' : 4' : 5' - Hexamethyldiphenyl
(*Di-ψ-cumyl*)



C₁₈H₂₂ MW, 238

Plates from EtOH. M.p. 52°. B.p. 320°/738 mm. Sol. C₆H₆. Spar. sol. EtOH.

Ullmann, Meyer, *Ann.*, 1904, 332, 47.

2 : 4 : 6 : 2' : 4' : 6' - Hexamethyldiphenyl
(*Dimesityl*).

Cryst. from EtOH. M.p. 100.5°. B.p. 296°/735 mm. Sol. Et₂O, C₆H₆. Spar. sol. EtOH. HNO₃ → tetranitro deriv. Br → 3 : 3'-dibromo deriv.

Ullmann, Meyer, *Ann.*, 1904, 332, 48.
Moyer, Adams, *J. Am. Chem. Soc.*, 1929, 51, 632.

3 : 4 : 5 : 3' : 4' : 5' - Hexamethyldiphenyl
(*Dihemimellityl*).

Cryst. from EtOH.Aq. M.p. 132-3°.

Liebermann, Kardos, *Ber.*, 1913, 46, 210.

Hexamethyldipyridyl.

See Dicollidyl.

Hexamethylene.

See Cyclohexane.

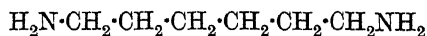
Hexamethylene bromide.

See 1 : 6-Dibromohexane.

Hexamethylene chloride.

See 1 : 6-Dichlorohexane.

Hexamethylenediamine (1 : 6-Diaminohexane)



C₆H₁₆N₂ MW, 116

Leaflets. M.p. 42° (39-40°). Sublimes in long needles. B.p. 204-5°, 100°/20 mm. Sol. H₂O, EtOH, C₆H₆.

N : N'-Dibenzoyl : m.p. 155°.

Di-Et urethane : m.p. 84°.

B, 2HCl : m.p. 248°.

B, 2(COOH)₂ : m.p. 168°.

Di-benzenesulphonyl : m.p. 154°.

B, H₂PtCl₆ : m.p. 200° decomp.

Picrate : m.p. 220°.

Curtius, Clemm, *J. prakt. Chem.*, 1900, 62, 194; *Ber.*, 1896, 29, 1167.

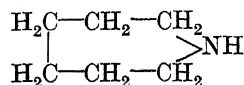
v. Braun, Müller, *Ber.*, 1905, 38, 2204.

Mokudai, *Chemical Reviews (Japan)*, 1941, 7, 194.

Hexamethylene Glycol.

See Hexandiol-1 : 6.

Hexamethyleneimine



C₆H₁₃N MW, 99

B.p. 138° (126-7°, 140°). Part. misc. with H₂O. D₄²⁰ 0.8643. n_D²⁰ 1.457.

N-Acetyl : b.p. 239-41°.

N-Benzoyl : m.p. 36°.

B, HCl : m.p. 222°.

B, H₂AuCl₄ : m.p. 206°.

B₂, H₂PtCl₆ : m.p. 197° (203°).

Picrate : m.p. 146°.

Müller, Sauerwald, *Monatsh.*, 1927, 48, 727.

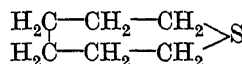
v. Braun, Goll, *Ber.*, 1927, 60, 1533.

Schmidt, *Ber.*, 1922, 55, 1584.

Hexamethylene iodide.

See 1 : 6-Di-iodo-*n*-hexane.

Hexamethylene sulphide



C₆H₁₂S MW, 116

Colourless mobile liq. B.p. 169-71°/747 mm. D₄¹⁸ 0.9743. n_D¹⁸ 1.5044. KMnO₄ → sulphone, m.p. 71°. Forms add. comp. with 1 mol. HgCl₂, m.p. 149°.

Methiodide : colourless prisms. M.p. 137.5-138.5°.

Grischkevitch-Trochimovskii, *J. Russ.*

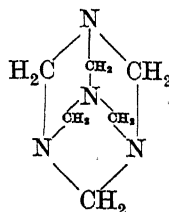
Phys.-Chem. Soc., 1916, 48, 944.

v. Braun, *Ber.*, 1910, 43, 3224.

Hexamethylene sulphone.

See under Hexamethylene sulphide.

Hexamethylenetetramine (*Aminoform*, *Formin*, *Hexa*, *Hexamine*, *Urotropine*)



C₆H₁₂N₄ MW, 140

Rhombohedral cryst. from EtOH. Sol. H₂O, EtOH, CHCl₃. Less sol. warm H₂O than cold. Insol. Et₂O. Volatilises on heating with part. decomp. Sublimes in vacuo. Heat of comb. C₆ 1005.85 Cal. Dil. acids → formaldehyde +

NH_3 . $\text{HNO}_2 + \text{HCl} \rightarrow$ trimethylenetrinitrosamine (m.p. 106°) and dinitrosopentamethylene-tetramine. $\text{HNO}_2 + \text{AcOH} \rightarrow$ formaldehyde + methylamine + NH_3 . 96% HNO_3 at $0^\circ \rightarrow$ trimethylenetrinitroamine (hexogen *q.v.*). $\text{H}_2\text{S} \rightarrow$ thioformaldehyde. $\text{Br} \rightarrow$ tetrabromide, which loses Br_2 to give a dibromide m.p. $196-200^\circ$ decomp. $\text{Zn} + \text{HCl} \rightarrow$ mainly NH_3 + trimethylamine. Stable to hot alkalis. Forms compounds with acids and metallic salts. Pptd. quantitatively by HgCl_2 . Used as urinary antiseptic, rubber vulcanisation accelerator, and for microscopic test for Au and Hg. Citrate (Helmitol, Formamol), camphorate (Amphotropin) and other salts are used in medicine.

$\text{B}_2\text{H}_6\text{O}$: m.p. 15° (13.5°) decomp.

$\text{B}_2\text{H}_6\text{SO}_4 \cdot \text{H}_2\text{O}$: m.p. 108° .

$\text{B}_2\text{H}_6\text{I}$: m.p. $170-1^\circ$.

Methiodide: needles from EtOH. M.p. 190° (204°) decomp. Sol. H_2O , EtOH. Insol. Et_2O , CHCl_3 .

Picrate: m.p. 179° decomp.

Butlerow, *Ann.*, 1860, **115**, 322.

Wohl, *Ber.*, 1886, **19**, 1842.

Höland, *Ann.*, 1887, **240**, 225.

Grassi-Cristaldi, Motta, *Gazz. chim. ital.*, 1899, **29**, 43.

Chemnitius, *Chem.-Ztg.*, 1928, **52**, 735.

Kolosov, *Norosti Tekhniki*, 1936, **40-41**, 42, (*Chem. Abstracts*, 1937, **31**, 3002).

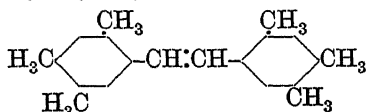
Hexamethylethane.

See 2 : 2 : 3 : 3-Tetramethylbutane.

Hexamethylhydrobenzoin.

See Hydromesitoin.

2 : 4 : 5 : 2' : 4' : 5' - Hexamethylstilbene
(*Di-ψ-cumylethylene*)



$\text{C}_{20}\text{H}_{24}$ MW, 264

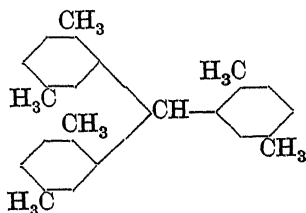
Cryst. from EtOH. M.p. 161° . Mod. sol. CHCl_3 , CS_2 , C_6H_6 . Prac. insol. ligroin. Shows violet fluorescence.

Picrate: $\text{C}_{20}\text{H}_{24}$, $2\text{C}_6\text{H}_3\text{O}_7\text{N}_3$, C_6H_6 . Cryst. from C_6H_6 . M.p. 123° .

$\text{C}_{20}\text{H}_{24} \cdot \text{C}_6\text{H}_3(\text{NO}_2)_3$ 1 : 3 : 5 : prisms from AcOH. M.p. $145-7^\circ$.

Elbs, *J. prakt. Chem.*, 1893, **47**, 51.

2 : 5 : 2' : 5' : 2'' : 5'' - Hexamethyltriphenylmethane



$\text{C}_{25}\text{H}_{28}$ MW, 328

Cryst. from EtOH. M.p. 188° . Sol. Et_2O , C_6H_6 . Mod. sol. EtOH.

Elbs, *J. prakt. Chem.*, 1887, **35**, 484.

Hexamine.

See Hexamethylenetetramine.

Hexanal.

See Caproic Aldehyde.

Hexandial-1 : 6.

See Adipic-dialdehyde.

Hexandiol-1 : 2 (1 : 2-Dihydroxyhexane, butylene glycol, 1-hexene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

d.-

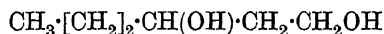
B.p. $110-13^\circ/6$ mm. $[\alpha]_D^{25} + 15.2^\circ$.

Di-1-naphthylcarbamate: m.p. $172-4^\circ$.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, **40**, 834.

Levene, Haller, *J. Biol. Chem.*, 1928, **79**, 483.

Hexandiol-1 : 3 (1 : 3-Dihydroxyhexane, 1-n-propyltrimethyleneglycol)



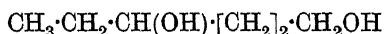
$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. $123^\circ/13$ mm. D_4^{25} 0.958. n_D^{25} 1.4461.

Diphenylurethane: m.p. 99.3° .

Glacet, *Compt. rend.*, 1944, **218**, 283.

Hexandiol-1 : 4 (1 : 4-Dihydroxyhexane, 1-ethyltetramethylene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

Not solid at -20° . B.p. $134-5^\circ/18.5$ mm. $D_4^{16.3}$ 0.982. $n_D^{16.3}$ 1.4530. Sol. H_2O , EtOH, Et_2O . Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ 2-ethyltetrahydrofuran.

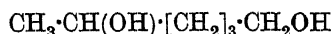
Diacetyl: b.p. $120^\circ/12$ mm. $D_4^{16.5}$ 1.007. $n_D^{16.5}$ 1.4282.

Diphenylurethane: m.p. 71° .

Wohlgemuth, *Compt. rend.*, 1914, **159**, 80.

Glacet, *Compt. rend.*, 1944, **218**, 283.

Hexandiol-1 : 5 (1 : 5-Dihydroxyhexane, 1-methylpentamethylene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. $234-5^\circ/710$ mm., $140-1^\circ/17$ mm., $89-91^\circ/0.5$ mm. D_4^0 0.9809. 60% $\text{H}_2\text{SO}_4 \rightarrow$ 2-methylpentamethylene oxide. $\text{HBr} \rightarrow$ 1 : 5-dibromohexane.

Lipp, *Ber.*, 1885, **18**, 3282.

Perkin, *J. Chem. Soc.*, 1887, **51**, 722.

Hill, Adkins, *J. Am. Chem. Soc.*, 1938, **60**, 1033.

Hexandiol-1 : 6 (1:6-Dihydroxyhexane, hexamethylene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

Needles from H_2O . M.p. 42° (40°). B.p. 250° , $152^\circ/17$ mm., $151^\circ/12$ mm. Sol. H_2O , EtOH. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ hexamethylene oxide.

Mono-Me ether: $\text{C}_7\text{H}_{16}\text{O}_2$. MW, 132. B.p. $123^\circ/31$ mm.

Di-Me ether: 1 : 6-dimethoxyhexane. $\text{C}_8\text{H}_{18}\text{O}_2$. MW, 146. B.p. 180° .

Di-Et ether: 1 : 6-diethoxyhexane. $\text{C}_{10}\text{H}_{22}\text{O}_2$. MW, 174. B.p. 208° .

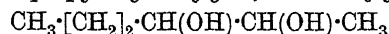
Haworth, Perkin, *J. Chem. Soc.*, 1894, 65, 598.

Hamonet, *Bull. soc. chim.*, 1905, 33, 538.

Lespieau, *Ann. chim.*, 1912, 27, 176.

Lazier, Hill, Amend, *Organic Syntheses*, 1939, XIX, 48.

Hexandiol-2 : 3 (2 : 3-Dihydroxyhexane, 1-methyl-2-propylethylene glycol, 2-hexene glycol)



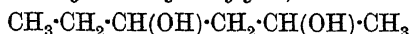
$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. 207° ($204-6^\circ$). D_4^{20} 0.9669. Sol. H_2O . $\text{CrO}_3 \rightarrow$ butyric acid, acetic acid and CO_2 .

Hecht, Munier, *Ber.*, 1878, 11, 1154.

Eltekow, *Journal of the Russian Chemical Society*, 1882, 1, 355.

Hexandiol-2 : 4 (2 : 4-Dihydroxyhexane, 1-methyl-3-ethyltrimethylene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. 206° slight decomp., $210-11^\circ/750$ mm., $104.5-105.5^\circ/9$ mm. D_4^{21} 0.9516. n_D^{21} 1.4418. PBr_3 in Py at $140^\circ \rightarrow$ 2 : 4-dibromohexane.

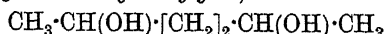
Diacetyl: b.p. $211^\circ/750$ mm. part. decomp., $101-2^\circ/13$ mm.

Diphenylcarbamate: m.p. 144° .

Franke, Kohn, *Monatsh.*, 1906, 27, 1111.

Lespieau, Wakeman, *Bull. soc. chim.*, 1932, 51, 389.

Hexandiol-2 : 5 (2 : 5-Dihydroxyhexane, 1 : 4-dimethyltetramethylene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

Exists in two forms.

(i) Solid.

M.p. $43-4^\circ$.

(ii) Liquid.

B.p. $212-15^\circ$, $216-18^\circ/750$ mm., $219-20^\circ/745$ mm., $120-2^\circ/12$ mm., $85-7^\circ/1$ mm. Sol. H_2O , EtOH, Et_2O . D_4^{20} 0.9610, D_4^{24} 0.9605, D_4^{20} 0.9638 (0.9759). n_D^{20} 1.4475. Dil. $\text{H}_2\text{SO}_4 \rightarrow$ 2 : 5-dimethyltetrahydrofuran. $\text{CrO}_3 \rightarrow$ acetic acid + CO_2 . $\text{HBr} \rightarrow$ 2 : 5-dibromohexane.

Diacetyl: b.p. 230° .

Wurtz, *Ann. chim.*, 1864, 3, 166.

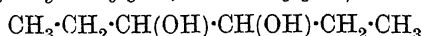
Sorokin, *J. prakt. Chem.*, 1881, 23, 18.

Duden, Lemme, *Ber.*, 1902, 35, 1335.

Dupont, *Ann. chim.*, 1913, 30, 526.

Hill, Adkins, *J. Am. Chem. Soc.*, 1938, 60, 1033.

Hexandiol-3 : 4 (3 : 4-Dihydroxyhexane, sym.-diethylethylene glycol, 3-hexene glycol)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

Exists in three forms.

(i) M.p. above -20° . B.p. $87-8^\circ/15$ mm.

(ii) M.p. 88° . B.p. $90-1^\circ/15$ mm.

(iii) *Meso form*: m.p. 88° . B.p. $91^\circ/20$ mm.

Sol. H_2O , EtOH, Et_2O , C_6H_6 , etc. $\text{CrO}_3 \rightarrow$ propionic acid. Br water \rightarrow dipropionyl.

Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2946.

Kuhn, Rebel, *Ber.*, 1927, 60, 1570.

Hexandione-2 : 3.

See Acetylbutyryl.

Hexandione-2 : 4.

See Propionylacetone.

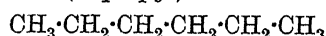
Hexandione-2 : 5.

See Acetonylacetone.

Hexandione-3 : 4.

See Dipropionyl.

n-Hexane (*Dipropyl*)



C_6H_{14} MW, 86

Occurs in petroleum. F.p. -93.5° (-95.4°). B.p. 68.95° , $68.4-68.8^\circ/744$ mm. D_4^{20} 0.67703, D_4^{20} 0.6603 (0.65945), D_4^{25} 0.65502. n_D^{20} 1.37506, n_D^{25} 1.37230. Heat of comb. C_p 991.2 Cal., C_p 989.2 (997.8) Cal. $\text{Cl} \rightarrow$ 1-, 2-, and 3-chlorohexanes. $\text{Br} \rightarrow$ 1-, 2-, and 3-bromohexanes. $\text{Br} (+\text{Fe}) \rightarrow$ 1 : 2 : 3 : 4 : 5 : 6-hexabromohexane. Dil. $\text{HNO}_3 \rightarrow$ 2-nitrohexane.

Michael, *Am. Chem. J.*, 1901, 25, 421.

Failliebin, *Bull. soc. chim.*, 1924, 35, 160.

Corson, B.P. 279,095, (*Chem. Abstracts*, 1928, 22, 2755).

Shepard, Henne, Midgley, *J. Am. Chem. Soc.*, 1931, 53, 1948.

Hexane-1-carboxylic Acid.

See n-Heptylic Acid.

Hexane-2-carboxylic Acid.

See 1-Methylcaproic Acid.

Hexane-3-carboxylic Acid.

See 1-Ethyl-n-valeric Acid.

Hexane-1 : 1-dicarboxylic Acid.

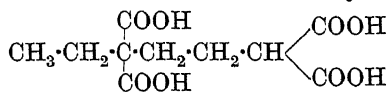
See n-Amylmalonic Acid.

Hexane-1 : 2-dicarboxylic Acid.

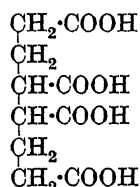
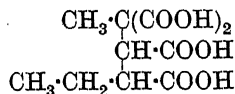
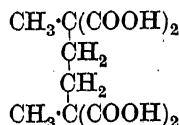
See n-Butylsuccinic Acid.

Hexane-1 : 3-dicarboxylic Acid.

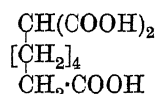
See 1-Propylglutaric Acid.

Hexane-1 : 4-dicarboxylic Acid.*See* 1-Ethyladipic Acid.**Hexane-1 : 5-dicarboxylic Acid.***See* 1-Methylpimelic Acid.**Hexane-1 : 6-dicarboxylic Acid.***See* Suberic Acid.**Hexane-2 : 2-dicarboxylic Acid.***See* Methylbutylmalonic Acid.**Hexane-2 : 3-dicarboxylic Acid.***See* 1-Methyl-2-propylsuccinic Acid.**Hexane-2 : 4-dicarboxylic Acid.***See* 1-Methyl-3-ethylglutaric Acid.**Hexane-2 : 5-dicarboxylic Acid.***See* 1 : 4-Dimethyladipic Acid.**Hexane-3 : 3-dicarboxylic Acid.***See* Ethylpropylmalonic Acid.**Hexane-3 : 4-dicarboxylic Acid.***See* 1 : 2-Diethylsuccinic Acid.**Hexane-1 : 1 : 4 : 4-tetracarboxylic Acid** $\text{C}_{10}\text{H}_{14}\text{O}_8$ MW, 262

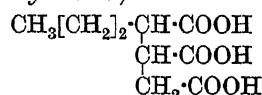
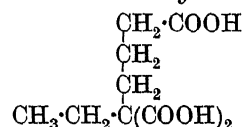
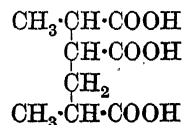
M.p. 76-7°.

Meinke, Cox, McElvain, *J. Am. Chem. Soc.*, 1935, 57, 1133.**Hexane-1 : 3 : 4 : 6-tetracarboxylic Acid** $\text{C}_{10}\text{H}_{14}\text{O}_8$ MW, 262Prisms from $\text{Me}_2\text{CO}-\text{C}_6\text{H}_6$. M.p. 215° decomp. Sol. H_2O , EtOH , Et_2O , C_6H_6 .*Di-Me ester*: $\text{C}_{12}\text{H}_{18}\text{O}_8$. MW, 290. M.p. 133°.Silberrad, *J. Chem. Soc.*, 1904, 85, 614.Sell, Jackson, *J. Chem. Soc.*, 1899, 75, 515.**Hexane-2 : 2 : 3 : 4-tetracarboxylic Acid** $\text{C}_{10}\text{H}_{14}\text{O}_8$ MW, 262Cryst. from Me_2CO -ligroin. M.p. 170°.Michael, Ross, *J. Am. Chem. Soc.*, 1931, 53, 1164.**Hexane-2 : 2 : 5 : 5-tetracarboxylic Acid** $\text{C}_{10}\text{H}_{14}\text{O}_8$ MW, 262

Dict. of Org. Comp.—II.

Needles from H_2O . M.p. 200° (rapid heat.), 170° (slow heat.), decomp. Sol. H_2O , EtOH , Et_2O . Insol. C_6H_6 , ligroin. Heat \rightarrow 1 : 4-dimethyladipic acid.*Tetra-Et ester*: $\text{C}_{18}\text{H}_{30}\text{O}_8$. MW, 374. Cryst. from EtOH .Aq. or ligroin. M.p. 53.5°.Kitzing, *Ber.*, 1894, 27, 1578.Lean, *J. Chem. Soc.*, 1894, 65, 1004.Noyes, Kyriakides, *J. Am. Chem. Soc.*, 1910, 32, 1059.**Hexanetetrol.***See* Tetrahydroxyhexane.**Hexane-1 : 1 : 6-tricarboxylic Acid** $\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218

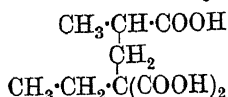
M.p. 95-8°.

Tri-Et ester: $\text{C}_{15}\text{H}_{26}\text{O}_6$. MW, 302. B.p. 167-70°/1-2 mm.Wood, du Vigneaud, *J. Am. Chem. Soc.*, 1945, 67, 210.**Hexane-1 : 2 : 3-tricarboxylic Acid (1-Propyltricarballic acid)** $\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218Laminæ + H_2O from H_2O . M.p. 151-2° (anhyd.). Sol. H_2O , EtOH , Et_2O . Insol. C_6H_6 , ligroin. $k = 3.1 \times 10^{-4}$ at 25°.Auwers, Köbner, v. Meyenburg, *Ber.*, 1891, 24, 2898.**Hexane-1 : 4 : 4-tricarboxylic Acid (1-Ethylbutane-1 : 1 : 4-tricarboxylic acid)** $\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218M.p. 155-8° decomp. (evolution of CO_2).*Tri-Et ester*: $\text{C}_{15}\text{H}_{26}\text{O}_6$. MW, 302. B.p. 205-8°/35 mm., 180-3°/28 mm. D_4^{25} 1.0888. n_D^{25} 1.4379.Lean, Lees, *J. Chem. Soc.*, 1897, 71, 1065.Mellor, *J. Chem. Soc.*, 1901, 79, 131.Meinke, McElvain, *J. Am. Chem. Soc.*, 1935, 57, 1443.**Hexane-2 : 3 : 5-tricarboxylic Acid (1 : 4-Dimethylbutane-1 : 2 : 4-tricarboxylic acid)** $\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218

Cryst. from CHCl_3 -ligroin. M.p. 107° . Sol. H_2O , EtOH , Et_2O . $k = 1.61 \times 10^{-4}$ at 25° .

Henstock, Sprankling, *J. Chem. Soc.*, 1907, 91, 357.

Hexane-2:4:4-tricarboxylic Acid



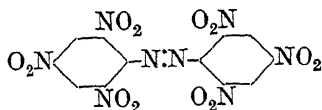
$\text{C}_9\text{H}_{14}\text{O}_6$ MW, 218

M.p. 166.5° decomp. Sol. H_2O , EtOH , Et_2O . Me_2CO , C_6H_6 , AcOH . Prac. insol. CS_2 , ligroin, $k = 9.7 \times 10^{-3}$ at 25° . Heat \rightarrow 1-methyl-3-ethylglutaric acid.

Tri-Et ester: $\text{C}_{15}\text{H}_{26}\text{O}_6$. MW, 302. B.p. 294.3° . D_4^{20} 1.0435. n_D^{20} 1.4372.

Bischoff, *Ber.*, 1891, 24, 1053.

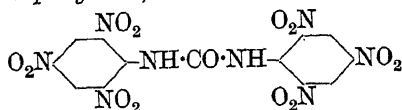
2:4:6:2':4':6'-Hexanitroazobenzene



$\text{C}_{12}\text{H}_4\text{O}_{12}\text{N}_8$ MW, 452

Red prisms from AcOH or PhNO_2 . M.p. $215-16^\circ$. Spar. sol. EtOH , Et_2O , C_6H_6 .

Grandmougin, Leemann, *Ber.*, 1906, 39, 4385; *Ber.*, 1908, 41, 1297.

2:4:6:2':4':6'-Hexanitrocarbanilide
(2:4:6:2':4':6'-Hexanitro-sym.-diphenylurea,
 N:N' -dipicrylurea)

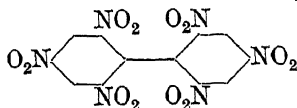
$\text{C}_{13}\text{H}_6\text{O}_{13}\text{N}_8$ MW, 482

Prisms. M.p. 203° ($206-9^\circ$). Sol. hot PhNO_2 .

Reudler, *Rec. trav. chim.*, 1914, 33, 59, 63.

Perkin, *J. Chem. Soc.*, 1893, 63, 1068.

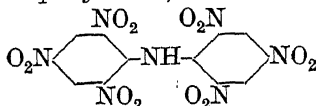
2:4:6:2':4':6'-Hexanitrodiphenyl



$\text{C}_{12}\text{H}_4\text{O}_{12}\text{N}_6$ MW, 424

M.p. 238° . Spar. sol. C_6H_6 . Insol. EtOH , Et_2O . Separates in brown cryst. + $\frac{1}{2}\text{C}_6\text{H}_5\text{CH}_3$ from toluene.

Ullmann, Bielecki, *Ber.*, 1901, 34, 2179.

2:4:6:2':4':6'-Hexanitrodiphenyl -
amine (p-Dipicrylamine)

$\text{C}_{12}\text{H}_5\text{O}_{12}\text{N}_7$ MW, 439

Yellow prisms from AcOH . M.p. 242° decomp. Insol. H_2O , Et_2O , and most org.

solvents. Reacts acid. Ammonium salt is dyestuff *Aurantia*, used in light filters and microscopic stains. Explosive, used in torpedoes. Very poisonous.

N-Acetyl: yellow cryst. M.p. 240° decomp.

N-Me: methyldipicrylamine. $\text{C}_{13}\text{H}_7\text{O}_{12}\text{N}_7$. MW, 453. Yellow cryst. from EtOH . M.p. $236-7^\circ$. Sol. AcOH , Me_2CO . Spar. sol. EtOH , Et_2O . Insol. H_2O . See ref.* below.

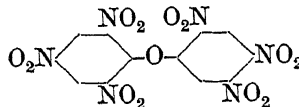
N-Et: ethyldipicrylamine. $\text{C}_{14}\text{H}_9\text{O}_{12}\text{N}_7$. MW, 467. Needles. M.p. $201-2^\circ$. Sol. AcOEt , Me_2CO . Spar. sol. EtOH , C_6H_6 , CHCl_3 , ligroin. See ref.* below.

Gnehm, *Ber.*, 1874, 7, 1399.

Hoffman, Dame, *J. Am. Chem. Soc.*, 1919, 41, 1013.

Marshall, U.S.P., 1,326,947, (*Chem. Abstracts*, 1920, 14, 633).

* Mulder, *Rec. trav. chim.*, 1906, 25, 121-2. Vanino, *Präparativen Chemie*, II, 456.

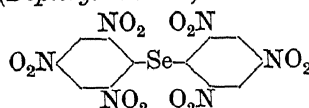
2:4:5:2':4':6'-Hexanitrodiphenyl
Ether

$\text{C}_{12}\text{H}_4\text{O}_{13}\text{N}_6$ MW, 440

Needles from AcOH . M.p. 269° . Sol. AcOH , PhNO_2 . Spar. sol. EtOH , Et_2O . Insol. H_2O .

Westfälisch-Anhaltische Sprengstoffaktiengesellschaft, D.R.P., 231,053, (*Chem. Zentr.*, 1915, I, 74).

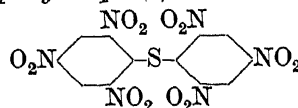
van Duin, van Lennep, *Rec. trav. chim.*, 1920, 39, 154.

2:4:6:2':4':6'-Hexanitrodiphenyl
selenide (Dipicryl selenide)

$\text{C}_{12}\text{H}_4\text{O}_{12}\text{N}_6\text{Se}$ MW, 503

M.p. above 240° decomp. Sol. AcOH , AcOEt . Spar. sol. EtOH . Explosive.

Twiss, *J. Chem. Soc.*, 1914, 105, 1676.

2:4:6:2':4':6'-Hexanitrodiphenyl sul-
phide (Dipicryl sulphide)

$\text{C}_{12}\text{H}_4\text{O}_{12}\text{N}_6\text{S}$ MW, 456

Yellow cryst. M.p. $230-1^\circ$ (226°). Deflagrates at 290° . Sol. Me_2CO . Spar. sol. EtOH , Et_2O , CHCl_3 . Insol. H_2O . Explosive.

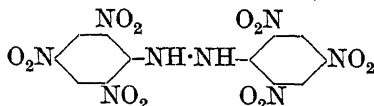
Twiss, *J. Chem. Soc.*, 1914, 105, 1675; D.R.P., 275,037, (*Chem. Zentr.*, 1914, II, 97).

van Duin, van Lennep, *Rec. trav. chim.*, 1920, 39, 157.

Hexanitrodioresorcinol.

See 2:4:6:2':4':6'-Hexanitro-3:5:3':5'-tetrahydroxydiphenyl.

2:4:6:2':4':6'-Hexanitrohydrazobenzene (N:N'-Dipicrylhydrazine)

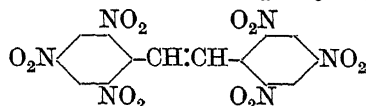


$C_{12}H_6O_{12}N_8$ MW, 454

Yellow needles from AcOH. M.p. 201-2°. Sol. EtOH, AcOH, AcOEt. Spar. sol. Et₂O, C₆H₆, ligroin. $HNO_3 \rightarrow 2:4:6:2':4':6'$ -hexanitroazobenzene.

Leemann, Grandmougin, *Ber.*, 1908, 41, 1296.

2:4:6:2':4':6'-Hexanitrostilbene (2:4:6:2':4':6'-Hexanitrodiphenylethylene)

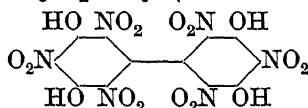


$C_{14}H_6O_{12}N_6$ MW, 450

Yellow needles from PhNO₂. M.p. 211° decomp. Spar. sol. Me₂CO. Insol. EtOH, Et₂O, ligroin.

Reich, Wetter, Widmer, *Ber.*, 1912, 45, 3060.

2:4:6:2':4':6'-Hexanitro-3:5:3':5'-tetrahydroxydiphenyl (Hexanitrodioresorcinol)

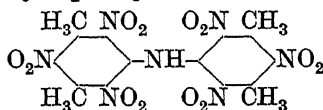


$C_{12}H_4O_{16}N_6$ MW, 488

Deflagrates at 245°. Sol. EtOH, Et₂O. Spar. sol. C₆H₆. Insol. ligroin.

Friedrichs, *Chem. Zentr.*, 1916, I, 975.

2:4:6:2':4':6'-Hexanitro-3:5:3':5'-tetramethyldiphenylamine

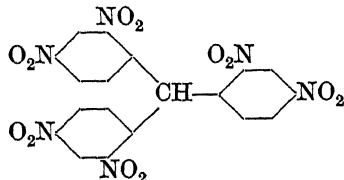


$C_{16}H_{13}O_{12}N_7$ MW, 495

Yellow cryst. from AcOH. M.p. 222°.

Blanksma, *Rec. trav. chim.*, 1906, 25, 373.

2:4:2':4':2'':4''-Hexanitrotriphenylmethane



$C_{19}H_{10}O_{12}N_6$ MW, 514

Plates from Me₂CO. M.p. 260° decomp. Spar. sol. usual org. solvents.

Baeyer, Villiger, *Ber.*, 1903, 36, 2779.

Hexanol-1.

See n-Hexyl Alcohol.

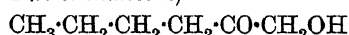
Hexanol-2.

See Methyl-n-butylcarbinol.

Hexanol-3.

See Ethylpropylcarbinol.

1-Hexanolone-2 (6-Hexanolone-5, 1-hydroxy-2-ketohexane, hydroxymethyl butyl ketone, valerylcarbinol, 2-ketohexanol-1)



$C_6H_{12}O_2$ MW, 116

B.p. 83-5°/15 mm.

Osazone: m.p. 223-5° decomp.

Et ether: $C_8H_{16}O_2$. MW, 144. B.p. 79°/18 mm. Spar. sol. H₂O. Semicarbazone: m.p. 99°. Oxime: b.p. 125°/17 mm.

Levene, Haller, *J. Biol. Chem.*, 1928, 79, 483.

Blaise, Picard, *Ann. chim.*, 1912, 25, 257, 262.

Linnell, Roushdi, *Quart. J. Pharm. Pharmacol.*, 1939, 12, 252.

1-Hexanolone-4 (6-Hexanolone-3, 1-hydroxy-4-ketohexane, ethyl 3-hydroxypropyl ketone, 3-propionyl-n-propyl alcohol, 3-propionylpropanol-1, 4-ketohexanol-1)



$C_6H_{12}O_2$ MW, 116

B.p. 115-16°/21 mm. Dist. at atm. press.

\rightarrow 2-ethyl-4:5-dihydrofuran. NaHg \rightarrow hexanediol-1:4.

Phenylurethane: m.p. 84°.

Wohlgemuth, *Ann. chim.*, 1914, 2, 424.

1-Hexanolone-5.

See Acetobutyl Alcohol.

2-Hexanolone-4 (5-Hexanolone-3, 2-hydroxy-4-ketohexane, ethyl 2-hydroxypropyl ketone)



$C_6H_{12}O_2$ MW, 116

B.p. 75-8°/12 mm. D_4^{20} 0.950. n_D^{25} 1.4280.

Stutsman, Adkins, *J. Am. Chem. Soc.*, 1939, 61, 3303.

2-Hexanolone-5 (5-Hexanolone-2, 2-hydroxy-5-ketohexane, methyl 3-hydroxybutyl ketone, 5-ketohexanol-2, 4-aceto-sec.-n-butyl alcohol)



$C_6H_{12}O_2$ MW, 116

B.p. 201-5°/270 mm., 140-2°/100 mm., 80-1°/10 mm. Misc. with H₂O, EtOH, Et₂O. Insol. conc. K₂CO₃-Aq. Reduces warm Fehling's and NH₃.AgNO₃. $Na_2Cr_2O_7 + H_2SO_4 \rightarrow$ acetonyl-acetone.

Oxime: yellow oil. Sol. H_2O , EtOH. Spar. sol. Et_2O . *Semicarbazone*: m.p. 149–50°.

Lipp, Scheller, *Ber.*, 1909, 42, 1963.

3-Hexanolone-4.

See Diethylketol.

3-Hexanolone-5 (4-Hexanolone-2, 3-hydroxy-5-ketohexane, methyl 2-hydroxybutyl ketone, 5-ketohexanol-3, 1-aceto-sec.-n-butyl alcohol)



$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116
B.p. 90°/25 mm., 83°/15 mm. D_4^{15} 0.951. n_D^{18} 1.4368.

Pastureau, Zamenhof, *Compt. rend.*, 1926, 182, 324.

I.G., B.P. 264,830, (*Chem. Abstracts*, 1928, 22, 243).

Knorr, Weissenborn, Winthrop Chemical Co., U.S.P., 1,714,378, (*Chem. Abstracts*, 1929, 23, 3477).

Hexanone-2.

See Methyl n-butyl Ketone.

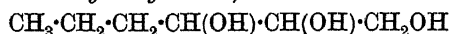
Hexanone-3.

See Ethyl propyl Ketone.

Hexantetrol.

See Tetrahydroxyhexane.

Hexantriol-1:2:3 (1-n-Propylglycerol, 1:2:3-trihydroxyhexane)



$\text{C}_6\text{H}_{14}\text{O}_3$ MW, 134
M.p. 60–2°. B.p. 167.5–168°/14 mm. Hygroscopic. Bitter taste.

Triacetyl: b.p. 157–9°/15 mm.

Delaby, *Compt. rend.*, 1922, 175, 1153.

Hexantriol-1:2:4 (1:2:4-Trihydroxyhexane)

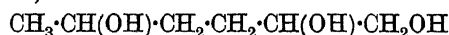


$\text{C}_6\text{H}_{14}\text{O}_3$ MW, 134
B.p. 190–2°/30 mm.

Triacetyl: b.p. 273–6°, 168–9°/20 mm. D^{21} 1.086.

Fournier, *Bull. soc. chim.*, 1895, 13, 121.

Hexantriol-1:2:5 (1:2:5-Trihydroxyhexane)

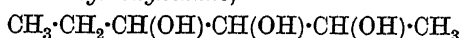


$\text{C}_6\text{H}_{14}\text{O}_3$ MW, 134
B.p. 181°/10 mm. D_4^{20} 1.1012. Misc. with H_2O , EtOH. Insol. Et_2O .

Traube, Lehmann, *Ber.*, 1901, 34, 1982.

Markownikow, Kablukow, *Ber.*, 1881, 14, 1711.

Hexantriol-2:3:4 (1-Methyl-3-ethylglycerol, 2:3:4-trihydroxyhexane)



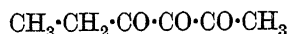
$\text{C}_6\text{H}_{14}\text{O}_3$ MW, 134

B.p. 256–7°, 155–156.5°/20 mm. Misc. with H_2O , EtOH.

Reif, *Ber.*, 1908, 41, 2742.

Delaby, Morel, *Compt. rend.*, 1925, 180, 1409.

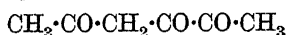
Hexantrione-2:3:4 (2:3:4-Triketohexane, methyl ethyl triketone)



$\text{C}_6\text{H}_8\text{O}_3$ MW, 128
Red oil. B.p. 70°/18 mm. Sol. EtOH. Spar. sol. cold H_2O . Reduces cold Fehling's.

Sachs, Alsleben, *Ber.*, 1907, 40, 2728.

Hexantrione-2:3:5 (2:3:5-Triketohexane, methyl acetonyl diketone)



$\text{C}_6\text{H}_8\text{O}_3$ MW, 128
Free ketone not isolated.

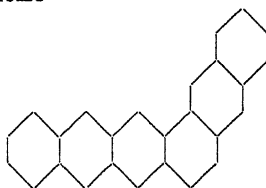
Trioxime: cryst. from EtOH. M.p. 168° (159°). *Tribenzoyl*: m.p. 180°.

3-Oxime-2:5-disemicarbazone: m.p. 231°.

Angelico, Calvello, *Gazz. chim. ital.*, 1904, 34, 45.

Angeli, Marchetti, *Atti accad. Lincei*, 1907, 16, 274.

Hexaphene



$\text{C}_{26}\text{H}_{16}$ MW, 328

Yellow plates from xylene. M.p. 308°. Yellow fluor. in light. Sol. conc. H_2SO_4 with violet \rightarrow brown \rightarrow olive-green col. Spar. sol. low b.p. solvents. More sol. high b.p. solvents \rightarrow sols. with greenish-blue fluor.

Clar, *Ber.*, 1940, 73, 81.

Clar, Wallenstein, Avenarius, *Ber.*, 1929, 62, 955.

Hexaphenol.

See Hexahydroxybenzene.

p-Hexaphenyl (p-Sexiphenyl)



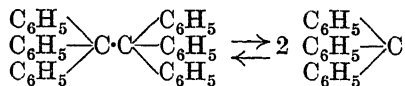
$\text{C}_{36}\text{H}_{26}$ MW, 458

Micro-plates from o-dichlorobenzene. M.p. 465°. Sublimes.

Pummerer, Bittner, *Ber.*, 1924, 57, 84.

Pummerer, Seligsberger, *Ber.*, 1931, 64, 2477.

Busch, Weber, Mathauser, *J. prakt. Chem.*, 1936, 146, 29.

Hexaphenylethane (Triphenylmethyl) $\text{C}_{38}\text{H}_{30}$

MW, 486

The dimeric form (hexaphenylethane) is a colourless solid. Cryst. from Me_2CO , Me formate or Et formate. M.p. $145-7^\circ$ decomp. Part. dissociates in sol. into triphenylmethyl (yellowish-red). Benzenoid-quinonoid tautomerism in monomeric forms exists. Sol: CHCl_3 , CCl_4 , CS_2 , toluene. Mod. sol. C_6H_6 . Spar. sol. EtOH, Et_2O , Me_2CO , AcOEt. Prac. insol. ligroin. Heat of comb. C_v 2377.7 Cal., C_p 2380 Cal. Absorbs O from air with formation of triphenylmethyl peroxide. CrO_3 or $\text{KMnO}_4 \rightarrow$ triphenylcarbinol. $\text{H} (+ \text{Pt}) \rightarrow$ triphenylmethane. $\text{I} \rightarrow$ triphenylmethyl iodide. $\text{NO} \rightarrow$ nitrosotriphenylmethyl. $\text{NO}_2 \rightarrow$ nitrotriphenylmethyl and triphenylmethyl nitrite. $\text{NOCl} \rightarrow$ nitrosotriphenylmethyl and triphenylmethyl chloride. $\text{PhOH} \rightarrow$ 4-hydroxytetraphenylmethane and triphenylmethane. $\text{CH}_3\text{N}_2 \rightarrow$ hexaphenylpropane. Combines with Na. Combines with many org. solvents (hydrocarbons, ethers, aldehydes, ketones, esters, etc.) with formation of cryst. add. products readily dissociated on heating. Conducts electricity in liquid SO_2 sol.

Schlenk, Weickel, Herzenstein, *Ann.*, 1910, 372, 17.

Schmidlin, *Ber.*, 1908, 41, 423.

Schmidlin, Garcia-Banús, *Ber.*, 1912, 45, 3191.

Wieland, *Ber.*, 1915, 48, 1096.

Arbusow, Arbusow, *Ber.*, 1929, 62, 1874.

Gomberg, Cone, *Ber.*, 1904, 37, 2033.

Gomberg, Schoepfle, *J. Am. Chem. Soc.*, 1917, 39, 1658.

Gomberg, *Chemical Reviews*, 1924, 1, 91.

1 : 1 : 1 : 3 : 3 : 3-Hexaphenylpropane $\text{C}_{39}\text{H}_{32}$

MW, 500

Prisms from ligroin. M.p. 216° . Sol. C_6H_6 . Spar. sol. EtOH, AcOH, ligroin.

Schlenk, *Ann.*, 1912, 394, 184.

Hexatetracontanoic Acid $\text{C}_{46}\text{H}_{92}\text{O}_2$

MW, 676

M.p. 107° .

Me ester : m.p. 91.4° .

Et ester : m.p. 90.5° .

Francis, King, Willis, *J. Chem. Soc.*, 1937, 999.

Hexatriacontane $\text{C}_{36}\text{H}_{74}$

MW, 506

Plates from pet. ether. M.p. 76° . B.p. $265^\circ/1$ mm. D_4^{20} 0.764. Spar. sol. EtOH, Et_2O , CHCl_3 , pet. ether. Volatile in steam.

Gascard, *Ann. chim.*, 1921, 15, 344.

1 : 3 : 5-Hexatriene (sym.-Divinylethylene) C_6H_8

MW, 80

Cis :

B.p. $78.5^\circ/760$ mm. D_4^{20} 0.7175. n_D^{20} 1.4577. Polymerises.

Trans :

B.p. $77-78.5^\circ/764.4$ mm. D_{15}^{15} 0.74229. $n_D^{13.5}$ 1.4884. Polymerises.

With Br in absence of HBr both forms give 1 : 2-dibromides; in presence of HBr 1 : 6-dibromides.

van Romburgh, van Dorssen, *J. Chem. Soc.*, 1906, 90, I, 130.

Farmer, Laroia, Switz, Thorpe, *J. Chem. Soc.*, 1927, 2948, 2953.

Hexatriene-dicarboxylic Acid.

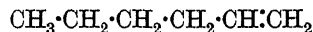
See Octatrienedioic Acid.

2-Hexenal-1.

See 2-Propylacrolein.

3-Hexendione-2 : 5.

See 1 : 2-Diacetoethylene.

1-Hexene (1-Hexylene, butylethylene, α -hexylene) C_6H_{12}

MW, 84

F.p. $-139-40^\circ$. B.p. 63.35° . D_4^{14} 0.684, D_4^{20} 0.6734. n_D^{20} 1.3837. 86% $\text{H}_2\text{SO}_4 \rightarrow$ 2-hexanol + hexylsulphonic acid. $\text{KMnO}_4 \rightarrow$ formic and valeric acids.

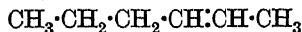
Glycol : see Hexandiol-1 : 2.

Bourguet, *Bull. soc. chim.*, 1927, 41, 1478.

Dykstra, Lewis, Boord, *J. Am. Chem. Soc.*, 1930, 52, 3401.

Wilkinson, *J. Chem. Soc.*, 1931, 3057.

van Pelt, Wibaut, *Rec. trav. chim.*, 1941, 60, 55.

2-Hexene (2-Hexylene, sym.-methylpropylethylene, β -hexylene) C_6H_{12}

MW, 84

F.p. -149° . B.p. 68.1° . D_4^{20} 0.6831, $D_4^{15.5}$ 0.66888. $n_D^{15.5}$ 1.38319.

Glycol : see Hexandiol-2 : 3.

v. Beresteyn, *Chem. Zentr.*, 1911, II, 1017.

Schmitt, Boord, *J. Am. Chem. Soc.*, 1932, 54, 751.

3-Hexene (3-Hexylene, sym.-diethylethylene, γ -hexylene) C_6H_{12}

MW, 84

Cis :

M.p. -135° . B.p. $66.8-66.9^\circ/741$ mm. D_4^{20} 0.67964. n_D^{20} 1.39338.

Trans:
M.p. -113° . B.p. $67.4-67.6^{\circ}/741$ mm. D_4^{20} 0.67788. n_D^{20} 1.39377.

Glycol: see Hexandiol-3:4.

Lespiau, Wiemann, *Bull. soc. chim.*, 1929, 45, 627.

Campbell, Eby, *J. Am. Chem. Soc.*, 1941, 63, 216.

Hexene-carboxylic Acid.

See Heptenic Acid.

Hexenic Acid.

See 2-Propylacrylic Acid, Hydrosorbic Acid, 3-Ethylidenebutiric Acid and 2-Allylpropionic Acid.

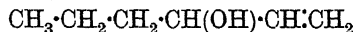
Hexenic Aldehyde.

See 2-Propylacrolein.

3-Hexenoamidoacetaldehyde.

See Penilloaldehyde-F.

1-Hexenol-3 (3-Hydroxy-1-hexene, propyl-vinylcarbinol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

l.

$[\alpha]_D - 28.2^{\circ}$.

Acid phthalate: m.p. $62-3^{\circ}$. *Strychnine salt*: m.p. $170-2^{\circ}$. *Brucine salt*: cryst. from Me_2CO . M.p. $118-20^{\circ}$.

dl.

B.p. $133.5-134^{\circ}$, $90-4^{\circ}/150$ mm. D_4^{20} 0.851, D_4^{25} 0.834. n_D^{25} 1.4215.

p-Nitrobenzoyl: m.p. $60-2^{\circ}$.

Allophanate: m.p. $139.5-140^{\circ}$.

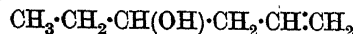
Acid phthalate: m.p. $58-60^{\circ}$. $[\alpha]_D - 16.05^{\circ}$ in EtOH.

Delaby, *Compt. rend.*, 1922, 175, 967.

Kenyon, Snellgrove, *J. Chem. Soc.*, 1925, 127, 1176.

Niemann, Benson, Mead, *J. Org. Chem.*, 1943, 8, 397.

1-Hexenol-4 (4-Hydroxy-1-hexene, ethylallylcarbinol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. $129-31^{\circ}$. $[\alpha]_D^{25} + 0.3^{\circ}$ without solvent.

Levene, Haller, *J. Biol. Chem.*, 1928, 76, 420.

1-Hexenol-5 (5-Hydroxy-1-hexene, methyl-allyl-methylcarbinol, methyl- γ -butenylcarbinol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. $140^{\circ}/759$ mm. D° 0.8614. Spar. sol. H_2O . $\text{CrO}_3 \rightarrow$ allylacetone + acetic acid. $\text{HBr} \rightarrow$ 2:5-dibromohexane.

Gardner, Perkin, *J. Chem. Soc.*, 1907, 91, 851.

1-Hexenol-6 (6-Hydroxy-1-hexene, 4-vinyl-*n*-butyl alcohol, 5-hexenyl alcohol)



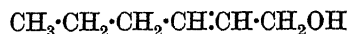
$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

Me ether: $\text{C}_7\text{H}_{14}\text{O}$. MW, 114. Liq. with strong odour. B.p. 125° . D° 0.8065, $n_D^{1.25}$ 1.4147.

Et ether: $\text{C}_8\text{H}_{16}\text{O}$. MW, 128. Liq. with strong odour. B.p. 143° . D° 0.8103, $D^{12.5}$ 0.7998. $n_D^{12.5}$ 1.4184.

Dionneau, *Bull. soc. chim.*, 1913, 13, 524; *Ann. chim.*, 1915, 3, 215.

2-Hexenol-1 (1-Hydroxy-2-hexene, 3-propylallyl alcohol, 2-hexenyl alcohol)



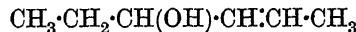
$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. $158-60^{\circ}$. D^{16} 0.8490. n_D^{16} 1.4403.

2-Naphthylurethane: m.p. 76° .

Bouis, *Ann. chim.*, 1928, 9, 402.

2-Hexenol-4 (4-Hydroxy-2-hexene, ethylpropenylcarbinol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

d.

D_4^{15} 0.8431. $[\alpha]_{5893}^{15} + 13.5^{\circ}$.

Hydrogen phthalate: m.p. 70.5° . $[\alpha]_{5461}^{15} + 15^{\circ}$ in CHCl_3 . *l*-Brucine salt: m.p. 168° .

l.

Hydrogen phthalate: m.p. 70.5° . $[\alpha]_{5461}^{15} - 15^{\circ}$ in CHCl_3 . *l*-Brucine salt: m.p. $125-6^{\circ}$.

dl.

Liq. with strong odour. B.p. $135-5.5^{\circ}$, $44-5^{\circ}/13$ mm. D_4^{25} 0.8346. n_D^{25} 1.4325. Heat with $\text{KHSO}_4 \rightarrow$ 2:4-hexadiene.

Acetyl: b.p. $154-7^{\circ}$. n_D^{20} 1.4218.

Me ether: $\text{C}_7\text{H}_{14}\text{O}$. MW, 114. B.p. $110-13^{\circ}$.

p-Xenylurethane: m.p. 102° .

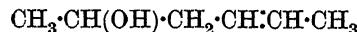
Auwers, Westerman, *Ber.*, 1921, 54, 2993.

Prévost, *Ann. chim.*, 1928, 10, 147.

van Pelt, Wibaut, *Rec. trav. chim.*, 1941, 60, 55.

Airs, Balfe, Kenyon, *J. Chem. Soc.*, 1942, 18.

2-Hexenol-5 (5-Hydroxy-2-hexene, 4-ethylidene-2-butanol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

B.p. 137.5° . D^{18} 0.8405. n_D^{18} 1.4361.

Prévost, *Bull. soc. chim.*, 1944, 11, 218.

3-Hexenol-1 (1-Hydroxy-3-hexene, 3-propylidenepropyl alcohol, 3-hexenyl alcohol)



$\text{C}_6\text{H}_{12}\text{O}$ MW, 100

Cis. Leaf alcohol.

Occurs in germanium and other oils. Odour of fresh grass. B.p. 156-7°, 65.7°/19 mm., 59-61°/12.5 mm. $D_4^{21.6}$ 0.8478. n_D^{20} 1.4384.

3:5-Dinitrobenzoyl: m.p. 49°.

Allophanate: m.p. 149°.

2-Anthraquinonecarboxylate: m.p. 68°.

p-Nitrophenylurethane: cryst. from pet. ether. M.p. 72.5-73.5°.

α -Naphthylurethane: needles from pet. ether. M.p. 71-71.5°.

4'-Iododiphenylurethane: m.p. 157°.

Trans.

B.p. 153-6°, 80-5°/22 mm., 51-3°/9 mm. n_D^{20} 1.4374.

3:5-Dinitrobenzoyl: m.p. 28°.

Allophanate: m.p. 143°.

2-Anthraquinonecarboxylate: m.p. 50°.

p-Nitrophenylurethane: m.p. 84-5°.

α -Naphthylurethane: cryst. from pet. ether. M.p. 69-70°.

4'-Iododiphenylurethane: m.p. 155-6°.

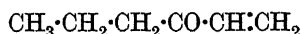
Takei, Imaki, Tada, *Ber.*, 1935, **68**, 953.

Stoll, Rouvé, *Helv. Chim. Acta*, 1938, **21**, 1542; *Ber.*, 1940, **73**, 1358.

Takei, Ono, Sinosaki, *Ber.*, 1940, **73**, 950.

Crombie, Harper, *J. Chem. Soc.*, 1950, 873.

1-Hexenone-3 (*Propyl vinyl ketone*, 3-keto-1-hexene, butyrylethylene)

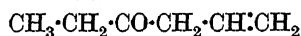


$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 24°/10 mm. Polymerises.

Blaise, Maire, *Bull. soc. chim.*, 1908, **3**, 270.

1-Hexenone-4 (*Ethyl allyl ketone*, 4-keto-1-hexene, 3-propionylpropylene)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 124-124.2° (126-7°). D_4^{20} 0.84976. n_D^{20} 1.42443. Heat of comb. C_p 857 Cal.

Oxime: b.p. 84°/13 mm.

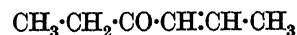
Blaise, *Bull. soc. chim.*, 1905, **33**, 40.

Coppens, *Bull. Soc. chim. Belg.*, 1929, **38**, 310.

1-Hexenone-5.

See Allylacetone.

2-Hexenone-4 (*Ethyl propenyl ketone*, 4-keto-2-hexene, 1-propionylpropylene)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 140.4-140.6° (137°). D_4^{20} 0.85587. n_D^{20} 1.43911. 2 Mols. semicarbazide \rightarrow ethyl propenyl ketone semicarbazide semicarbazone, m.p. 157° decomp.

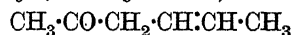
2:4-Dinitrophenylhydrazone: red cryst. M.p. 164-5°.

Blaise, *Bull. soc. chim.*, 1905, **33**, 47.

Coppens, *Bull. soc. chim. Belg.*, 1929, **38**, 310.

Stutsman, Adkins, *J. Am. Chem. Soc.*, 1939, **61**, 3303.

2-Hexenone-5 (1-Aceto-2-butylene, 5-keto-2-hexene, methyl β -butenyl ketone)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

B.p. 127° (133°). D_4^{16} 0.8520 (D_4^{20} 0.91915). n_D^{16} 1.4300.

Semicarbazone: m.p. 145°.

Baudrenghien, *Bull. soc. chim. Belg.*, 1922, **31**, 160.

Prévost, *Bull. soc. chim.*, 1944, **11**, 218.

3-Hexenone-2 (*Propylideneacetone*, 2-keto-3-hexene, methyl α -butenyl ketone, 1-aceto-1-butylene)



$\text{C}_6\text{H}_{10}\text{O}$ MW, 98

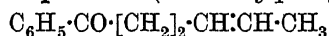
B.p. 136-7° (140°). D_4^{16} 0.8601. n_D^{16} 1.4400 (1.447).

Semicarbazone: m.p. 198°.

Grignard, Fluchaire, *Ann. chim.*, 1928, **9**, 11.

Prévost, *Bull. soc. chim.*, 1944, **11**, 218.

4-Hexenophenone (3-Pentenylphenyl ketone)



$\text{C}_{12}\text{H}_{14}\text{O}$ MW, 174

M.p. 23°. B.p. 96-7°/1 mm. D_{25}^{25} 0.9612. n_D^{25} 1.5270.

Semicarbazone: m.p. 129-30°.

Kimel, Cope, *J. Am. Chem. Soc.*, 1943, **65**, 1992.

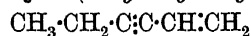
Hexenyl Alcohol.

See 1-Hexenol-6, 2-Hexenol-1 and 3-Hexenol-1.

2-Hexenylcarbinol.

See 2-Heptenol-1.

1-Hexen-3-yne (*Ethylvinylacetylene*)



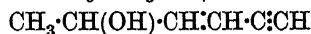
C_6H_8 MW, 80

B.p. 85°/758 mm. D_4^{20} 0.7492. n_D^{20} 1.4522.

Jacobson, Carothers, *J. Am. Chem. Soc.*, 1933, **55**, 1622.

Thorn, Hennion, Nieuwland, *J. Am. Chem. Soc.*, 1936, **58**, 796.

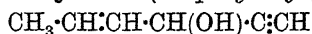
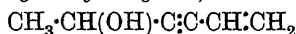
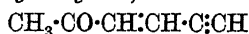
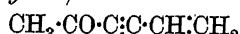
3-Hexen-1-yn-5-ol (3-Hexen-5-yn-2-ol, γ -hydroxy- α -butenylacetylene)

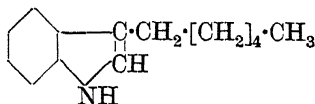


$\text{C}_6\text{H}_8\text{O}$ MW, 96

B.p. 103-6°/100 mm., 69-70°/18 mm. n_D^{22} 1.4791.

Jones, McCombie, *J. Chem. Soc.*, 1943, 261.

4-Hexen-1-yn-3-ol (*Propenylethynylcarbinol*)C₆H₈O MW, 96*d.*B.p. 157–9°. D₄²⁰ 0.9030. n_D^{16.5} 1.4645. [α]_{589.3}^{19.5} +16.06°.*Hydrogen phthalate*: m.p. 56–7°. [α]_{589.3}¹⁶ +47.5°*dl.*B.p. 154–6°, 58–9°/13 mm. D₄²³ 0.9148. n_D²³ 1.4651.*Acetyl*: b.p. 110–12°/100 mm. n_D^{20.5} 1.4463.*Phenylurethane*: m.p. 65°.*2-Naphthylurethane*: m.p. 89°.Jones, McCombie, *J. Chem. Soc.*, 1942, 733.Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1945, 81.Kenyon, Poplett, *ibid.*, 273.**1-Hexen-3-yn-5-ol** (*5-Hexen-3-yn-2-ol, α-hydroxyethyl-vinylacetylene*)C₆H₈O MW, 96B.p. 64°/18 mm. D₄²⁰ 0.9112. n_D²⁰ 1.4851.*Acetyl*: b.p. 77°/10 mm. D₄¹⁵ 0.9612. n_D¹⁵ 1.4650.Carothers, Jacobson, *J. Am. Chem. Soc.*, 1933, 55, 1097.Nazarov, Elizarova, *Chem. Abstracts*, 1942, 36, 742.**3-Hexen-1-yn-5-one** (*3-Hexen-5-yn-2-one, γ-keto-α-butenylacetylene*)C₆H₆O MW, 94Pale yellow oil. B.p. 60–3°/20 mm. n_D¹⁶ 1.4954.*2:4-Dinitrophenylhydrazone*: reddish-brown cryst. M.p. 181° decomp.Bowden, Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1946, 39.**4-Hexen-1-yn-3-one** (*Propenyl ethynyl ketone*)C₆H₆O MW, 94B.p. 145°/747 mm., 75–77°/44 mm. n_D²⁰ 1.4770.*2:4-Dinitrophenylhydrazone*: red cryst. M.p. 162–3°.Bowden, Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1946, 39.**1-Hexen-3-yn-5-one** (*5-Hexen-3-yn-2-one, vinylacetylacetylene*)C₆H₆O MW, 94Sternutatory liq. B.p. 62–3.5°/40 mm. n_D¹⁵ 1.4891.*2:4-Dinitrophenylhydrazone*: orange cryst. M.p. 162°.Bowden, Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1946, 39.**Hexetone.***See* Δ⁶-*m*-Menthenone-5.**Hexoestrol.***See* Dihydrodiethylstilboestrol.**Hexogen.***See* Cyclonite.***n*-Hexoic Acid.***See n*-Caproic Acid.***n*-Hexylacetylene.***See* 1-Octyne.**Hexylacetylene-1-carboxylic Acid.***See* 1-Nonynoic Acid.***n*-Hexyl Alcohol** (*Hexanol-1, 1-hydroxy-hexane*)C₆H₁₄O MW, 102B.p. 155.2–155.7° (156.4–156.8°, 157–157.5°/755 mm.). D₄⁰ 0.8333, D₂₀⁰ 0.8204. n_D²⁰ 1.41326.*Formyl*: b.p. 153.6°. D₄⁰ 0.8977.*Acetyl*: b.p. 169.2°. D₄⁰ 0.8902.*Butyryl*: b.p. 205.1°. D₄⁰ 0.8825.*Benzoyl*: b.p. 272°/770 mm. D₄¹⁷ 0.9985.*p*-Nitrobenzoyl: m.p. 6.7°. B.p. 175–7°/8 mm. D₂₀²⁰ 1.1193. n_D²⁰ 1.5153.*Et ether*: *see* Ethyl *n*-hexyl Ether.*p*-Nitrophenylurethane: m.p. 103°.Dreger, *Organic Syntheses*, 1926, VI, 54.Lieben, Janacek, *Ann.*, 1877, 187, 135.Bouveault, Blanc, D.R.P., 164,294, (*Chem. Zentr.*, 1905, II, 1700).Derick, Bissell, *J. Am. Chem. Soc.*, 1916, 38, 2484.Vaughn, Spahr, Nieuwland, *J. Am. Chem. Soc.*, 1933, 55, 4207.**Hexyl Aldehyde.***See* Caproic Aldehyde.***n*-Hexylamine.***See* 1-Amino-*n*-hexane.**ψ-Hexylamine.***See* 1-Amino-2-ethyl-*n*-butane.**Hexylaminoethyl Alcohol.***See N*-2-Hydroxyethylhexylamine.**Hexyl bromide.***See* Bromohexane.**Hexyl chloride.***See* Chlorohexane.**Hexyl 2:4-dihydroxyphenyl Ketone.***See* 4-*n*-Heptylylresorcinol.**Hexylene.***See* Hexene.**Hexylene Aldehyde.***See* 2-Propylacrolein.**Hexyl fluoride.***See* Fluorohexane.**Hexyl *p*-hydroxyphenyl sulphide.***See under* Thiohydroquinone.

3-*n*-Hexylindole $C_{14}H_{19}N$

MW, 201

Yellow liq. B.p. 212–24°/14 mm.

Korczyński, Brydówna, Kierzek, *Gazz. chim. ital.*, 1926, 56, 906.

Hexyl iodide.

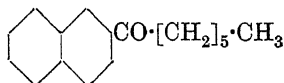
See Iodohehexane.

Hexylmalonic Acid.

See Heptane-1 : 1-dicarboxylic Acid.

Hexylmethynylcarbinol.

See 1-Nonyl-3.

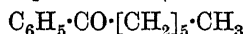
Hexyl 2-naphthyl Ketone (*Enanthonaphthone*) $C_{17}H_{20}O$

MW, 240

Prisms. M.p. 60°. B.p. 214–16°/13 mm.

Oxime : fine prisms. M.p. 74°.

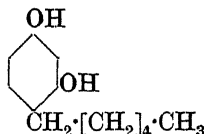
Semicarbazone : short prisms. M.p. 132°.

Buu-Hoi, Caigniant, *Bull. soc. chim.*, 1945, 307.Hexyl phenyl Ketone (*Enanthophenone*) $C_{13}H_{18}O$

MW, 190

M.p. 17°. B.p. 173°/34 mm.

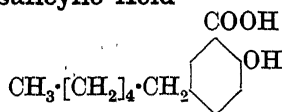
Oxime : needles from EtOH. M.p. 55°.

Krafft, *Ber.*, 1886, 19, 2987.4-*n*-Hexylresorcinol (2 : 4-Dihydroxyhexylbenzene, 1-[2 : 4-dihydroxyphenyl]-hexane) $C_{12}H_{18}O_2$

MW, 194

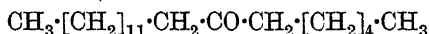
Needles from ligroin. M.p. 67·5–69° (68–70°). B.p. 178–80°/6–7 mm. Sol. EtOH, Et₂O, CHCl₃, Me₂CO. Spar. sol. ligroin. Prac. insol. H₂O. Greenish-yellow col. with FeCl₃ in EtOH. Urinary antiseptic.Dohme, Cox, Miller, *J. Am. Chem. Soc.*, 1926, 48, 1691.Cox, *Rec. trav. chim.*, 1931, 50, 850.Hirzel, U.S.P., 1,717,105, (*Chem. Abstracts*, 1929, 23, 3717).Dohme, B.P. 219,922, (*Chem. Abstracts*, 1925, 19, 705).Shas, *Chem. Zentr.*, 1941, II, 636 (*Review*).

5-Hexylsalicylic Acid

 $C_{13}H_{18}O_3$

MW, 222

Cryst. from ligroin. M.p. 86° (83–4°). Disinfectant.

Hoffmann-La Roche A.-G., Swiss P., 127,649, (*Chem. Abstracts*, 1929, 23, 1217).Cox, *J. Am. Chem. Soc.*, 1930, 52, 357.*n*-Hexyl *n*-tridecyl Ketone (*Eicosanone-7*, 7-ketoeicosane) $C_{20}H_{40}O$

MW, 296

B.p. 210–11°/11 mm.

Krafft, *Ber.*, 1882, 15, 1717.

Hexylvinylcarbinol.

See 1-Nonenol-3.

1-Hexyne (*n*-Butylacetylene) C_6H_{10}

MW, 82

F.p. –132·09°. B.p. 71·35°, 12·5°/75 mm. D⁰ 0·7336, D¹⁵ 0·7193. n_D^{20} 1·402.2C₆H₁₀.Hg : m.p. 96·2–96·4°.Bourguet, *Ann. chim.*, 1925, 3, 222, 380.Grignard, Lapayre, Faki, *Compt. rend.*, 1928, 187, 517.Henne, Greenlee, *J. Am. Chem. Soc.*, 1945, 67, 484.2-Hexyne (*Methylpropylacetylene*) C_6H_{10}

MW, 82

F.p. –92°. B.p. 83·8°. D⁰ 0·7494, D₆¹⁵ 0·7377.Harzer, *Chem. Zentr.*, 1914, II, 1171.3-Hexyne (*Diethylacetylene*) C_6H_{10}

MW, 82

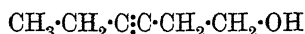
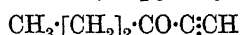
F.p. –51° (–105·5°). B.p. 81°. D₄²⁰ 0·724. n_D^{20} 1·4115.Lespiau, Wiemann, *Bull. soc. chim.*, 1929, 45, 627.Henne, Greenlee, *J. Am. Chem. Soc.*, 1945, 67, 484.

1-Hexyne-1-carboxylic Acid.

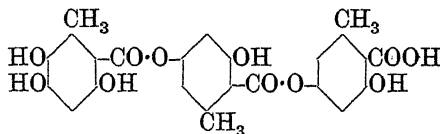
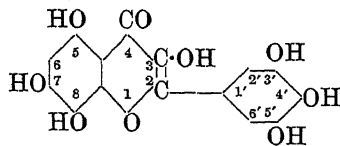
See *n*-Butylpropionic Acid.1-Hexynol-3 (*Propylethynylcarbinol*) $C_6H_{10}O$

MW, 98

B.p. 140–1°. D²⁰ 0·8704. n_D^{20} 1·4330.Acetyl : b.p. 65·6–66°/19 mm. n_D^{19} 1·4257.Bowden, Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1946, 39.I.G., B.P. 508,062, (*Chem. Abstracts*, 1940, 34, 447).

3-Hexynol-1 (β -Hydroxyethyl-propyl-acetylene)C₆H₁₀O MW, 98B.p. 64–6°/12 mm. D₄²⁰ 0.8982. n_D²⁰ 1.4530.Stoll, Rouvé, *Helv. Chim. Acta*, 1938, 21, 1542.Bohnsack, *Ber.*, 1941, 74B, 1575.**1-Hexynone-3** (*Propyl ethynyl ketone*)C₆H₈O MW, 96Sternutatory and lachrymatory liq. B.p. 65–6°/100 mm. n_D¹⁷ 1.4260.

2:4-Dinitrophenylhydrazones: orange cryst. M.p. 136–7°.

Bowden, Heilbron, Jones, Weedon, *J. Chem. Soc.*, 1946, 39.**Hiascininic Acid**C₂₄H₂₀O₁₁ MW, 484Tridepside of *Cetraria hiascens*. M.p. 190–5° decomp.*Me ester*: C₂₅H₂₂O₁₁. MW, 498. M.p. 144°. *Penta-acetyl*: m.p. 213–14°. *Penta-carbethoxyl*: m.p. 212–13°.*Penta-acetyl*: m.p. 176–8° decomp.*Penta-carbethoxyl*: m.p. 137°.Asahina, Kusaka, *Bull. Chem. Soc. Japan*, 1942, 17, 152.**Hibiscetin** (3:5:7:8:3':4':5'-Hepta-hydroxyflavone)C₁₅H₁₀O₉ MW, 334

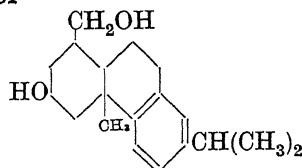
Cryst. from EtOH. M.p. 350° decomp.

Hepta-acetyl: m.p. 242–4°.

3:5:8:3':4':5'-Hexa-Me ether: yellow cryst. from AcOH.Aq. M.p. 194–6°.

Hepta-Me ether: m.p. 194–6°.Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1942, 15A, 148.Rao, Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1944, 19A, 88.Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1947, 25A, 417.**Hibiscitrin**C₂₇H₃₀O₁₉ MW, 658Glycoside from *Hibiscus sabdariffa*. Cryst. from MeOH. M.p. 238–40°. Dil. min. acids → hibiscetin.Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1942, 15A, 148.**Hinokinin.**

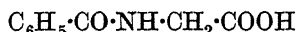
See Cubebin.

Hinokiol

Suggested structure

C₁₉H₂₈O₂ MW, 288Constituent of Hinoki wood (*Chamecyparis obtusa*, Sieb. et Zucc.). Prisms from EtOH. M.p. 234–5°. B.p. 240–7°/5 mm. part. decomp. [α]_D²⁰ +74.4° in CHCl₃. H₂SO₄ → purple-red col.*Me ether*: C₂₀H₃₀O₂. MW, 302. Needles. M.p. 95–6°. [α]_D¹⁸ +59.5° in EtOH.*Diacetyl*: prisms. M.p. 143°. [α]_D²⁴ +70.4° in EtOH.*Dibenzoyl*: prisms. M.p. 207°. [α]_D²² +93.8° in CHCl₃.*Di-phenylurethane*: prisms. M.p. 246–7°.Keimatsu, Ishiguro, *J. Pharm. Soc. Japan*, 1935, 55, 186.Yoshiki, Ishiguro, *J. Pharm. Soc. Japan*, 1933, 53, 73.**Hinokitiol.**

See β-Thujaplicin.

Hippuric Acid (*Benzoylaminoacetic acid*, *benzoylglycine*)C₉H₉O₃N MW, 179Prisms from H₂O or EtOH. M.p. 187° (188–5°). *k* = 15.7 × 10⁻⁵ (2.3 × 10⁻⁴). Sol. H₂O, EtOH, AcOEt. Spar. sol. Et₂O, CHCl₃, C₆H₆. Insol. CS₂, pet. ether. H₂SO₄ + PbO₂ → benzamide. ZnCl₂ at 300° → benzonitrile. Conc. HNO₃ → oxalic acid.*Me ester*: C₁₀H₁₁O₃N. MW, 193. Prisms. M.p. 85°. Sol. H₂O, Et₂O.*Et ester*: C₁₁H₁₃O₃N. MW, 207. Needles from H₂O. M.p. 67.5°. D₂₃ 1.043. Sol. H₂O, EtOH, Et₂O. Steam dist. → hippuric acid.*Phenyl ester*: C₁₅H₁₃O₃N. MW, 255. Plates from EtOH. M.p. 104°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Spar. sol. CS₂. Insol. pet. ether.*Chloride*: C₉H₈O₂NCl. MW, 197.5. M.p. 125–30°. Sol. C₆H₆. Insol. pet. ether.*Amide*: C₉H₁₀O₂N₂. MW, 178. Cryst. from H₂O. M.p. 183°. Insol. cold EtOH, Et₂O. Sublimes.*Nitrile*: C₉H₈ON₂. MW, 160. Plates from

EtOH. M.p. 144°. Sol. EtOH, C_6H_6 , $CHCl_3$. Spar. sol. ligroin.

Hydrazide: see Hippuryl hydrazide.

Baum, *Z. physiol. Chem.*, 1884, **9**, 465.

Fischer, *Ber.*, 1905, **38**, 612.

Bergell, Wülfing, *Z. physiol. Chem.*, 1910, **64**, 362.

Johnson, Burnham, *Am. Chem. J.*, 1912, **47**, 235.

Hippuric Aldehyde (*Benzoylaminoacetaldehyde*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CHO$ MW, 163

Resin. Reduces Fehling's.

B.HCl: cryst. M.p. 110–15° decomp. Sol. H_2O , EtOH. Spar. sol. C_6H_6 . Insol. Et_2O . Br \rightarrow hippuric acid.

Phenylhydrazone: prisms from C_6H_6 . M.p. 107–8°. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 .

Fischer, *Ber.*, 1893, **26**, 465.

Hippuryl- α -alanine (*Hippuryl-1-aminopropionic acid*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot \overset{CH_3}{CH} \cdot COOH$
 $C_{12}H_{14}O_4N_2$ MW, 250

Needles from H_2O . M.p. 202°. Sol. EtOH. Insol. Et_2O , C_6H_6 , $CHCl_3$.

Me ester: $C_{13}H_{16}O_4N_2$. MW, 264. Needles from H_2O . M.p. 136°.

Et ester: $C_{14}H_{18}O_4N_2$. MW, 278. Needles from H_2O . M.p. 124–6°. Sol. EtOH, C_6H_6 , $CHCl_3$. Insol. Et_2O , ligroin.

Curtius, Lambotte, *J. prakt. Chem.*, 1904, **70**, 117.

Hippuryl- β -alanine.

See Hippuryl-2-aminopropionic Acid.

Hippurylaminoacetic Acid.

See Hippurylglycine.

i-Hippuryl-2-aminobutyric Acid

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot \overset{CH_3}{CH} \cdot CH_2 \cdot COOH$
 $C_{13}H_{16}O_4N_2$ MW, 264

Needles from H_2O . M.p. 122°. Sol. EtOH. Insol. Et_2O , C_6H_6 .

Me ester: $C_{14}H_{18}O_4N_2$. MW, 278. Needles from H_2O . M.p. 104°. Sol. EtOH. Spar. sol. C_6H_6 . Insol. Et_2O .

Et ester: $C_{15}H_{20}O_4N_2$. MW, 292. Needles from H_2O . M.p. 80°. Sol. EtOH. Spar. sol. C_6H_6 , Et_2O , AcOH.

Amide: $C_{13}H_{17}O_3N_3$. MW, 263. Plates from EtOH. M.p. 173°. Sol. EtOH, H_2O . Insol. Et_2O , C_6H_6 .

Curtius, Gumlich, *J. prakt. Chem.*, 1904, **70**, 206.

Hippuryl-3-aminobutyric Acid

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot CH_2 \cdot CH_2 \cdot CH_2 \cdot COOH$
 $C_{13}H_{16}O_4N_2$ MW, 264

Needles from H_2O . M.p. 175°. Sol. EtOH. Insol. C_6H_6 .

NH₄ salt: cryst. M.p. 161–2°.

Et ester: $C_{15}H_{20}O_4N_2$. MW, 292. Needles from H_2O . M.p. 94°. Spar. sol. Et_2O , C_6H_6 .

Curtius, Müller, *J. prakt. Chem.*, 1904, **70**, 225.

Hippuryl-1-aminopropionic Acid.

See Hippuryl- α -alanine.

Hippuryl-2-aminopropionic Acid (*Hippuryl- β -alanine*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot CH_2 \cdot CH_2 \cdot COOH$
 $C_{12}H_{14}O_4N_2$ MW, 250

Cryst. M.p. 183–5°. Sol. EtOH. Spar. sol. H_2O , $CHCl_3$.

Baumann, Ingvaldsen, *J. Biol. Chem.*, 1918, **35**, 276.

Hippurylglycine (*Hippurylaminoacetic acid, benzoylglycylglycine*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot CH_2 \cdot COOH$
 $C_{11}H_{12}O_4N_2$ MW, 236

Needles from H_2O . M.p. 208° (206.5°). Sol. EtOH. Aq. Spar. sol. abs. EtOH. Insol. Et_2O , $CHCl_3$, C_6H_6 , CS_2 . Conc. alkalis \rightarrow hippuric acid + glycine.

Et ester: $C_{13}H_{16}O_4N_2$. MW, 264. Needles from H_2O . M.p. 117°. Sol. EtOH. Spar. sol. H_2O , Et_2O , $CHCl_3$.

Amide: $C_{11}H_{13}O_3N_3$. MW, 235. Plates. M.p. 202°. Sol. EtOH. Spar. sol. Et_2O . Insol. H_2O , $CHCl_3$, C_6H_6 .

Azide: $C_{11}H_{11}O_3N_5$. MW, 261. Needles. M.p. 109–10°.

Fischer, *Ber.*, 1905, **38**, 608.

Curtius, *J. prakt. Chem.*, 1916, **94**, 120.


Hippuryl hydrazide (*Benzoylaminoacetylhydrazide*)

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot NH \cdot NH_2$
 $C_9H_{11}O_2N_3$ MW, 193

Needles. M.p. 162.5°. Mod. sol. H_2O . Sol. hot EtOH. Spar. sol. Et_2O . Reduces Fehling's. $HNO_2 \rightarrow$ hippurazide.

Curtius, *J. prakt. Chem.*, 1895, **52**, 243.

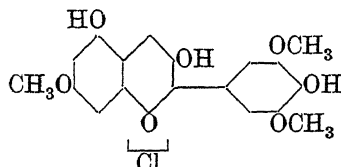
Hippurylresorcinol

$C_6H_5 \cdot CO \cdot NH \cdot CH_2 \cdot CO \cdot O$  OH
 $C_{15}H_{13}O_4N$ MW, 271

Cryst. from AcOEt. M.p. 144°. Sol. EtOH, AcOH. Decomp. in alk. sol.

Fischer, *Ber.*, 1905, **38**, 2931.

Hirsutidin chloride (7:3':5'-Trimethoxydelphinidin chloride)



$C_{18}H_{17}O_7Cl$

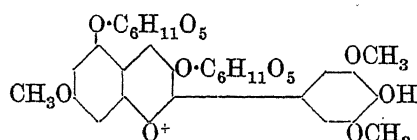
MW, 380.5

Red prisms. Sol. $H_2O \rightarrow$ red col. fading on boiling: col. restored by acids. Sol. 0.1N/NaOH \rightarrow purple-blue col. \rightarrow crimson-blue (dichroic) \rightarrow emerald green.

Karrer, Widmer, *Helv. Chim. Acta*, 1927, **10**, 758.

Bradley, Robinson, Schwarzenbach, *J. Chem. Soc.*, 1930, 132, 808.

Hirsutin



$C_{30}H_{37}O_{17}$

MW, 669

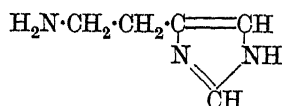
Colouring matter of *Primula hirsuta*. Diglucooside of hirsutidin.

Chloride: $C_{30}H_{37}O_{17}Cl$. MW, 704.5. Opaque needles from MeOH-HCl.Aq. M.p. 150-3° decomp. NaOAc \rightarrow reddish-violet col. $FeCl_3 \rightarrow$ stable orange col.

Robinson, Todd, *J. Chem. Soc.*, 1932, **135**, 2293.

Karrer, Widmer, *Helv. Chim. Acta*, 1927, **10**, 758.

Histamine (4-[ω -Aminoethyl]-glyoxaline, 2-[4-iminazolyl]-ethylamine, ergamine)



$C_5H_9N_3$

MW, 111

Constituent of ergot.

$B,2HCl$: prisms from EtOH. M.p. 244-6°.

$B,2HBr$: needles. Darkens at 265°. M.p. 284°.

ω -N-Benzoyl: prisms from hot H_2O . M.p. 148°.

Picrate: m.p. 160-2°.

Di-picrate: m.p. 238-42° decomp. (241°).

Picolonate: m.p. 262-4°.

Benzeneazo deriv.: red cryst. M.p. 237°.

p-Aminobenzeneazo deriv.: red powder. M.p. 241-3°.

Koessler, Hanke, *J. Am. Chem. Soc.*, 1918, **40**, 1716.

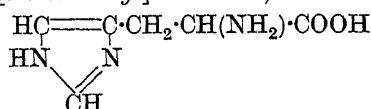
Garforth, Pyman, *J. Chem. Soc.*, 1935, 489.

McHenry, *Physiological Reviews*, 1931, **11**, 371.

Cheymol, *Annales pharmaceutiques françaises*, 1944, **2**, 16, 58.

Dankova, Siderova, Preobraznenskii, *J. Gen. Chem. U.S.S.R.*, 1945, **15**, 674, (*Chem. Abstracts*, 1946, **40**, 5722).

Histidine (1-Amino-2-iminazolylpropionic acid, 2-[4-iminazolyl]- α -alanine)



$C_6H_9O_2N_3$

MW, 155

Constituent of nearly all complete proteins. Sol. H_2O . Mod. sol. EtOH. $[\alpha]_D^{20} = -39.74^\circ$ in H_2O . Dextrorotatory in HCl. Gives biuret test. Br.Aq. \rightarrow red col.

Me ester: $C_7H_{11}O_2N_3$. MW, 169. $B,2HCl$: cryst. M.p. 196°.

Picolonate: yellow needles. M.p. 220°.

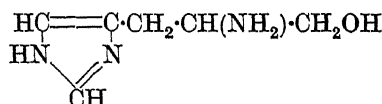
Betaine: see Hercynin.

Pyman, *J. Chem. Soc.*, 1916, **109**, 186.

Foster, Shemin, *Organic Syntheses*, 1938, **XVIII**, 43.

Albertson, Tullar, *J. Am. Chem. Soc.*, 1945, **67**, 502.

L-Histidinol



$C_6H_{11}ON_3$

MW, 141

$B,2HCl$: m.p. 193-5°. $[\alpha]_D^{21} = -3.98^\circ$ in H_2O .

N-Benzoyl: cryst. M.p. 207-8°. $[\alpha]_D^{19} = -47.6^\circ$ in EtOH. B,HCl : m.p. 178°.

Karrer, Suter, Waser, *Helv. Chim. Acta*, 1949, **32**, 1936.

Holarrhenine

$C_{24}H_{38}ON_2$

MW, 370

Alkaloid present in *Holarrhena congolensis*. Silky needles from AcOEt. M.p. 197-8°. Sol. EtOH, $CHCl_3$. Spar. sol. Me_2CO , Et_2O . Insol. H_2O . $[\alpha]_D = -7.1^\circ$ in $CHCl_3$.

B,HBr : needles + $3H_2O$ from H_2O . Loses H_2O at 100°. M.p. anhyd. 265-8°. $[\alpha]_D$ (anhyd.) + 11.0°.

Acetyl deriv.: plates. M.p. 180°.

Pyman, *J. Chem. Soc.*, 1919, **115**, 163.

Holarrhimine

$C_{21}H_{36}ON_2$ MW, 332

Present in *Holarrhena antidysenterica*. Needles from AcOEt. M.p. 183°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O , pet. ether. $[\alpha]_D^{25} - 14.19^\circ$ in $CHCl_3$. A diacid base. Contains no $-OCH_3$ or $-N \cdot CH_3$ groups. Possesses 3 active H atoms.

B, HCl : plates from H_2O . M.p. 345° decomp. Sol. EtOH. Mod. sol. H_2O . Spar. sol. HCl.Aq. $[\alpha]_D^{25} - 22.80^\circ$ in MeOH.

$B, 2HBr$: plates from H_2O . M.p. 358–60° decomp.

B, H_2SO_4 : m.p. 337°. Spar. sol. H_2O and all org. solvents.

B, H_2PtCl_6 : powder. Darkens at 270°, chars above 300° without melting. Insol. H_2O , EtOH.

Picrate: yellow plates (hydrated) from H_2O . M.p. 108–10°. M.p. anhyd. 198–200° decomp.

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, 9, 561.

Holarrhine

$C_{20}H_{38}O_3N_2$ MW, 354

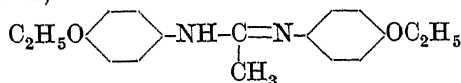
Present in *Holarrhena antidysenterica*. Needles from MeOH–AcOEt. M.p. 240°. Sol. MeOH, EtOH. Spar. sol. $CHCl_3$. Insol. AcOEt, Et_2O , pet. ether. $[\alpha]_D^{25} - 17.01^\circ$ in MeOH. Secondary base.

B, H_2PtCl_6 : darkens at 270°, chars at 300°.

Picrate: darkens at 275°, does not melt below 320°.

Siddiqui, Pillay, *J. Indian Chem. Soc.*, 1932, 9, 562.

Holocaine (NN'-Di-[p-ethoxyphenyl]-acetamidine)



$C_{18}H_{22}O_2N_2$ MW, 298

Needles. M.p. 117°. Sol. EtOH, C_6H_6 , Et_2O . Spar. sol. H_2O , ligroin.

B, HCl : phenacaine. Cryst. + $1H_2O$ from H_2O . M.p. anhyd. 189°. Sol. EtOH, $CHCl_3$. Reduces $KMnO_4$ instantly. Gives positive diazo reaction. Local anaesthetic.

Tauber, D.R.P., 79,868, (*Chem. Zentr.*, 1897, I, 1100).

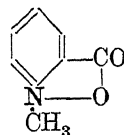
Kennert, *Chem. Zentr.*, 1897, II, 556.

Holstiine

$C_{22}H_{26}O_4N_2$ MW, 382

Strychnos alkaloid. Cryst. M.p. 247–8° decomp. $[\alpha]_D + 268^\circ$ in $CHCl_3$. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O , C_6H_6 . $H_2SO_4 + K_2Cr_2O_7 \rightarrow$ blue \rightarrow violet col. $H_2SO_4 + Fe_2(SO_4)_3 \rightarrow$ bluish-violet col.

Janot, Goutarel, Bosly, *Compt., rend.*, 1951, 232, 852.

Homarine

$C_7H_7O_2N$ MW, 137

B, HCl : needles from H_2O . M.p. 170–175° decomp. Spar. sol. MeOH, EtOH.

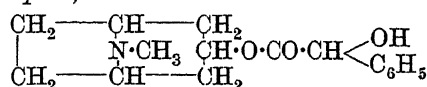
$B, HAuCl_4$: prisms from HCl. M.p. 188–90°.

B_2, H_2PtCl_6 : plates from HCl. M.p. 197–8°.

Picrate: plates. M.p. 155–60°.

Hoppe-Seyler, *Z. physiol. Chem.*, 1933, 222, 105.

Homatropine (Phenylglycollyltropine, mandelyltropine)



$C_{16}H_{21}O_2N$ MW, 259

Prisms from Et_2O . M.p. 99–100°. Sol. Et_2O , $CHCl_3$. Spar. sol. H_2O . *Picric acid* \rightarrow yellow ppt. Powerful mydriatic.

B, HCl : prisms. M.p. 219–27°.

B, HBr : plates. M.p. 217–18°. Sol. H_2O . Salt commonly used in medicine.

B_2, H_2SO_4 : needles. M.p. 222–6°.

Methobromide: cryst. M.p. 192–6°.

Acetyl: oil. Sol. Et_2O . B, HCl : m.p. 67°.

Picrate: yellow. M.p. 229° decomp.

Me ether: see Methylhomatropine.

Chemnitius, *J. prakt. Chem.*, 1927, 117, 144.

Asahina, Nogami, *Proc. Imper. Acad., Tokyo*, 1940, 16, 229.

Homoallantoic Acid (1:1-Diureidopropionic acid)



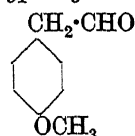
$C_5H_{10}O_4N_4$ MW, 190

Cryst. M.p. 155° decomp. Insol. H_2O . $H_2O \rightarrow$ urea + pyruvic acid.

Et ester: $C_7H_{14}O_4N_4$. MW, 218. Cryst. M.p. 200° decomp. Sol. EtOH–Py. Spar. sol. hot EtOH. Insol. H_2O and most org. solvents. H_2O at 100° \rightarrow urea + pyruvic Et ester.

Simon, *Compt. rend.*, 1904, 138, 372.

Homoanisaldehyde (p-Methoxy- α -toluic aldehyde, p-methoxyphenylacetaldehyde)



$C_9H_{10}O_2$ MW, 150

B, p . 255–6°, 117.5–118°/9 mm. Spar. sol. H_2O . D_4^{20} 1.096. n_D^{20} 1.5359. Reduces warm Fehling's.

Oxime: plates. M.p. 121° (120°).

Phenylhydrazone: m.p. 95°.

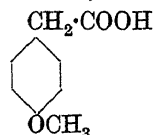
Semicarbazone: cryst. from C₆H₆. M.p. 181–2°.

Tiffeneau, *Ann. chim. phys.*, 1907, 10, 350.

Mannich, Jacobsohn, *Ber.*, 1910, 43, 195.

Harries, Adam, *Ber.*, 1916, 49, 1032.

Homoanisic Acid (*p*-Methoxy- α -toluic acid, *p*-methoxyphenylacetic acid)



C₉H₁₀O₃ MW, 166

Plates from H₂O. M.p. 85–7°. Sol. EtOH, Et₂O.

Me ester: C₁₀H₁₂O₃. MW, 180. B.p. 263–5°, 155–7°/23 mm. D₄²⁰ 1.135.

Et ester: C₁₁H₁₄O₃. MW, 194. B.p. 138–40°/7 mm.

Amide: C₉H₁₁O₂N. MW, 165. Plates from H₂O. M.p. 175°.

Chloride: C₉H₉O₂Cl. MW, 184.5. B.p. 143°/10 mm.

Nitrile: *p*-methoxybenzyl cyanide. C₉H₉ON. MW, 147. B.p. 285–90°. D₄²⁰ 1.10013, D₄²⁰ 1.08454. n_D²⁰ 1.53175.

Tiffeneau, *Ann. chim. phys.*, 1907, 10, 351.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, 103, 1037.

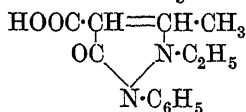
Kondo, Oshima, *Journal of the Pharmaceutical Society of Japan*, 1931, 51, 979.

Kindler, *Ber.*, 1941, 74, 315.

Homoanthranilic Acid.

See 3-Amino-*p*-toluic Acid.

Homoantipyric Acid (3-Methyl-2-ethyl-1-phenyl-5-pyrazolone-4-carboxylic acid)



C₁₃H₁₆O₃N₂ MW, 248

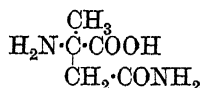
Cryst. M.p. 179°.

Kaufmann *et al.*, *Ber.*, 1942, 75, 1214.

Homoantipyridine.

See 5-Methyl-1-ethyl-2-phenylpyrazolone-3.

Homosparagine (*C*-Methylasparagine, 1-amino-1-methylsuccinic mono-amide)



C₅H₁₀O₃N₂ MW, 146

dl.

Cryst. from EtOH. M.p. 254–6° decomp.

Amide: C₅H₁₁O₂N₃. MW, 145. M.p. 266–7° decomp.

Benzenesulphonyl: m.p. 174°.

d.

Benzenesulphonyl: m.p. 173°. [α]_D²⁰ +10.38°.

Brucine salt: m.p. 158° decomp.

l.

Benzenesulphonyl: m.p. 173°. [α]_D²⁰ –9.72°.

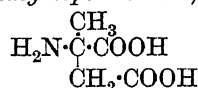
Brucine salt: m.p. 160° decomp.

Körner, Menozzi, *Atti Accad. Lincei*, 1893, 2, ii, 370.

Migliacci, Furia, *Gazz. chim. ital.*, 1928, 58, 103.

Berlingozzi, Cecco, *Chem. Abstracts*, 1937, 31, 3875.

Homoaspartic Acid (1-Amino-1-methylsuccinic acid, *C*-methylaspartic acid)



C₅H₉O₄N MW, 147

dl.

Cryst. + 1H₂O. M.p. 232–4°. Sol. EtOH. Aq. Spar sol. EtOH.

Acetyl: m.p. 156–7°.

Amide: see Homoasparagine.

d.

Cryst. + 1H₂O. M.p. 166–7°. Sol. H₂O. [α]_D²⁰ +3.55°.

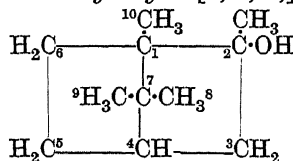
l.

[α]_D²⁰ –3.47°.

Piutti, *Gazz. chim. ital.*, 1898, 28, ii, 148, 155.

Pfeiffer, Heinrich, *J. prakt. Chem.*, 1936, 146, 105.

Homoborneol (2-Methylborneol, 2-hydroxy-2-methylcamphane, 2-methylcamphanol - 2, 1:2:7:7-tetramethylbicyclo-[1, 2, 2,]-heptanol-2)



C₁₁H₂₀O MW, 168

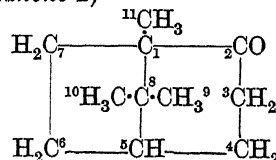
M.p. 154–6°. B.p. 193° (slight loss of H₂O). [α]_D²⁰ +30.79° in EtOH. Volatile in steam.

Nametkin, Schlesinger, *Ann.*, 1923, 432, 223.

Zelinsky, *Ber.*, 1901, 34, 2883.

Ruzicka, *Helv. Chim. Acta*, 1918, 1, 116.

Homocamphor (1:8:8-Trimethylbicyclo-[1, 2, 3,]-octanone-2)



C₁₁H₁₈O MW, 166

Cryst. mass. M.p. 189–90°. Sublimes below m.p. Sol. H₂O. Similar to camphor in solu-

bility in org. solvents. $[\alpha]_D - 112.9^\circ$ in C_6H_6 . Volatile in steam.

Semicarbazone: needles from EtOH. M.p. $250-2^\circ$.

Oxime: m.p. $167-8^\circ$.

2 : 4-Dinitrophenylhydrazone: m.p. $232-3^\circ$.

3-Isonitroso deriv.: plates from C_6H_6 . M.p. $167-8^\circ$.

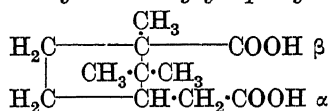
Lapworth, Royle, *J. Chem. Soc.*, 1920, 117, 747.

Rupe, Frey, *Helv. Chim. Acta*, 1944, 27, 627.

β -Homocamphor.

See Homoepicamphor.

Homocamphoric Acid (1 : 2 : 2-Trimethyl-3-carboxymethylcyclopentane-1-carboxylic acid, 2 : 2 : 3-trimethyl-3-carboxycyclopentylacetic acid)



$C_{11}H_{18}O_4$ MW, 214

Needles from $PhNO_2$. M.p. 233° . Spar. sol. most org. solvents.

α -Et ester: $C_{13}H_{22}O_4$. MW, 242. M.p. 56° .

Di-Et ester: $C_{15}H_{26}O_4$. MW, 270. B.p. 175° .

β -Phenyl ester: $C_{17}H_{22}O_4$. MW, 290. M.p. $152-3^\circ$.

α -Et- β -phenyl ester: m.p. 51° . B.p. $221^\circ/12$ mm.

α -Nitrile: see Cyanocampholic Acid.

Palfray, *Ann. chim.*, 1923, 20, 297.

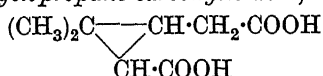
Lapworth, Royle, *J. Chem. Soc.*, 1920, 117, 750.

Haller, *Compt. rend.*, 1896, 122, 446.

β -Homocamphoric Acid.

See Homoepicamphoric Acid.

Homocaronic Acid (3 : 3-Dimethyl-2-carboxymethylcyclopropane-carboxylic acid)



$C_8H_{12}O_4$ MW, 172

Cis.

Needles from H_2O . M.p. $135-6^\circ$ after sintering at 120° . Sol. toluene. Spar. sol. C_6H_6 , $CHCl_3$. Stable to Br in $CHCl_3$ or AcOH even on warming.

Di-phenylphenacyl ester: prisms from EtOH- Me_2CO . M.p. $147-9^\circ$.

Anhydride: b.p. $155-60^\circ/17$ mm.

Trans.

Needles from H_2O . M.p. $191-2^\circ$. Less sol. H_2O than *cis*-form.

Owen, Simonsen, *J. Chem. Soc.*, 1933, 1226.

Simonsen, Rau, *J. Chem. Soc.*, 1923, 123, 556.

Guha, Sankaran, *Ber.*, 1937, 70, 1691.

Homocassaine

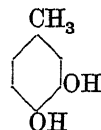
$C_{26}H_{43}O_4N$

MW, 433

Colourless cryst. M.p. $107-9^\circ$. Sol. Et_2O .

Faltis, Holzinger, *Ber.*, 1939, 72, 1443.

Homocatechol (4-Methylcatechol, 3 : 4-dihydroxytoluene)



$C_7H_8O_2$

MW, 124

Prisms from C_6H_6 . M.p. 65° . B.p. 251° , $210-15^\circ/190$ mm., $143-6^\circ/20$ mm. $D_4^{25} 1.1287$. $n_D^{25} 1.5425$. Sol. H_2O , EtOH, Et_2O . Spar. sol. ligroin. Sublimes. Reduces NH_3 , $AgNO_3$ and Fehling's. $FeCl_3 \rightarrow$ green col. Alk. sol. turns red in air.

3-Me ether: see Creosol.

4-Me ether: isocresol, 4-methylguaiacol, 3-hydroxy-4-methoxytoluene. $C_8H_{10}O_2$. MW, 138. Leaflets. M.p. $37-9^\circ$. B.p. 223° . $D_4^{25} 1.0742$. $n_D^{25} 1.5269$. Sublimes. Volatile in steam. Picrate: m.p. 88° .

Di-Me ether: see Homoveratrol.

3-Et ether: 4-hydroxy-3-ethoxytoluene, 2-hydroxy-5-methylphenetole. $C_9H_{12}O_2$. MW, 152. M.p. 58° .

Di-Et ether: 3 : 4-diethoxytoluene. $C_{11}H_{16}O_2$. MW, 180. B.p. $227-30^\circ$, $123^\circ/70$ mm. $D_4^{25} 1.0303$.

3-Me-4-Et ether: 3-methoxy-4-ethoxytoluene. $C_{10}H_{14}O_2$. MW, 166. B.p. 223° . $D_4^{25} 1.032$.

Diacetyl: b.p. $260-4^\circ$, $160^\circ/70$ mm.

Pauly, *Ber.*, 1909, 42, 421.

De Vries, *Rec. trav. chim.*, 1909, 28, 278.

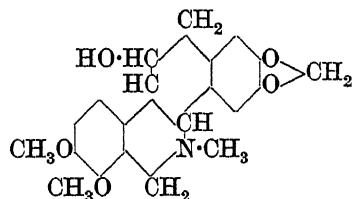
Perkin, *J. Chem. Soc.*, 1896, 69, 1185.

Cousin, *Compt. rend.*, 1893, 116, 105.

Homocerebron.

See Kerasin.

α -Homochelidonine



$C_{21}H_{23}O_5N$

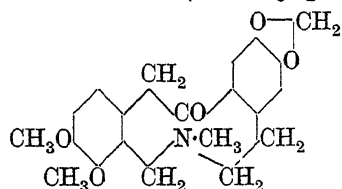
MW, 369

Alkaloid from *Chelidonium majus*. Prisms from AcOEt. M.p. 182° . Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O .

Schmidt, Selle, *Arch. Pharm.*, 1890, 228, 441.

Späth, Kuffner, *Ber.*, 1931, 64, 1123.

β-Homochelidonine (α-Allocryptopine)



C₂₁H₂₃O₅N

MW, 369

Occurs with other chelidonines in *Sanguinaria canadensis*, *Eschscholtzia californica*, etc. Prisms from AcOEt. M.p. 159–60°. Sol. AcOEt, CHCl₃. Spar. sol. EtOH, Et₂O. Sol. conc. H₂SO₄ to carmine sol. POCl₃ → dihydroanhydroberberine methochloride, m.p. 200–1°.

B,HCl: m.p. 190°.

B,H₂AuCl₄: m.p. 190–2°.

Methosulphate, 3H₂O: m.p. 125°.

α-Methiodide: m.p. 185°.

β-Methiodide: m.p. 211°.

Haworth, Perkin, *J. Chem. Soc.*, 1926, 445.

Gadamer, *Arch. Pharm.*, 1920, 258, 156.

Fischer, *Arch. Pharm.*, 1901, 239, 409.

Momoya, *Chem. Abstracts*, 1919, 13, 1459.

γ-Homochelidonine (β-Allocryptopine).

Alkaloid constituent of *Sanguinaria canadensis*. Tablets from AcOEt. M.p. 168° (170–1°). Sol. CHCl₃. Spar. sol. cold EtOH, Et₂O. Physical isomer of β-homochelidonine.

B,HCl, 1½H₂O: m.p. 175° decomp.

B,H₂AuCl₄: m.p. 187°.

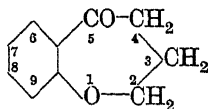
Miller, *J. Am. Pharm. Assocn.*, 1929, 18, 12.

Konig, Tietz, *Arch. Pharm.*, 1893, 231, 161.

Jowett, Pyman, *J. Chem. Soc.*, 1913, 103, 299.

Fischer, *Arch. Pharm.*, 1901, 239, 409.

5-Homochromanone



C₁₀H₁₀O₂

MW, 162

Oil. Sol. EtOH, Et₂O, C₆H₆, pet. ether. Warm conc. H₂SO₄ → red col.

Oxime: white plates from pet. ether. M.p. 99°.

Semicarbazone: needles from EtOH. M.p. 228–9°.

Powell, Anderson, *J. Am. Chem. Soc.*, 1931, 53, 811.

Homocinchonidine

C₁₉H₂₂ON₂

MW, 294

One of the cinchona alkaloids. Prisms from EtOH. M.p. 207.5°. [α]_D – 107.3° in EtOH. Sol. EtOH, CHCl₃. Spar. sol. Et₂O. Insol. H₂O. Similar in properties to cinchonine. Re-

cryst. of neutral sulphate → cinchonidine sulphate. Ox. → cinchonetidine, m.p. 256°.

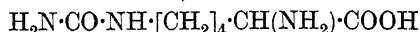
Acetyl: [α]_D – 34° in EtOH.

B,HCl, 2H₂O: [α]_D – 138° in EtOH.

B,H₂SO₄, 6H₂O: [α]_D – 138° in EtOH.

Hesse, *Ann.*, 1880, 205, 203; *Ber.*, 1881, 14, 1891.

Homocitrulline (1-Amino-5-ureidocaproic acid, ureidonorleucine)



C₇H₁₅O₃N₃

MW, 189

l.

Plates from Me₂CO.Aq. M.p. 211–12° decomp. [α]_D²⁵ + 6.9° in H₂O, [α]_D²⁵ + 27.5° in *N*/HCl.

Cu complex: cryst. M.p. 246–7° decomp.

dl.

Cryst. M.p. 224° with evolution of gas. Very sol. H₂O. Insol. EtOH, Et₂O. Faintly sweet taste.

Cu complex: pale blue needles. M.p. 258° decomp.

Kurtz, *J. Biol. Chem.*, 1949, 180, 1253.

Homococaine.

See under Ecgonine.

Homocysteine (3-Mercapto-1-aminobutyric acid)



C₄H₉O₂NS

MW, 135

Intermediate in the metabolic conversion of methionine into cysteine.

dl.

Cryst. from H₂O–EtOH. M.p. 232–3° corr. Ox. → homocystine.

S-Benzyl: cryst. M.p. 240–50° corr. *N*-Formyl: plates from Me₂CO–C₆H₆. M.p. 85–6° corr.

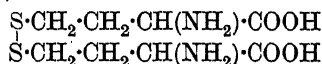
Thiolactone: *B*,HCl: cryst. from EtOH–Et₂O. M.p. 200–1°.

d.

S-Benzyl: cryst. from H₂O. M.p. 247–52° corr. [α]_D²⁵ – 25° in *N*/HCl. FeCl₃ → *d*-homocystine.

Riegel, Vigneaud, *J. Biol. Chem.*, 1935, 112, 149.

Homocystine (1:1'-Diamino-3:3'-disulphidobutyric acid, di-[3-amino-3-carboxy]-propyl disulphide)



C₈H₁₆O₄N₂S₂

MW, 268

dl.

Plates from H₂O. Decomp. at 260–5°. Reduce with Na–liq. NH₃ in presence of MeI → *dl*-methionine. HOBr → homocysteic acid,

decomp. at 230–5°. Can replace cystine as growth promoter.

Dibenzoyl: cryst. from EtOH. M.p. 184–5°.

d.

M.p. 281–4° corr. decomp. $[\alpha]_D^{25} - 77^\circ$ in N/HCl , $[\alpha]_D^{21} + 16^\circ$ in H_2O .

l.

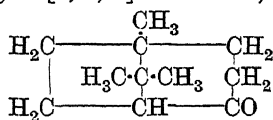
M.p. 281–4° corr. decomp. $[\alpha]_D^{25} + 77^\circ$ in N/HCl , $[\alpha]_D^{21} - 16^\circ$ in H_2O .

Butz, Vigneaud, *J. Biol. Chem.*, 1932, **99**, 135.

Patterson, Vigneaud, *J. Biol. Chem.*, 1935, **111**, 393; **109**, 97.

Snyder, Cannon, *J. Am. Chem. Soc.*, 1944, **66**, 511.

Homoepicamphor (β -Homocamphor, 1:8:8-trimethylbicyclo-[1, 2, 3]-octanone-3)



$C_{11}H_{18}O$ MW, 166

M.p. 202–4°. $[\alpha]_D^{15} + 13^\circ$ in MeOH. Sol. most org. solvents. Volatile in steam.

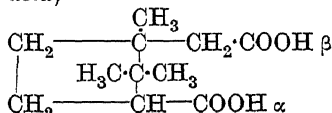
Semicarbazone: m.p. 245–7°.

Oxime: m.p. 105°.

Isonitroso deriv.: m.p. 174–5°. $[\alpha]_D^{22} + 175.6^\circ$ in MeOH.

Salmon-Legagneur, *Compt. rend.*, 1932, **194**, 467; *Bull. soc. chim.*, 1932, **51**, 807.

Homoepicamphoric Acid (1:2:2-Tri-methyl-3-carboxycyclopentylacetic acid, β -homo-camphoric acid)



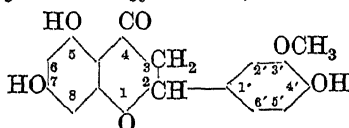
$C_{11}H_{18}O_4$ MW, 214

M.p. 220–2°. $[\alpha]_D^{15} + 27.2^\circ$ in MeOH.

β -Mononitrile: $C_{11}H_{17}O_3N$. MW, 195. M.p. 155–6°. $[\alpha]_D^{20} + 40.1^\circ$ in MeOH.

Salmon-Legagneur, *Compt. rend.*, 1932, **194**, 467; *Bull. soc. chim.*, 1932, **51**, 807.

Homoeriodictyol (*Eriodictyonone*, 5:7:4'-tri-hydroxy-3'-methoxyflavanone)



$C_{16}H_{14}O_6$ MW, 302

Occurs in leaves of *Eriodictyon glutinosum* and *E. angustifolium*, Benth. Needles from AcOH. M.p. 224–5°. $[\alpha]_D^{20} - 28.21^\circ$ in EtOH. Mod. sol. EtOH, AcOH. Spar. sol. AcOEt. Insol. H_2O ,

$CHCl_3$, C_6H_6 . $FeCl_3 \rightarrow$ red col. Reduces Fehling's.

7:4'-*Di-Me ether*: $C_{18}H_{18}O_6$. MW, 330. Needles. M.p. 136°.

Oxime: leaflets from EtOH. M.p. 224°.

Phenylhydrazone: yellow cryst. from EtOH. M.p. 184–6°.

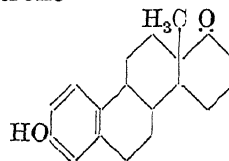
Shinoda, Sato, *Chem. Abstracts*, 1929, **23**, 4210.

Mossler, *Ann.*, 1907, **351**, 233.

Power, Tutin, *J. Chem. Soc.*, 1907, **91**, 887.

Geissman, *J. Am. Chem. Soc.*, 1940, **62**, 3258.

D-Homœstrone



$C_{19}H_{24}O_2$ MW, 284

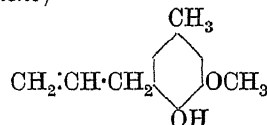
Needles from H_2O . M.p. 263° (269° after sublimation). Sol. dioxan. $[\alpha]_D^{15} + 27.5^\circ$ in dioxan.

Oxime: cryst. from MeOH-Et₂O. M.p. 221–2°.

Acetyl: prisms from AcOH-hexane. M.p. 130–1°.

Goldberg, Studer, *Helv. Chim. Acta*, 1941, **24**, 478.

Homo-o-eugenol (4-Hydroxy-5-methoxy-3-propenyltoluene)

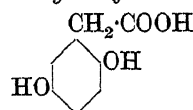


$C_{11}H_{14}O_2$ MW, 178

B.p. 142°/16 mm. $n_D^{15} 1.5400$. $FeCl_3 \rightarrow$ green col.

Buu-Hoï et al., *Bull. soc. chim.*, 1945, **12**, 866.

Homogentisic Acid (2:5-Dihydroxyphenyl-acetic acid, 2:5-dihydroxy- α -toluic acid, Alcapton)



$C_8H_8O_4$ MW, 168

Occurs in plants, and urine of alcaptonurics. Prisms + $1H_2O$ from H_2O . Plates from EtOH- $CHCl_3$. M.p. anhyd. 152–4° (146.5–147°). Sol. H_2O , EtOH, Et₂O. Insol. $CHCl_3$, C_6H_6 . Reduces Fehling's. KOH fusion \rightarrow hydroquinone. Ox. \rightarrow *p*-benzoquinonylacetic acid.

Me ester: m.p. 116–17°. *Dibenzoyl*: m.p. 125°. *Di-Me ether*: $C_{11}H_{14}O_4$. MW, 210. M.p. 45°.

Et ester: $C_{10}H_{12}O_4$. MW, 196. M.p. 119–20°. *Dibenzoyl*: m.p. 130–1°.

Amide: dibenzoyl, m.p. 204°.

Di-Me ether: $C_{10}H_{12}O_4$. MW, 196. M.p. 124–5°.

Dibenzoyl: m.p. 181°.

Wolkow, Baumann, *Z. physiol. Chem.*, 1888, 15, 282.

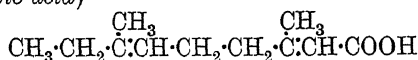
Blix, *Z. physiol. Chem.*, 1932, 210, 87.

Hahn, Stenner, *Z. physiol. Chem.*, 1929, 181, 100.

Mörner, *Z. physiol. Chem.*, 1921, 117, 85.

McElvain, Cohen, *J. Am. Chem. Soc.*, 1942, 64, 260.

Homogeranic Acid (2:6-Dimethyl-1:5-octadiene-1-carboxylic acid, 3:7-dimethylnona-dienoic acid)



$C_{11}H_{18}O_2$ MW, 182

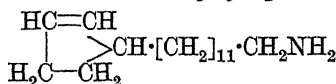
Oil. B.p. 119–125°/1.5 mm.

S-Benzylthiouronium salt: cryst. from EtOH. M.p. 123°.

p-Bromophenacyl ester: plates. M.p. 52–3°.

King, Grundon, *J. Chem. Soc.*, 1950, 3547.

Homohydnocarpylamine (ω -Cyclopentenyl-dodecylamine, ω -aminododecylcyclopentene)



$C_{17}H_{33}N$ MW, 251

Cryst. from EtOH. M.p. 18°. B.p. 190°/15 mm.

B₂HCl: m.p. 151° (160°).

N-Acetyl: m.p. 60°.

Picrate: m.p. 112°.

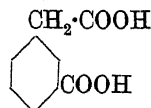
Naegeli, Stefanovitsch, *Helv. Chim. Acta*, 1928, 11, 648.

Naegeli, Vogt-Markus, *Helv. Chim. Acta*, 1932, 15, 67.

Homohydroquinone.

See Toluhydroquinone.

Homoisophthalic Acid (*m*-Carboxyphenyl-acetic acid, 3-carboxy- α -toluic acid)



$C_9H_8O_4$ MW, 180

Needles or plates from H_2O . M.p. 184–5°. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. cold H_2O , C_6H_6 , $CHCl_3$. Sublimes. Ox. \rightarrow isophthalic acid.

Di-nitrile: *see m*-Cyanobenzyl cyanide.

Reinglass, *Ber.*, 1891, 24, 2417.

Komppa, Hirn, *Ber.*, 1903, 36, 3611.

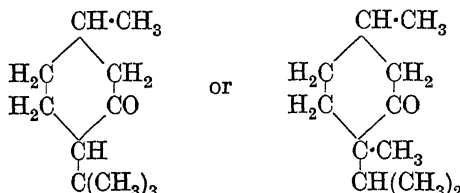
Homolevulinic Acid.

See 3-Keto-*n*-caproic Acid.

ψ -**Homolycorine.**

See Lycoramine.

Homomenthone (1-Methyl-4-tert.-butylcyclohexanone-3, 1:4-dimethyl-4-isopropylcyclohexanone-3, 4(or 8)-methylmenthone)



$C_{11}H_{20}O$ MW, 168

B.p. 93°/11 mm. D_4^{20} 0.9050. n_D^{20} 1.4642. $[\alpha]_D^{20} + 43.98^\circ$.

Semicarbazone: m.p. 186°.

Rupe, Schobel, Abegg, *Ber.*, 1912, 45, 1539.

Homomestiones.

The above trivial name has been given to a number of unsaturated ketones which are here grouped together.

1. 3-Methyl-3-heptenone-5, 5-keto-3-methylheptene-3.

$C_8H_{14}O$ $\text{CH}_3\text{CH}_2\text{CO}\cdot\text{CH}\cdot\text{C}(\text{CH}_3)=\text{CH}_2\cdot\text{CH}_3$ MW, 126

B.p. 165–8°, 66°/18 mm., 53–4°/8 mm. $D_4^{21.5}$ 0.85516. $n_D^{21.5}$ 1.45073.

Semicarbazone: m.p. 162°.

2. 3-Methyl-2-heptenone-5, 5-keto-3-methylheptene-2.

$C_8H_{14}O$ $\text{CH}_3\text{CH}_2\text{CO}\cdot\text{CH}_2\cdot\text{C}(\text{CH}_3)=\text{CH}\cdot\text{CH}_3$ MW, 126

B.p. 63°/19 mm. $D_4^{21.2}$ 0.85244. $n_D^{21.2}$ 1.43668.

Semicarbazone: m.p. 134°.

3. 3:4-Dimethyl-3-hexenone-2, 1:2-dimethyl-1-acetobutylene-1, 3-methyl-2-acetopentene-2, 2-keto-3:4-dimethylhexene-3.

$C_8H_{14}O$ $\text{CH}_3\text{CH}_2\text{C}(\text{CH}_3)=\text{C}(\text{CH}_3)\cdot\text{CO}\cdot\text{CH}_3$ MW, 126

B.p. 65°/20 mm. $D_4^{17.4}$ 0.86856. $n_D^{17.4}$ 1.45283.

Semicarbazone: m.p. 180–2°.

4. 3:4-Dimethyl-2-hexenone-5, 1:2-dimethyl-1-acetobutylene-2, 3-methyl-4-acetopentene-2, 5-keto-3:4-dimethylhexene-2.

$C_8H_{14}O$ $\text{CH}_3\text{CO}\cdot\text{CH}(\text{CH}_3)\cdot\text{C}(\text{CH}_3)=\text{CH}\cdot\text{CH}_3$ MW, 126

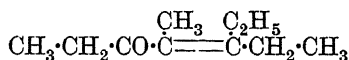
B.p. 154°/750 mm., 48°/12 mm. $D_4^{19.2}$ 0.85385. $n_D^{19.2}$ 1.43768.

Semicarbazone: two forms, m.p.'s. 163° and 203-4°.

Abbot, Kon, Satchell, *J. Chem. Soc.*, 1928, 2519 *et seq.*

McAllister, Bailey, Bouton, *J. Am. Chem. Soc.*, 1940, **62**, 3210.

5. 4-Methyl-3-ethyl-3-heptenone-5, 5-keto-4-methyl-3-ethylheptene-3.

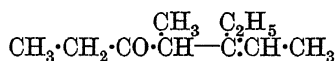


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 80°/10 mm. D_4^{19} 0.86218. n_D^{19} 1.45453.

Semicarbazone: m.p. 153°.

6. 4-Methyl-3-ethyl-2-heptenone-5, 5-keto-4-methyl-3-ethylheptene-2.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 74°/10 mm. D_4^{21} 0.85640. n_D^{21} 1.44522.

Semicarbazone: m.p. 109°.

7. 4-Methyl-4-nonenone-6, 6-keto-4-methyl-nonene-4.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 90-2°/16 mm. D_4^{20} 0.8608. n_D^{20} 1.45183.

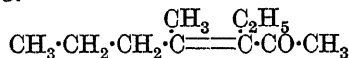
8. 4-Methyl-3-nonenone-6, 6-keto-4-methyl-nonene-3.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 94°/18 mm. $D_4^{21.5}$ 0.84130. $n_D^{21.5}$ 1.44291.

9. 4-Methyl-3-ethyl-3-heptenone-2, 4-methyl-3-acetoheptene-3, 2-keto-4-methyl-3-ethylheptene-3.

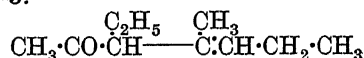


$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

B.p. 83°/14 mm. D_4^{20} 0.85589. n_D^{20} 1.45353.

Semicarbazone: m.p. 123°.

10. 4-Methyl-5-ethyl-3-heptenone-6, 4-methyl-5-acetoheptene-3, 6-keto-4-methyl-5-ethylheptene-3.



$\text{C}_{10}\text{H}_{18}\text{O}$ MW, 154

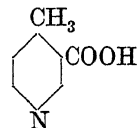
B.p. 69°/11 mm. D_4^{20} 0.84503. n_D^{20} 1.44050.

Semicarbazone: m.p. 154°.

Kon, Leton, *J. Chem. Soc.*, 1931, 2502 *et seq.*

Colonge, Joly, *Ann. chim.*, 1943, **18**, 286.

Homonicotinic Acid (4-Methylpyridine-3-carboxylic acid, 4-methylnicotinic acid, γ -picoline-3-carboxylic acid)



$\text{C}_7\text{H}_7\text{O}_2\text{N}$ MW, 137

Prisms from H_2O . M.p. 215-16° decomp. Hot $\text{Ca}(\text{OH})_2 \rightarrow \gamma$ -picoline. Hot $\text{H} \cdot \text{CHO} \rightarrow$ trimethylolhomonicotinic lactone.

Et ester: $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. B.p. 118°/12 mm. *Picrate*: m.p. 137°. *Chloroplatinate*: m.p. 183° decomp.

Chloride: $\text{C}_7\text{H}_6\text{ONCl}$. MW, 155.5. Cryst. from C_6H_6 . M.p. 135-8° decomp. B.p. 105°/12 mm. *Chloroplatinate*: m.p. 206-7° decomp.

B_3HAuCl_4 : decomp. 190° (sinters at 180°).

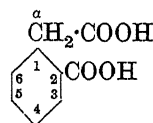
Gabriel, Colman, *Ber.*, 1902, **35**, 2849.

Rabe, Jantzen, *Ber.*, 1921, **54**, 925.

Preobrazhenskii, Beer, *J. Gen. Chem.*

U.S.S.R., 1945, **15**, 667.

Homophthalic Acid (o-Carboxy- α -toluic acid, o-carboxyphenylacetic acid)



$\text{C}_9\text{H}_8\text{O}_4$ MW, 180

M.p. 180-1°. Sol. EtOH , hot H_2O . Spar. sol. Et_2O . Insol. CHCl_3 , C_6H_6 . k (first) = 1.91×10^{-6} at 25°; (second) = 0.9×10^{-6} at 25°. Ox. \rightarrow phthalic acid.

2-Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_4$. MW, 194. M.p. 143-5°. $k = 4.34 \times 10^{-5}$ at 25°. *Amide*: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{N}$. MW, 193. M.p. 110-12°.

α -*Me ester*: m.p. 96-8°. $k = 7.64 \times 10^{-5}$ at 25°.

2-Et ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. M.p. 111-13°. $k = 4.6 \times 10^{-5}$ at 25°.

α -*Et ester*: m.p. 107-8°. $k = 7.08 \times 10^{-5}$ at 25°.

Di-Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. M.p. 39-42°. B.p. 169-74°/15 mm.

Di-Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_4$. MW, 236. B.p. 291.5-292.5°.

Anhydride: $\text{C}_9\text{H}_6\text{O}_3$. MW, 162. M.p. 140-5-141°.

2-Amide: $\text{C}_9\text{H}_9\text{O}_3\text{N}$. MW, 179. M.p. 230° decomp. $k = 5.0 \times 10^{-5}$ at 25°.

α -*Amide*: m.p. 185-7° (184°). $k = 8.9 \times 10^{-5}$ at 25°.

α -*Nitrile*: o-carboxybenzylcyanide. $\text{C}_9\text{H}_7\text{O}_2\text{N}$. MW, 161. M.p. 116° decomp.

Dinitrile: see o-Cyanobenzyl cyanide.

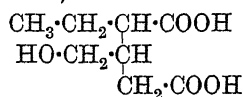
Imide: $\text{C}_9\text{H}_7\text{O}_2\text{N}$. MW, 161. M.p. 233°.

Anilide: m.p. 231-5°.

Davies, Poole, *J. Chem. Soc.*, 1928, 1616.

Dieckmann, Hardt, *Ber.*, 1919, **52**, 1141.

Homopilomalic Acid (2-Hydroxymethyl-pentane-1:3-dicarboxylic acid, 2-hydroxymethyl-1-ethylglutaric acid)



$\text{C}_8\text{H}_{14}\text{O}_5$ MW, 190

Free acid unstable.

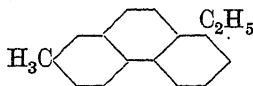
Di-Et ester: $\text{C}_{12}\text{H}_{22}\text{O}_5$. MW, 246. B.p. $293^\circ/755$ mm., $181-3^\circ/26$ mm.

Diamide: $\text{C}_8\text{H}_{16}\text{O}_2\text{N}_2$. MW, 188. Prisms from H_2O . M.p. 208° (206°). Sol. H_2O , EtOH. $[\alpha]_D^{18} + 20.8^\circ$ in EtOH.Aq.

Jowett, *J. Chem. Soc.*, 1901, 79, 1338.

Pinner, Schwarz, *Ber.*, 1902, 35, 198.

Homopimanthrene (Methylpimanthrene, 7-methyl-1-ethylphenanthrene)



$\text{C}_{17}\text{H}_{16}$ MW, 220

Plates from EtOH. M.p. 81° .

Picrate: yellow needles from MeOH. M.p. $115-16^\circ$.

Quinoxaline deriv.: needles from AcOH. M.p. 154° .

Ruzicka, Balas, *Helv. Chim. Acta*, 1924, 7, 875.

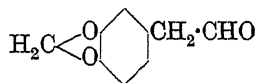
Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, 15, 1300.

Haworth, *J. Chem. Soc.*, 1932, 2718.

Homopiperidinic Acid.

See 4-Amino-n-valeric Acid.

Homopiperonal (3:4-Methylenedioxyphenylacetaldehyde, 3:4-methylenedioxy- α -toluic aldehyde)



$\text{C}_9\text{H}_8\text{O}_3$ MW, 164

Cryst. from MeOH. M.p. 69° . B.p. $143-4^\circ/10$ mm., $123-5^\circ/1$ mm. D^{20}_D 1.295. n_D 1.57117.

Oxime: needles from EtOH.Aq. M.p. 121° ($124-5^\circ$). B.p. $180-1^\circ/10$ mm.

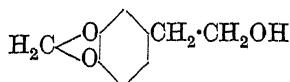
Semicarbazone: cryst. from MeOH. M.p. 189° .

2:4-Dinitrophenylhydrazones: orange leaflets from AcOH. M.p. $140-1^\circ$.

Semmler, Bartelt, *Ber.*, 1908, 41, 2751.

Erdtman, Robinson, *J. Chem. Soc.*, 1933, 1530.

Homopiperonyl Alcohol (2-[3:4-Methylenedioxyphenyl]-ethyl alcohol)

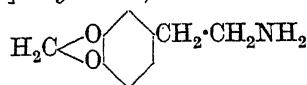


$\text{C}_9\text{H}_{10}\text{O}_3$ MW, 166

B.p. $156^\circ/10$ mm. n_D 1.54780.

Semmler, Bartelt, *Ber.*, 1908, 41, 2752.

Homopiperonylamine (2-[3:4-Methylenedioxyphenyl]-ethylamine)



$\text{C}_9\text{H}_{11}\text{O}_2\text{N}$ MW, 165

B.p. $166^\circ/20$ mm., $146-8^\circ/10$ mm. D^{20}_D 1.225. n_D 1.5620.

B,HCl: m.p. $208-9^\circ$ ($210-11^\circ$).

B,2HCl: m.p. 310° .

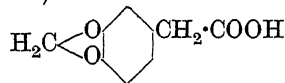
Picrate: m.p. 160° decomp.

Kindler, Peschke, *Arch. Pharm.*, 1931, 269, 70.

Hahn, Schales, *Ber.*, 1934, 67, 1486.

Semmler, Bartelt, *Ber.*, 1908, 41, 2752.

Homopiperonylic Acid (3:4-Methylenedioxyphenylacetic acid, homoprotocatechuic acid methylene ether)



$\text{C}_9\text{H}_8\text{O}_4$ MW, 180

Cryst. from H_2O . M.p. 127° .

Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_4$. MW, 194. B.p. $153-5^\circ/10$ mm. D^{20}_D 1.246. n_D 1.534.

Et ester: $\text{C}_{11}\text{H}_{12}\text{O}_4$. MW, 208. B.p. $145-7^\circ/8$ mm.

Amide: $\text{C}_9\text{H}_9\text{O}_3\text{N}$. MW, 179. M.p. $172-3^\circ$.

Nitrile: $\text{C}_9\text{H}_7\text{O}_3\text{N}$. MW, 161. M.p. 42° . B.p. $153-6^\circ/10$ mm. D^{20}_D 1.231. n_D 1.53698.

Semmler, Bartelt, *Ber.*, 1908, 41, 2752.

Stevens, *J. prakt. Chem.*, 1934, 140, 46.

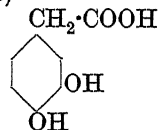
Slotta, Haberland, *J. prakt. Chem.*, 1934, 139, 211.

Hahn, Schales, *Ber.*, 1934, 67, 1486.

Hahn, Schulz, *Ber.*, 1939, 72, 1308.

Kindler, *Ber.*, 1941, 74, 315.

Homoprotocatechuic Acid (3:4-Dihydroxyphenylacetic acid)



$\text{C}_8\text{H}_8\text{O}_4$ MW, 168

Needles from C_6H_6 . M.p. 127° . Sol. H_2O , EtOH, Et_2O . Insol. pet. ether. Reduces $\text{NH}_3\cdot\text{AgNO}_3$ and Fehling's. $\text{FeCl}_3 \rightarrow$ green col. KOH fusion \rightarrow protocatechuic acid.

3-Me ether: see Homovanillic Acid.

3:4-Di-Me ether: see Homoveratric Acid.

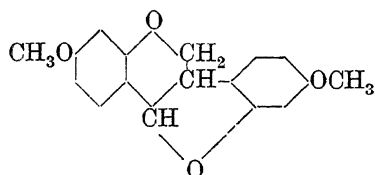
Methylene ether: see Homopiperonylic Acid.

3:4-Diacetyl: cryst. from EtOH.Aq. M.p. $89-90^\circ$. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Pictet, Gams, *Ber.*, 1909, 42, 2949.

Pfeiffer, Loewe, *J. prakt. Chem.*, 1937, 147, 293.

Homopterocarpin

 $C_{17}H_{16}O_4$

MW, 284

Colourless constituent of the "Insoluble Red" woods, e.g. Red sandalwood (*Pterocarpus santalinus*, Linn.), barwood (*Baphia nitida*, Lodd), etc. Needles from pet. ether. M.p. 88–9°. $[\alpha]_D^{20} - 237^\circ$ in $CHCl_3$. Sublimes at 80°/0.1 mm. Stable towards alkalis but very sensitive towards min. acids. $HNO_3 \rightarrow$ styphnic acid.

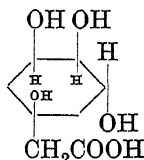
McGookin, Robertson, Whalley, *J. Chem. Soc.*, 1940, 787.

Späth, Schläger, *Ber.*, 1940, 73, 1.

Homopyrrole.

See Methylpyrrole.

Homoquinaic Acid

 $C_8H_{14}O_6$

MW, 206

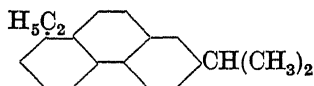
δ -Lactone: $C_8H_{12}O_5$. MW, 188. Colourless oil. $[\alpha]_D^{25} - 32^\circ$ in H_2O .

Tetra-acetyl: cryst. from Et_2O -light petroleum. M.p. 117°. $[\alpha]_D^{25} - 29^\circ$ in H_2O . Amide: cryst. from $AcOEt$ -light petroleum. M.p. 180–1°. $[\alpha]_D^{25} - 40^\circ$ in $MeOH$.

Nitrile: $C_8H_{13}O_4N$. MW, 187. Cryst. from $MeOH-Et_2O$. M.p. 146°. $[\alpha]_D^{25} - 41^\circ$ in $EtOH$. Tetra-acetyl: cryst. from $MeOH$ or H_2O . M.p. 155°. Tribenzoyl: needles from $MeOH$. M.p. 171°. $[\alpha]_D^{25} - 147^\circ$ in $CHCl_3$.

Grewe, Nolte, *Ann.*, 1951, 575, 1.

Homoretene (Methylretene, 8-ethyl-2-isopropylphenanthrene)

 $C_{19}H_{20}$

MW, 248

Plates from $EtOH$. M.p. 79°.

Quinoxaline deriv.: yellow needles from $AcOH$. M.p. 165–6°.

Picrate: yellow ppt. from $EtOH$. M.p. 101–4°.

Ruzicka, Meyer, *Helv. Chim. Acta*, 1922, 5, 590.

Ruzicka, de Graaf, Müller, *Helv. Chim. Acta*, 1932, 15, 1300.

Haworth, *J. Chem. Soc.*, 1932, 2719.

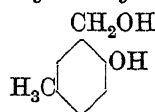
Homosalicylaldehyde.

See Hydroxytoluic Aldehyde and o-Hydroxyphenylacetaldehyde.

Homosalicylic Acid.

See Hydroxytoluic Acid.

Homosaligenin (5-Methylsaligenin, 5-methyl-2-hydroxybenzyl alcohol, 2-hydroxy-5-methylbenzyl alcohol, 3- ω -hydroxy-m-4-xyleneol)

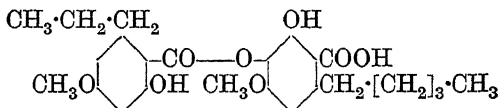
 $C_8H_{10}O_2$

MW, 138

Plates from H_2O . M.p. 105°. Very sol. $EtOH$, Et_2O , hot H_2O . Sol. 15 parts H_2O at ord. temp.

Auwers, *Ber.*, 1907, 40, 2531.

Homosekikaic Acid

 $C_{24}H_{30}O_8$

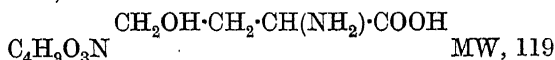
MW, 446

Occurs in the thallus of the lichen *Cladonia subpityrea*, Sandst. Plates from pet. ether. M.p. 133–4°. Alc. $FeCl_3 \rightarrow$ violet col.

Me ester: $C_{25}H_{32}O_8$. MW, 460. M.p. 106°.

Asahina, Kusaka, *Ber.*, 1937, 70, 1820, 1822.

Homoserine (3-Hydroxy-1-aminopropionic acid)

 $C_4H_9O_3N$

MW, 119

d.-

Cryst. M.p. 203° decomp. $[\alpha]_D^{25} - 8^\circ$ in H_2O .

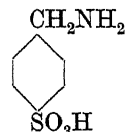
l.-

Cryst. M.p. 203° decomp. $[\alpha]_D^{25} + 8^\circ$ in H_2O .

dl.-

Cryst. M.p. 186–7° decomp.

Armstrong, *J. Am. Chem. Soc.*, 1948, 70, 1756.

4-Homosulphanilic Acid (α -Aminotoluene-p-sulphonic acid, benzylamine-p-sulphonic acid) $C_7H_9O_3NS$

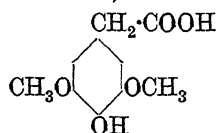
MW, 187

Plates from H_2O . Decomp. without melting. Amide: see Maphenide.

Jensen et al., *Z. physiol. Chem.*, 1944, 280, 37.

Bergeim, Braker, *J. Am. Chem. Soc.*, 1944, 66, 1459.

Homosyringic Acid (4-Hydroxy-3:5-dimethoxyphenylacetic acid)



$C_{10}H_{12}O_5$

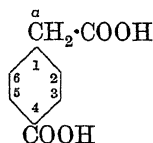
MW, 212

Needles from ligroin. M.p. 130–1°. Sol. C_6H_6 . Insol. pet. ether. $FeCl_3 \rightarrow$ red col.

Benzoyl: needles from C_6H_6 . M.p. 149–50°.

Mauthner, *J. prakt. Chem.*, 1935, 142, 32.

Homoterephthalic Acid (p-Carboxyphenylacetic acid)



$C_9H_8O_4$

MW, 180

Cryst. from EtOH.Aq. M.p. 237–8°. Sol. Et_2O , C_6H_6 . Sol. 100 parts H_2O at 50°, 7 parts $EtOH$ at 30°.

Di-Et ester: $C_{13}H_{16}O_4$. MW, 236. B.p. 312–13°.

4-Amide: $C_9H_9O_3N$. MW, 179. M.p. 229°.

α -Amide: cryst. from EtOH. M.p. 261°.

Diamide: $C_9H_{10}O_2N_2$. MW, 178. M.p. 235°.

4-Nitrile: p-cyanophenylacetic acid. $C_9H_7O_2N$. MW, 161. Cryst. from EtOH. M.p. 152°.

α -Nitrile: cryst. from EtOH.Aq. M.p. 201°.

Dinitrile: see p-Cyanobenzyl cyanide.

α -Amide-4-nitrile: $C_9H_8ON_2$. MW, 160. Cryst. from EtOH.Aq. M.p. 195–5° (196°).

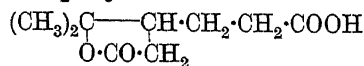
4-Amide- α -nitrile: plates from EtOH. M.p. 182°.

Mellinghoff, *Ber.*, 1889, 22, 3211.

Fileti, Basso, *Gazz. chim. ital.*, 1895, 21, 61.

Fileti, Baldracco, *J. prakt. Chem.*, 1893, 47, 532.

Homoterpenylic Acid



$C_9H_{14}O_4$

MW, 186

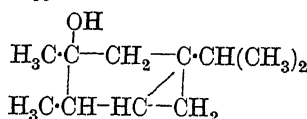
Plates from H_2O . M.p. 100–1° (100–102.5° from Et_2O). Very sol. H_2O , $CHCl_3$. Spar. sol. Et_2O .

Et ester: $C_{11}H_{18}O_4$. MW, 214. B.p. 186°/18 mm. Liq. at –15°.

Baeyer, Villiger, *Ber.*, 1896, 29, 1928.

Simonsen, *J. Chem. Soc.*, 1907, 91, 190.

Homothujyl Alcohol



$C_{11}H_{20}O$

MW, 168

Exists in two forms.

(i) *Solid form*.

Needles from MeOH. M.p. 84°. $[\alpha]_D^{15} - 30.5^\circ$ in Et_2O , $[\alpha]_D^{12} - 26.0^\circ$ in MeOH. Does not react with phenyl isocyanate.

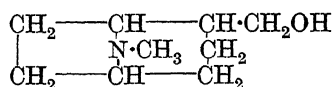
(ii) *Liquid form*.

B.p. 204°. $[\alpha]_D^{14} + 35.9^\circ$ in Et_2O , $[\alpha]_D^{13} + 33.4^\circ$ in MeOH. Does not react with phenyl isocyanate.

Wallach, *Ann.*, 1908, 360, 93.

Thomson, *J. Chem. Soc.*, 1910, 97, 1509.

Homotropine



$C_9H_{17}ON$

MW, 155

Needles from ligroin. M.p. 85°. Sol. H_2O , $EtOH$, Et_2O . Spar. sol. pet. ether. $[\alpha]_D^{20} + 22.48^\circ$ in $EtOH$. Mydriatic and local anæsthetic.

B,HCl: cryst. from $EtOH-Et_2O$. M.p. 192°.

B,HAuCl4: cryst. M.p. 191°.

Picrate: needles from EtOH. M.p. 208–9°.

Methiodide: cryst. from EtOH. Does not melt below 300°.

B,H2PtCl6: red cryst. M.p. 183°.

B,HAuCl4: yellow leaflets. M.p. 238°.

Benzoyl deriv.: *picrate*, yellow cryst. M.p. 177°.

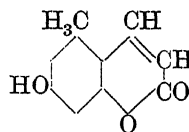
Tropic ester: see Mydriasin.

v. Braun, Müller, *Ber.*, 1918, 51, 239.

Homotropinic Acid.

See Granatic Acid.

Homoumbelliferone (7-Hydroxy-5-methylcoumarin, 5-methylumbelliferone)



$C_{10}H_8O_3$

MW, 176

Yellow plates from Me_2CO . M.p. 248°. Sol. $EtOH$, Me_2CO , $AcOH$. Insol. H_2O , $CHCl_3$, C_6H_6 . Sol. alkalis and conc. H_2SO_4 with blue fluor.

Acetyl: needles from H_2O . M.p. 126°. Sol. $EtOH$, Et_2O . $KOH \rightarrow$ blue fluor.

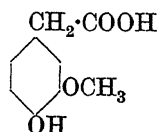
Me ether: $C_{11}H_{10}O_3$. MW, 190. Needles from $EtOH.Aq$. M.p. 146°. Sol. C_6H_6 , $CHCl_3$. Spar. sol. $EtOH$, Et_2O . Conc. $H_2SO_4 \rightarrow$ blue fluor.

v. Pechmann, Welsh, *Ber.*, 1884, 17, 1649.

Hoesch, *Ber.*, 1913, 46, 890.

Rao, Seshadri, *Proc. Indian Acad. Sci.*, 1941, 13A, 255.

Homovanillic Acid (*Homoprotocatechuic acid 3-methyl ether, 4-hydroxy-3-methoxyphenylacetic acid, 4-hydroxy-3-methoxy- α -toluic acid*)



$\text{C}_9\text{H}_{10}\text{O}_4$

MW, 182

Prisms from H_2O or C_6H_6 . M.p. 142° (139°). Sol. hot H_2O , EtOH, Et₂O. Spar. sol. cold C_6H_6 . $\text{FeCl}_3 \rightarrow$ faint green col. Dist. Ca salt with $\text{Ca}(\text{OH})_2 \rightarrow$ creosol. Hot dil. HCl \rightarrow homoprotocatechuic acid + CH_3Cl .

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. B.p. $180\text{--}5^\circ$ $13\text{--}15$ mm.

Nitrile: 4-acetyl, m.p. 52° . B.p. $204^\circ/16$ mm.

4-Acetyl: m.p. 140° (134°).

4-Carbomethoxyl: m.p. $140\text{--}1^\circ$.

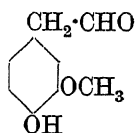
Tiemann, Nagai, *Ber.*, 1877, 10, 202, 204.

Mauthner, *Ann.*, 1909, 370, 373.

Kitasato, *Chem. Abstracts*, 1928, 22, 1780.

Hahn, Schales, *Ber.*, 1934, 67, 1486.

Homovanillin (*4-Hydroxy-3-methoxyphenyl-acetaldehyde*)



$\text{C}_9\text{H}_{10}\text{O}_3$

MW, 166

Prisms from CCl_4 . M.p. $50\text{--}50.5^\circ$ (165°). B.p. $111\text{--}14^\circ/0.45$ mm., $105\text{--}6^\circ/0.25$ mm. Sol. H_2O , Et₂O, pet. ether. Spar. sol. EtOH. Reduces Fehling's. Resinified by acids or alkalis.

Me ether: see Homoveratric Aldehyde.

Acetyl: p-nitrophenylhydrazone, m.p. 179° .

Oxime: m.p. 115° .

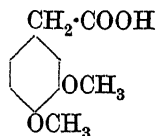
p-Nitrophenylhydrazone: m.p. 154.5° .

Semicarbazone: m.p. 173° .

Harries, Haarmann, *Ber.*, 1915, 48, 39.

Harries, *Ber.*, 1915, 48, 868.

Homoveratric Acid (*Homoveratrumic acid, 3:4-dimethoxy- α -toluic acid, 3:4-dimethoxyphenylacetic acid, homoprotocatechuic acid dimethyl ether*)



$\text{C}_{10}\text{H}_{12}\text{O}_4$

MW, 196

Needles + H_2O from H_2O . Cryst. anhyd. from C_6H_6 -pet. ether. M.p. 82° (80°), anhyd. $98\text{--}9^\circ$. Sol. H_2O , EtOH, Et₂O.

Me ester: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. B.p. $175^\circ/15$ mm.

Et ester: $\text{C}_{12}\text{H}_{16}\text{O}_4$. MW, 224. B.p. $191^\circ/25$ mm.

Phenacyl ester: m.p. $66.5\text{--}67^\circ$.

Chloride: $\text{C}_{10}\text{H}_{11}\text{O}_3\text{Cl}$. MW, 214.5. B.p. approx. $240^\circ/25$ mm.

Amide: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. M.p. $145\text{--}7^\circ$.

Nitrile: $\text{C}_{10}\text{H}_{11}\text{O}_2\text{N}$. MW, 177. M.p. $64\text{--}5^\circ$. B.p. $171\text{--}8^\circ/10$ mm.

Hydrazide: m.p. $115\text{--}16^\circ$.

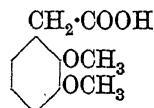
Pictet, Gams, *Ber.*, 1909, 42, 2949.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, 103, 1038.

Kaufmann, Müller, *Ber.*, 1918, 51, 127.

Kindler, Metzendorf, Dschi-yin-Kwok, *Ber.*, 1943, 76, 308.

α -Homoveratric Acid (*2:3-Dimethoxy- α -toluic acid, 2:3-dimethoxyphenylacetic acid, homoveratrumic acid*)



$\text{C}_{10}\text{H}_{12}\text{O}_4$

MW, 196

Cryst. from H_2O or pet. ether. M.p. $82\text{--}3^\circ$.

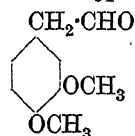
Amide: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. M.p. $130\text{--}130.5^\circ$.

Späth, Mosettig, *Ann.*, 1923, 433, 146.

Montequi, *Chem. Abstracts*, 1930, 24, 605.

Mauthner, *J. prakt. Chem.*, 1937, 148, 95.

Homoveratric Aldehyde (*Homovanillin methyl ether, 3:4-dimethoxyphenylacetaldehyde*)



$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Yellow oil. B.p. $121^\circ/0.35$ mm. D_{20}^{20} 1.55. n_D^{20} 1.5426. Spar. sol. H_2O . Reduces warm Fehling's.

Oxime: m.p. $90\text{--}1^\circ$.

p-Nitrophenylhydrazone: m.p. 159° .

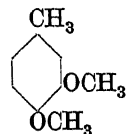
Semicarbazone: m.p. 181° .

Mannich, Jacobsohn, *Ber.*, 1910, 43, 196.

Harries, Haarmann, *Ber.*, 1915, 48, 41.

Harries, Adam, *Ber.*, 1916, 49, 1030.

Homoveratrol (*3:4-Dimethoxytoluene, homocatechol dimethyl ether, 4-methylveratrol, creosol 4-methyl ether*)



$\text{C}_9\text{H}_{12}\text{O}_2$

MW, 152

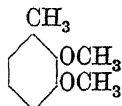
Prisms from Et₂O. M.p. 24° (21°). B.p. $219\text{--}21^\circ$ (216°), $128\text{--}30^\circ/25$ mm., $116\text{--}17^\circ/23$ mm. Sol. EtOH, Et₂O. Insol. H_2O , dil. EtOH.

D₁²⁵ 1.0653, D₁²⁵ 1.0562 (1.0491). n_D^{25} 1.5257.
Ox. \rightarrow veratric acid.

De Vries, *Rec. trav. chim.*, 1909, **28**, 292.
Luff, Perkin, Robinson, *J. Chem. Soc.*,
1910, **97**, 1134.

Karrer, Schick, *Helv. Chim. Acta*, 1943,
26, 800.

o-Homoveratrol (2:3-Dimethoxytoluene, 3-methylveratrol)



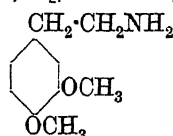
C₉H₁₂O₂ MW, 152

Oil. B.p. 92-3°/18 mm. D₄²⁵ 1.0335. n_D^{25} 1.5121. Conc. H₂SO₄ \rightarrow pink col. on standing.
Mosimann, Tambor, *Ber.*, 1916, **49**, 1262.
Wasserman, Dawson, *J. Org. Chem.*, 1943,
8, 73.

Homoveratrumic Acid.

See Homoveratric Acid.

Homoveratrylamine (3:4-Dimethoxy-phenylethylamine, 4-[β-aminoethyl]-veratrol)



C₁₀H₁₅O₂N MW, 181

M.p. 124°. B.p. 188°/15 mm. Sol. H₂O, EtOH. Insol. Me₂CO. Conc. HCl at 150° \rightarrow 3:4-dihydroxyphenylethylamine.

B, HCl: m.p. 154-5°.

B₂H₂PtCl₆: m.p. 196° (174°).

N-Formyl: m.p. 40-2°. B.p. 170°/0.01 mm.

N-Homoveratroyl: needles from dil. AcOH or CHCl₃-pet. ether. M.p. 124°. Sol. hot H₂O, CHCl₃, AcOH. Insol. pet. ether. Sol. conc. HCl, pptd. unchanged by H₂O.

N-Trimethylhomogalloyl: m.p. 98°.

N-Homopiperonyl: m.p. 136°.

N-4-Methoxybenzyl: m.p. 123-5°.

Späth, Polgar, *Monatsh.*, 1929, **51**, 190.

Kindler, D.R.P., 571,794, (*Chem. Abstracts*, 1933, **27**, 4246).

Mannich, Jacobsohn, *Ber.*, 1910, **43**, 196.

Hahn, Schales, *Ber.*, 1934, **67**, 1486.

Hongkelin

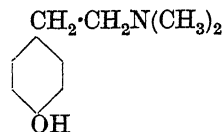
C₃₀H₄₆O₈ MW, 434

Glycoside of *Adenium hongkel*. Cryst. M.p. 130-5°. $[\alpha]_D^{25}$ -10.3° in MeOH. Sol. EtOH, CHCl₃, Me₂CO, AcOH. Spar. sol. Et₂O. Insol. H₂O. Bitter taste. Sternutatory. KOH \rightarrow isohongkelin, needles, m.p. 268°, $[\alpha]_D^{20}$ -20.3° in CHCl₃.

Diacyl deriv.: needles + H₂O. M.p. 207°. $[\alpha]_D^{20}$ -9.5° in MeOH.

Frèrejacque, Hasenfratz, *Compt. rend.*, 1949, **229**, 848.

Hordenine (*Anhaline*, p-β-dimethylamino-ethylphenol, dimethyl-p-hydroxyphenylethylamine, 1-dimethylamino-2-p-hydroxyphenylethane)



C₁₀H₁₅ON MW, 165

Alkaloid of barley germs and Mexican *Anhalonium fissuratum*. Prisms. M.p. 117°. B.p. 173-4°/11 mm. Sublimes at 140-50°. Sol. hot H₂O, EtOH, Et₂O, CHCl₃. Spar. sol. C₆H₆. Reduces acid KMnO₄ and NH₃.AgNO₃.

B₂H₂SO₄: m.p. anhyd. 205° (209-11°).

B, HCl: m.p. 176-7°.

Benzoyl deriv.: m.p. 47-8°.

Picrate: m.p. 139-40°.

Methiodide: m.p. 229-30°.

Reineckate: m.p. 176-8° decomp.

Voswinkel, *Ber.*, 1912, **45**, 1004.

Späth, Sobel, *Monatsh.*, 1920, **41**, 77.

Späth, *Monatsh.*, 1919, **40**, 129.

Raoul, *Compt. rend.*, 1937, **204**, 74.

Kirkwood, Marion, *J. Am. Chem. Soc.*, 1950, **72**, 2522.

Humulene.

See α-Caryophyllene.

Humulinone

C₂₁H₃₀O₆ MW, 378

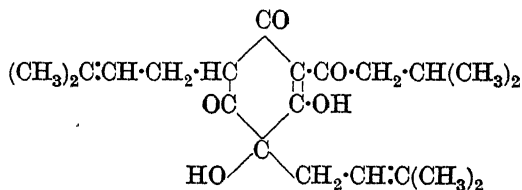
Isolated from hops (*Humulis lupulus*). Cryst. M.p. 74°. Sol. most org. solvents. Insol. H₂O. Forms insol. Pb salt. Heat with NaOH.Aq. \rightarrow acetone + Δ³-isohexenoic acid.

Cook, Harris, *J. Chem. Soc.*, 1950, 1873.

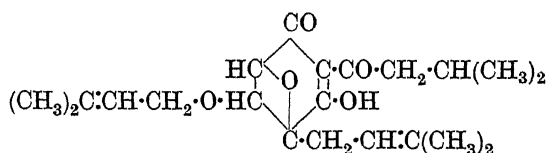
Verzele et al., *J. Chem. Soc.*, 1952, 3313.

Rigby et al., *J. Am. Chem. Soc.*, 1952, **74**, 6118.

Humulone (α-Lupulinic acid)



or



Suggested structures

C₂₁H₃₀O₅ MW, 362

One of the bitter acids from hops. Cryst. M.p. 66-66.5°. Sol. org. solvents. Spar. sol.

H₂O. [α]_D²⁰ — 232.2°. Reduces NH₃.AgNO₃.
Alc. FeCl₃ → reddish-violet col.

o-Phenylenediamine deriv.: cryst. from C₆H₆.
M.p. 115–17°.

Wöllmer, *Ber.*, 1916, **49**, 782.

Wieland, *Ber.*, 1925, **58**, 2012.

Harris *et al.*, *J. Chem. Soc.*, 1952, 1906.

Riedl, *Ber.*, 1952, **85**, 692.

Hydantoic Acid (*Carbamylglycine, ureidoacetic acid, glycoluric acid, N-carboxymethylurea*)



C₃H₆O₃N₂ MW, 118

Prisms. M.p. 180° (156°, 163°). Sol. hot H₂O, EtOH. Spar. sol. cold H₂O, cold EtOH, Et₂O. Heat of comb. C_p 308.4 Cal., C_v 308.9 Cal. Br → parabanic acid. HI at 170° → CO₂, NH₃, and glycine. Hot FeCl₃ → red col.

Et ester: C₅H₁₀O₃N₂. MW, 146. Needles from H₂O. M.p. 135°. Insol. Et₂O.

n-Butyl ester: C₇H₁₄O₃N₂. MW, 174. M.p. 119°.

Amide: C₃H₇O₂N₃. MW, 117. Prisms from H₂O. M.p. 180° (204°).

Baeyer, *Ann.*, 1864, **130**, 160.

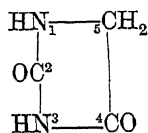
Weidel, Roithner, *Monatsh.*, 1896, **17**, 188.

Lippich, *Ber.*, 1908, **41**, 2959.

Harries, Weiss, *Ber.*, 1900, **33**, 3418.

West, *J. Biol. Chem.*, 1918, **34**, 188.

Hydantoin (*Diketotetrahydroglyoxaline, glycollylurea*)



C₃H₄O₂N₂ MW, 100

Needles from MeOH. M.p. 220° (216°). Sol. EtOH. Spar. sol. H₂O, Et₂O. Sol. alkalis. Br → parabanic acid. H·CHO → hydroxymethylhydantoin, m.p. 125°. Hot Ba(OH)₂ → hydantoic acid.

1-Acetyl: m.p. 143–4°.

1:3-Diacetyl: m.p. 104–5°.

5-Benzylidene: C₁₀H₈O₂N₂. MW, 188. Yellow needles from EtOH. M.p. 220°.

Pauly, Sauter, *Ber.*, 1930, **63**, 2068.

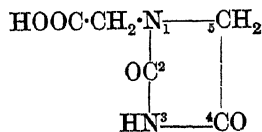
Harries, Weiss, *Ber.*, 1900, **33**, 3419.

Johnson, Bengis, *J. Am. Chem. Soc.*, 1913, **35**, 1605.

Diels, Heintzel, *Ber.*, 1905, **38**, 305.

Anschütz, *Ann.*, 1889, **254**, 260.

1-Hydantoinacetic Acid (*1-Carboxymethylhydantoin*)



C₅H₆O₄N₂

MW, 158

Cryst. from H₂O.

Me ester: C₆H₈O₄N₂. MW, 172. Cryst. from C₆H₆. M.p. 114° (107–8°).

Et ester: C₇H₁₀O₄N₂. MW, 186. Needles from C₆H₆. M.p. 84–5°.

Amide: C₅H₇O₃N₃. MW, 157. Plates from H₂O. M.p. 196–7°.

Jongkees, *Rec. trav. chim.*, 1908, **27**, 324.

Bailey, Snyder, *J. Am. Chem. Soc.*, 1915, **37**, 935, 945.

3-Hydantoinacetic Acid (*3-Carboxymethylhydantoin*).

Cryst. from EtOH. M.p. 196°. Sol. H₂O, alkalis. Stable to acids, unstable to alkalis. NaOH → glycylglycine-carboxylic acid.

Et ester: needles from Et₂O. M.p. 120°.

5-Benzylidene deriv., m.p. 155°.

Propyl ester: C₈H₁₂O₄N₂. MW, 200. M.p. 116°.

Isobutyl ester: C₉H₁₄O₄N₂. MW, 214. M.p. 124°.

Isomyl ester: C₁₀H₁₆O₄N₂. MW, 228. M.p. 104°.

Amide: m.p. 226°.

Anilide: m.p. 218°.

5-Benzyl: m.p. 181–3°.

5-Benzylidene: m.p. 260°.

Gränacher, Landolt, *Helv. Chim. Acta*, 1927, **10**, 799.

Johnson, Renfrew, *J. Am. Chem. Soc.*, 1925, **47**, 240.

Cerchez, *Bull. soc. chim.*, 1931, **49**, 602.

Locquin, Cerchez, *Compt. rend.*, 1929, **188**, 177.

5-Hydantoinacetic Acid (*5-Carboxymethylhydantoin, malyureidic acid*).

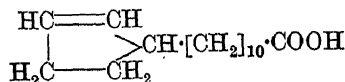
Prisms from EtOH or H₂O. M.p. 215–16° (224–6°) decomp. Spar. sol. H₂O, EtOH. Insol. EtOH.

Lippich, *Ber.*, 1908, **41**, 2972.

Gabriel, *Ann.*, 1906, **348**, 87.

Johnson, Guest, *Am. Chem. J.*, 1912, **48**, 103.

Hydnocarpic Acid (ω -Cyclopentenylundecylic acid)



C₁₆H₂₈O₂

MW, 252

d.

Constituent of saponifiable matter of Chaulmoogra and other oils. Plates from EtOH. M.p. 59–60°. Spar. sol. most org. solvents. Readily sol. CHCl₃. [α]_D + 68.1° in CHCl₃.

Me ester: C₁₇H₃₀O₂. MW, 266. M.p. 8°. B.p. 200–3°/19 mm. [α]_D + 62.4° in CHCl₃.

Et ester: C₁₈H₃₂O₂. MW, 280. B.p. 211°/19 mm. [α]_D + 51.6° in CHCl₃.

Amide: C₁₅H₂₉ON. MW, 251. Fine needles

from EtOH. M.p. 112–13°. $[\alpha]_D + 70.2^\circ$ in CHCl_3 .

dl-.

Cryst. M.p. 59–59.5°.

Amide: cryst. M.p. 108.5–109°.

Nitrile: $\text{C}_{16}\text{H}_{27}\text{N}$. MW, 233. Colourless liq. B.p. 155–6°/2–3 mm. $D_{25}^{25} 0.8580$. $n_D^{25} 1.4559$.

Power, Barrowcliff, *J. Chem. Soc.*, 1905, 87, 888.

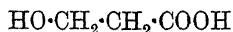
Shriner, Adams, *J. Am. Chem. Soc.*, 1925, 47, 2727.

Hinegardner, *J. Am. Chem. Soc.*, 1933, 55, 2831.

Bokil, Nargund, *Proc. Indian Acad. Sci.*, 1941, 13A, 233.

Diaper, Smith, *Biochem. J.*, 1948, 42, 581.

Hydracrylic Acid (2-Hydroxypropionic acid, β -lactic acid, ethylene-lactic acid)



$\text{C}_3\text{H}_6\text{O}_3$ MW, 90

Free acid exists as syrup. $k = 3.11 \times 10^{-3}$ at 25°. Dist. \rightarrow acrylic acid + H_2O . Salts on heating \rightarrow diacrylic acid and paradipimelic acids. Ox. \rightarrow oxalic acid + CO_2 . KOH fusion \rightarrow formic, acetic, oxalic and glycollic acids.

Na salt: m.p. 143°.

Me ether: see 2-Methoxypropionic Acid.

Et ether: 2-ethoxypropionic acid. $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. B.p. 119°/19 mm. $D_4^{15} 1.0508$. $k = 3.19 \times 10^{-3}$. Et ester: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 63°/13 mm., 50°/7 mm. Amide: $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$. MW, 117. M.p. 50–5°. Nitrile: $\text{C}_5\text{H}_9\text{ON}$. MW, 99. B.p. 172°. $D_4^{25} 0.9189$.

Phenyl ether: see 2-Phenoxypropionic Acid.

Me ester: $\text{C}_4\text{H}_8\text{O}_3$. MW, 104. B.p. 177–84°, 121°/94 mm., 79°/12 mm. $D^{16} 1.105$. $n_D^{23} 1.43$.

Et ester: $\text{C}_5\text{H}_{10}\text{O}_3$. MW, 118. B.p. 185–90°, 81°/13 mm. $D^{20} 1.059$. $n_D^{23} 1.4271$.

Propyl ester: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. 142°/107 mm., 98°/12 mm. $D^{25} 1.4341$. $n_D^{23} 1.4341$.

Isopropyl ester: b.p. 128.5°/82 mm., 95°/12 mm. $D^{25} 1.058$. $n_D^{23} 1.4303$.

Nitrile: ethylene cyanohydrin. $\text{C}_3\text{H}_5\text{ON}$. MW, 71. B.p. 220°, 110°/15 mm. $D^0 1.059$. Misc. with H_2O , EtOH. $\text{P}_2\text{O}_5 \rightarrow$ acrylic nitrile. $\text{HCl} \rightarrow \text{NH}_4\text{Cl}$ + hydracrylic and acrylic acids. Acetyl: b.p. 205–8°.

Read, *Organic Syntheses*, 1927, VII, 55.

Kendall, McKenzie, *Organic Syntheses*, 1923, III, 57.

Palomaa, *Chem. Zentr.*, 1912, II, 596.

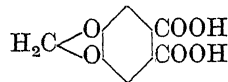
Palomaa, Kilpi, *Chem. Zentr.*, 1910, II, 1453.

Drushel, Holden, *Chem. Zentr.*, 1916, I, 142.

Hydracrylic Aldehyde.

See 2-Hydroxypropionaldehyde.

Hydrastic Acid (4:5-Methylenedioxyphthalic acid)



$\text{C}_9\text{H}_6\text{O}_6$ MW, 210

Prisms from H_2O . M.p. 175° decomp. (187° rapid heat.). Spar. sol. H_2O , Et_2O . Insol. CHCl_3 , pet. ether.

Mono-Me ester: $\text{C}_{10}\text{H}_8\text{O}_6$. MW, 224. Plates from EtOH. M.p. 136°.

Di-Me ester: $\text{C}_{11}\text{H}_{10}\text{O}_6$. MW, 238. Leaflets from EtOH. M.p. 88–9°.

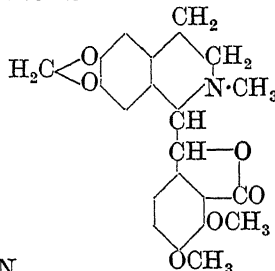
Anhydride: $\text{C}_9\text{H}_4\text{O}_5$. MW, 192. Needles from EtOH. M.p. 175°.

Imide: methylenedioxyphthalimide. $\text{C}_9\text{H}_5\text{O}_4\text{N}$. MW, 191. Needles from AcOH. M.p. 275–7°.

Freund, *Ann.*, 1892, 271, 375.

Stevens, Robertson, *J. Chem. Soc.*, 1927, 2790.

l-Hydrastine



$\text{C}_{21}\text{H}_{21}\text{O}_6\text{N}$ MW, 383

Alkaloid from Golden Seal (*Hydrastis canadensis*) and *Berberis laurina*. Prisms from EtOH. M.p. 132°. $[\alpha]_D^{20} - 49.8^\circ$ in EtOH. Bitter taste. Sol. Et_2O , CHCl_3 , C_6H_6 . Spar. sol. EtOH. Insol. H_2O . Sol. conc. H_2SO_4 to violet sol., conc. HNO_3 to orange sol. Sol. in dil. H_2SO_4 + $\text{KMnO}_4 \rightarrow$ blue fluor. $\text{HNO}_3 \rightarrow$ hydrastinine + opianic acid. Salts are unstable.

B,HCl: m.p. 116°. $[\alpha]_D + 127.3^\circ$ in dil. HCl.

Picrate: m.p. 184°.

Freund, *Ann.*, 1892, 271, 311.

Eigkman, *Rec. trav. chim.*, 1886, 5, 291.

Freund, Will, *Ber.*, 1887, 20, 88.

Haworth, Pinder, *J. Chem. Soc.*, 1950, 1776.

Mirza, Robinson, *Nature*, 1950, 166, 771.

Hydrastine a (Synthetic hydrastine).

Prisms from AcOEt. M.p. 137°. Sol. CHCl_3 . Spar. sol. cold EtOH, Et_2O .

B,HCl: m.p. 165° decomp.

Picrate: m.p. 219°.

Hope, Pyman, Remfry, Robinson, *J. Chem. Soc.*, 1931, 236.

Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1317.

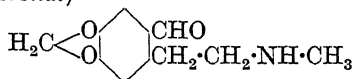
Hydrastine b.

Prisms from EtOH. M.p. 151–2°. Synthetic hydrastine isomeric with hydrastine a.

Hope, Pyman, Remfry, Robinson, *J. Chem. Soc.*, 1931, 236.

Marshall, Pyman, Robinson, *J. Chem. Soc.*, 1934, 1317.

Hydrastinine (4 : 5 - Methyleneedioxy - 2 - β - methylaminoethylbenzaldehyde, 6- β -methylaminoethylpiperonal)



$\text{C}_{11}\text{H}_{13}\text{O}_3\text{N}$ MW, 207

Needles from pet. ether. M.p. 116–17°. Sol. non-polar solvents to colourless sols. Sol. H_2O , EtOH, etc., to yellow fluorescent sols. Alk. $\text{KMnO}_4 \rightarrow$ hydrastininic acid. $\text{NaOH} \rightarrow$ oxyhydrastinine, m.p. 98°.

N-Acetyl : needles from H_2O . M.p. 105°.

N-Benzoyl : m.p. 98–9°.

B.HCl : m.p. 212° decomp.

B.HI : m.p. 233–4°.

Oxime : m.p. 145–6°. Mono-acetyl : m.p. 90°.

Diacetyl : m.p. 121–2°.

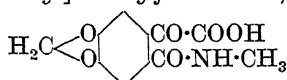
$\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 207° decomp.

Methiodide : m.p. 267°.

Fritsch, *Ann.*, 1895, 286, 18.

Freund, *Ann.*, 1892, 271, 311; *Ber.*, 1889, 22, 2330.

Hydrastininic Acid (3 : 4 - [Methyleneedioxy - 6-methylcarbamyl] - benzoylformic acid)

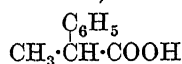


$\text{C}_{11}\text{H}_9\text{O}_6\text{N}$ MW, 251

Needles from H_2O . M.p. 164° decomp. Spar. sol. H_2O . Insol. CHCl_3 . $\text{HNO}_3 \rightarrow$ hydrastic acid + $\text{CH}_3\cdot\text{NH}_2$.

Freund, *Ann.*, 1892, 271, 371; *Ber.*, 1889, 22, 1159.

Hydratropic Acid (1-Phenylpropionic acid, α -methylphenylacetic acid)



$\text{C}_9\text{H}_{10}\text{O}_2$ MW, 150

d.-

B.p. 152°/16 mm. $[\alpha]_D^{20} +9.14^\circ$.

l.-

B.p. 152°/16 mm. $[\alpha]_D^{20} -7.0^\circ$.

dl.-

B.p. 264–5°, 160°/25 mm. Spar. sol. H_2O . Alk. $\text{KMnO}_4 \rightarrow$ atrolactic acid.

Me ester : $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. 221°, 119°/22 mm.

Et ester : $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. 230°.

Chloride : $\text{C}_9\text{H}_9\text{OCl}$. MW, 168.5. B.p. 97–8°/12.5 mm.

Amide : $\text{C}_9\text{H}_{11}\text{ON}$. MW, 149. Needles from EtOH.Aq. M.p. 91–2°.

Nitrile : $\text{C}_9\text{H}_9\text{N}$. MW, 131. B.p. 230–2°. Sol. EtOH, Et_2O .

Janssen, *Ann.*, 1889, 250, 136.

Neure, *ibid.*, 151.

Rupe, *Ann.*, 1909, 369, 332.

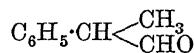
Opolski, Kowalski, Pilewski, *Ber.*, 1916, 49, 2282.

Ott, Krämer, *Ber.*, 1935, 68, 1655.

Hydratropic Alcohol.

See 2-Phenylpropyl Alcohol.

Hydratropic Aldehyde (1-Phenylpropionaldehyde)



$\text{C}_9\text{H}_{10}\text{O}$ MW, 134

B.p. 202–5°, 92–92.5°/12 mm. D_4^{20} 1.0089. n_D^{20} 1.5176. Forms bisulphite comp. $\text{Ag}_2\text{O} \rightarrow$ hydratropic acid.

Oxime : b.p. 124°/7 mm.

Semicarbazone : plates from EtOH. M.p. 153–4°.

Benzoylhydrazone : needles from EtOH. M.p. 191–2°.

m-Nitrobenzoylhydrazone : yellow cryst. from EtOH. M.p. 156–7°.

I.G., D.R.P. 602,816, (*Chem. Abstracts*, 1935, 29, 1438).

Claisen, *Ber.*, 1905, 38, 705.

Tiffeneau, *Ann. chim.*, 1907, 10, 192.

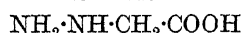
Allen, Van Allan, *Organic Syntheses*, 1944, XXIV, 87.

Hydrazine-carboxylic Acid.

See Hydrazinoformic Acid.

Hydrazine-dicarboxylic Acid.

See Hydrazoformic Acid.

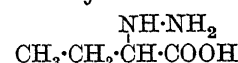
Hydrazinoacetic Acid

$\text{C}_2\text{H}_6\text{O}_2\text{N}_2$ MW, 90

Cryst. from EtOH. M.p. 152°.

B.HI : cryst. M.p. 156°.

Darapsky, Prabhakar, *Ber.*, 1912, 45, 1662.

1-Hydrazinobutyric Acid

$\text{C}_4\text{H}_{10}\text{O}_2\text{N}_2$ MW, 118

Cryst. M.p. 208°.

Traube, Longinescu, *Ber.*, 1896, 29, 674.

4-Hydrazino-1-ethylbenzene.

See p-Ethylphenylhydrazine.

Hydrazinoformic Acid (Hydrazine-carboxylic acid, carbazinic acid)



$\text{CH}_4\text{O}_2\text{N}_2$ MW, 76

White powder. Decomp. about 90°.

Me ester : $\text{C}_2\text{H}_6\text{O}_2\text{N}_2$. MW, 90. Cryst. M.p.

75°. B.p. 108°/12 mm. Very sol. H₂O, EtOH. Spar. sol. Et₂O, C₆H₆. Insol. pet. ether. Volatile in steam. *B.HCl*: m.p. 160°.

Ester: C₃H₅O₂N₂. MW, 104. Cryst. M.p. 46°. B.p. 108-9°/22 mm., 93°/9 mm.

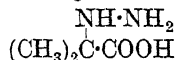
Amide: see Semicarbazide.

Diels, Fritzsche, *Ber.*, 1911, **44**, 3022.

Diels, *Ber.*, 1914, **47**, 2186.

Allen, Bell, *Organic Syntheses*, 1944, XXIV, 58.

Hydrazinoisobutyric Acid



C₄H₁₀O₂N₂ MW, 118
Plates from EtOH. M.p. 237° decomp. Sol. H₂O. Insol. Et₂O, EtOH. Reduces NH₃.AgNO₃ and Fehling's.

B.HCl: needles from H₂O. M.p. 156-7°.

B₂H₂SO₄: needles from H₂O. M.p. 189°.

Ester: C₆H₁₄O₂N₂. MW, 146. B.p. 93-5°/13 mm.

Thiele, Heuser, *Ann.*, 1896, **290**, 17.

1-Hydrazinoisovaleric Acid



C₅H₁₂O₂N₂ MW, 132
Plates from H₂O. M.p. 230-5° decomp. Spar. sol. H₂O.

B.HCl: m.p. 135-5°.

Me ester: yellow oil. *B.HCl*: m.p. 112°.

Et ester: light yellow oil. *B.HCl*: m.p. 104°.

Diacetyl deriv.: cryst. from EtOH. M.p. 205°.

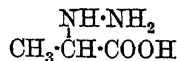
o-Hydroxybenzylidene deriv.: m.p. 124°.

Darapsky *et al.*, *J. prakt. Chem.*, 1917, **96**, 283; 1936, **146**, 219.

p-Hydrazinophenol.

See *p*-Hydroxyphenylhydrazine.

1-Hydrazinopropionic Acid



C₃H₈O₂N₂ MW, 104

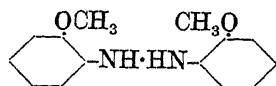
Needles from EtOH. M.p. 181°. Very sol. H₂O. Insol. EtOH, Et₂O. Reduces Fehling's.

Et ester hydrochloride: C₅H₁₂O₂N₂.HCl. MW, 167.5. Plates from EtOH. M.p. 108-10° decomp.

Darapsky, *J. prakt. Chem.*, 1917, **96**, 281.

Bailey, Mikeska, *J. Am. Chem. Soc.*, 1916, **38**, 1782.

o-Hydrazoanisole (2 : 2'-Dimethoxyhydrazobenzene)



C₁₄H₁₆O₂N₂ MW, 244

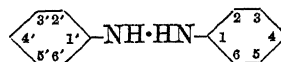
Plates. M.p. 102°. HCl → dianisidine.

Starke, *J. prakt. Chem.*, 1899, **59**, 209.

Wülfing, D.R.P., 100,234, (*Chem. Zentr.*, 1899, I, 720).

Nelson, U.S.P., 1,469,586, (*Chem. Abstracts*, 1923, **17**, 3878).

Hydrazobenzene (sym.-Diphenylhydrazine)



C₁₂H₁₂N₂ MW, 184

Plates or rhombohedra from EtOH-Et₂O. M.p. 126-7°. Sol. EtOH. Mod. sol. C₆H₆. Spar. sol. H₂O. Insol. AcOH. Decomp. at m.p. → azobenzene + aniline. HNO₂, Cl, I, O₃ → azobenzene. KOH at 100° → azobenzene + 2-hydroxyazobenzene. HCl → benzidine.

N-Me: C₁₃H₁₄N₂. MW, 198. Needles from ligroin. M.p. 75°. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

NN'-Di-Me: C₁₄H₁₆N₂. MW, 212. Oil. B.p. 138°/1 mm.

NN'-Di-Et: C₁₆H₂₀N₂. MW, 240. Oil. B.p. 141°/1 mm. Volatile in steam.

N-Acetyl: sym.-diphenylacetylhydrazide. C₁₄H₁₄ON₂. MW, 226. Needles from EtOH. M.p. 159°. Spar. sol. Et₂O. Insol. H₂O. Heat. → acetanilide + azobenzene.

NN'-Diacetyl: yellow rhombohedra from EtOH. M.p. 105°. Sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O. Conc. H₂SO₄ → benzidine.

N-Benzoyl: *NN'*-diphenylbenzhydrazone. Exists in two forms. (i) Prisms from EtOH. Me₂CO, or AcOH. M.p. 38-9°. (ii) Plates from C₆H₆, CHCl₃, or pet. ether. M.p. 126°.

NN'-Dibenzoyl: prisms from EtOH. M.p. 161-2°. Sol. Me₂CO.

Darmstädter, D.R.P., 189,312, (*Chem. Zentr.*, 1907, II, 2002).

Ismailski, Kolpenski, Russian P., 29,172, (*Chem. Zentr.*, 1933, II, 3049).

Stern, *Ber.*, 1884, **17**, 380.

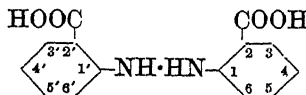
Schmidt, Schultz, *Ann.*, 1881, **207**, 327.

Freundler, *Compt. rend.*, 1903, **136**, 1553.

Rassow, *J. prakt. Chem.*, 1911, **84**, 267.

Wieland, Fressel, *Ann.*, 1912, **392**, 147.

Hydrazobenzene-2 : 2'-dicarboxylic Acid (oo'-Hydrazobenzoic acid)



C₁₄H₁₂O₄N₂ MW, 272

Plates from EtOH. M.p. 205°. Stable when dry. Damp air → azobenzene-2 : 2'-dicarboxylic acid. Hot dil. H₂SO₄ → benzidine-3 : 3'-dicarboxylic acid.

Diamide: C₁₄H₁₄O₂N₄. MW, 270. Needles

from AcOH. M.p. 233°. Sol. Me₂CO, AcOH. Spar. sol. EtOH, Et₂O, CHCl₃.

Homolka, *Ber.*, 1884, 17, 1904.

Schultz, Rohde, Vicari, *Ann.*, 1907, 352, 129.

Heller, *Ber.*, 1910, 43, 1914.

Hydrazobenzene-2 : 3'-dicarboxylic Acid (om'-Hydrazobenzoic acid).

Needles from EtOH.Aq. M.p. 206° decomp. Sol. ord. org. solvents.

Paal, Fritzweiler, *Ber.*, 1892, 25, 3597.

Hydrazobenzene-3 : 3'-dicarboxylic Acid (mm'-Hydrazobenzoic acid).

Yellow flakes from EtOH.Aq. Spar. sol. EtOH. Insol. H₂O. Alk. sol. in air → azobenzene-3 : 3'-dicarboxylic acid. Reduces NH₃.AgNO₃.

Strecker, *Ann.*, 1864, 129, 141.

Hydrazobenzene-4 : 4'-dicarboxylic Acid (pp'-Hydrazobenzoic acid).

Needles from EtOH. Insol. H₂O.

Di-Et ester: C₁₈H₂₀O₄N₂. MW, 328. Needles from EtOH.Aq. M.p. 118°. Sol. EtOH, Me₂CO, CHCl₃, AcOEt. Spar. sol. pet. ether. Insol. H₂O. Oxidises readily.

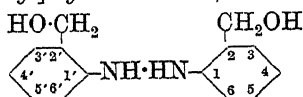
Bilfinger, *Ann.*, 1865, 135, 159.

Krösche, *Chem. Zentr.*, 1915, II, 1186.

Hydrazobenzoic Acid.

See Hydrazobenzene-dicarboxylic Acid.

o-Hydrazobenzyl Alcohol (2 : 2'-Di-[hydroxymethyl]-hydrazobenzene)



C₁₄H₁₆O₂N₂ MW, 244

M.p. 200°. Undergoes benzidine rearrangement to 3 : 3'-di-[hydroxymethyl]-benzidine.

Diacetyl: m.p. above 250°.

Dibenzoyl: m.p. 107°.

Sen, Sadasivan, *J. Indian Chem. Soc.*, 1932, 9, 403.

m-Hydrazobenzyl Alcohol (3 : 3'-Di-[hydroxymethyl]-hydrazobenzene).

M.p. 268°. Undergoes benzidine rearrangement to 2 : 2'-di-[hydroxymethyl]-benzidine.

Diacetyl: m.p. above 220°.

Sen, Sadasivan, *J. Indian Chem. Soc.*, 1932, 9, 403.

Hydrazodiacetyl.

See sym.-Diacetylhydrazine.

Hydrazodibenzoyl.

See sym.-Dibenzoylhydrazine.

Hydrazodibenzyl.

See sym.-Dibenzylhydrazine.

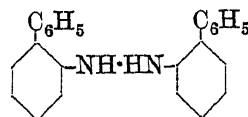
Hydrazodicarbonimide.

See Urazole.

Hydrazodicarboxylic Acid.

See Hydrazoformic Acid.

o-Hydrazodiphenyl (NN'-Di-o-diphenylhydrazine, NN'-di-o-xenylhydrazine, 2 : 2'-hydrazodiphenyl)



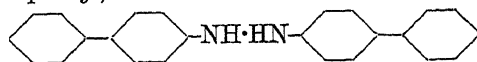
C₂₄H₂₀N₂

MW, 336

Needles from EtOH. M.p. 182°. Hot. conc. HCl → 3 : 3'-diphenylbenzidine.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 459.

p-Hydrazodiphenyl (NN'-Di-p-diphenylhydrazine, NN'-di-p-xenylhydrazine, 4 : 4'-hydrazodiphenyl)



C₂₄H₂₀N₂

MW, 336

Plates. M.p. 167-9°. Spar. sol. EtOH. Insol. H₂O. HCl at 100° → 4-aminodiphenyl.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 449.

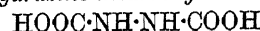
Hydrazoditoluyl.

See Ditoluylhydrazine.

Hydrazoethane.

See sym.-Diethylhydrazine.

Hydrazoformic Acid (Hydrazo-dicarboxylic acid, sym.-hydrazine-dicarboxylic acid)



C₂H₄O₄N₂

MW, 120

Di-Me ester: C₄H₈O₄N₂. MW, 148. Prisms or needles. M.p. 132°. Very sol. H₂O, EtOH. Spar. sol. Et₂O. Insol. pet. ether.

Di-Et ester: C₆H₁₂O₄N₂. MW, 176. Prisms from H₂O. M.p. 130°. B.p. about 250° with slight decomp. Very sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Diamide: C₂H₆O₂N₄. MW, 118. Needles from H₂O. M.p. 248°. Spar. sol. H₂O. Insol. EtOH, Et₂O. *Diacetyl deriv.*: cryst. from H₂O. M.p. above 300°.

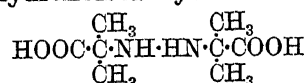
Me ester-amide: C₃H₇O₃N₃. MW, 133. Cryst. from EtOH. M.p. 169-70°.

Diels, Fritzsche, *Ber.*, 1911, 44, 3025.

Diels, Paquin, *Ber.*, 1913, 46, 2007.

Curtius, Heidenreich, *J. prakt. Chem.*, 1895, 52, 476.

1 : 1'-Hydrazoisobutyric Acid



C₈H₁₆O₄N₂

MW, 204

Prisms from H₂O. M.p. 223-4°. Sol. H₂O. Spar. sol. EtOH, Et₂O, AcOEt.

Di-Me ester: C₁₀H₂₀O₄N₂. MW, 232. Prisms from ligroin. M.p. 53-4°. B.p. 216°.

Di-Et ester: $C_{15}H_{24}O_4N_2$. MW, 260. B.p. $231-3^\circ$. D_4^{25} 0.99784.

Mononitrile: $C_8H_{15}O_2N_3$. MW, 185. Cryst. from Et_2O or ligroin. M.p. 100° . Very sol. Et_2O , EtOH. Spar. sol. ligroin.

Dinitrile: $C_8H_{14}N_4$. MW, 166. Plates from Et_2O . M.p. $92-3^\circ$. Very sol. EtOH, Et_2O . Insol. H_2O .

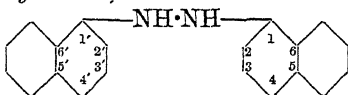
Thiele, Heuser, *Ann.*, 1896, **290**, 21.

Gabriel, *Ber.*, 1911, **44**, 60 (Note).

Hydrazomethane.

See sym.-Dimethylhydrazine.

1:1'-Hydrazonaphthalene (sym.-*Di-1-naphthylhydrazine*)



$C_{20}H_{16}N_2$ MW, 284

Colourless plates from pet. ether. M.p. 153° . Insol. H_2O . Spar. sol. EtOH, pet. ether. Sol. C_6H_6 . Gradually oxidises in air \rightarrow 1:1'-azonaphthalene. Acids \rightarrow dinaphthylidine.

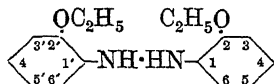
Cumming, Howie, *J. Chem. Soc.*, 1933, 134.

2:2'-Hydrazonaphthalene (sym.-*Di-2-naphthylhydrazine*).

Red plates from C_6H_6 . M.p. $140-1^\circ$. Very sol. most org. solvents. Oxidises in air \rightarrow 2:2'-azonaphthalene.

Meisenheimer, Witte, *Ber.*, 1903, **36**, 4160.

o-Hydrazophenetole (2:2'-*Diethoxyhydrazobenzene*)



$C_{16}H_{20}O_2N_2$ MW, 272

Needles from EtOH. M.p. 89° . Oxidises in air \rightarrow 2:2'-diethoxyazobenzene. Conc. HCl \rightarrow di-*o*-phenetidine.

Schmitt, Möhlau, *J. prakt. Chem.*, 1878, **18**, 202.

m-Hydrazophenetole (3:3'-*Diethoxyhydrazobenzene*).

Needles from EtOH. M.p. $118-19^\circ$.

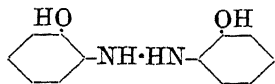
Kinzel, *Arch. Pharm.*, 1891, **229**, 351.

p-Hydrazophenetole (4:4'-*Diethoxyhydrazobenzene*).

Cryst. from pet. ether or EtOH. M.p. 86° . Very sol. EtOH, Et_2O , CS_2 . HCl \rightarrow isodiphenetidine.

Buchstab, *J. prakt. Chem.*, 1884, **29**, 300.

o-Hydrazophenol (*o-Dihydroxyhydrazobenzene*)



$C_{12}H_{12}O_2N_2$ MW, 216

M.p. 148° .

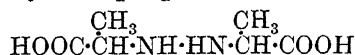
Dibenzoyl deriv.: m.p. 186° .

Di-Me ether: see *o*-Hydrazoanisole.

Di-Et ether: see *o*-Hydrazophenetole.

Sen, Sadasivan, *J. Indian Chem. Soc.*, 1932, **9**, 405.

1:1'-Hydrazopropionic Acid



$C_6H_{12}O_4N_2$ MW, 176

Needles from H_2O . M.p. 198° decomp.

Di-Me ester: $C_8H_{16}O_4N_2$. MW, 204. Cryst. from ligroin. M.p. 93° . B.p. $220^\circ/720$ mm.

Di-Et ester: $C_{10}H_{20}O_4N_2$. MW, 232. Prisms from ligroin. M.p. 78° . B.p. $245^\circ/750$ mm.

Thiele, Bailey, *Ann.*, 1898, **303**, 90.

Hydrazotoluene.

See Dimethylhydrazobenzene.

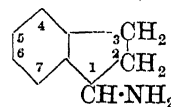
Hydrazotoluidine.

See 5:5'-Diamino-2:2'-dimethylhydrazobenzene.

Hydrazo-xylene.

See Tetramethylhydrazobenzene.

1-Hydrindamine (1-*Aminohydrindene*, α -hydrindamine, 1-indanamine)



$C_9H_{11}N$ MW, 133

Oil. B.p. $220.5^\circ/747$ mm., $96-7^\circ/8$ mm. Absorbs CO_2 rapidly. Optically resolvable into *d*- and *l*-forms.

B,HCl: m.p. 208° . Sol. H_2O , EtOH.

B,H_2SO_4: m.p. $256-7^\circ$ decomp.

N-Me: $C_{10}H_{13}N$. MW, 147. B.p. $106-7^\circ/15$ mm.

N-Benzoyl: needles from EtOH. M.p. $142-3^\circ$.

Picrate: yellow prisms from H_2O . M.p. 207° .

König, *Ann.*, 1893, **275**, 348.

Courtot, Dondelinger, *Ann. chim.*, 1925, **4**, 231; *Compt. rend.*, 1924, **178**, 493.

2-Hydrindamine (2-*Aminohydrindene*, β -hydrindamine, 2-indanamine).

Colourless oil. B.p. $229^\circ/753$ mm. Absorbs $CO_2 \rightarrow$ cryst. carbonate. Salts very sol. H_2O .

B,HCl: plates from conc. HCl. M.p. 241° .

N-Acetyl: cryst. from EtOH.Aq. M.p. $126-7^\circ$.

N-Benzoyl: plates from EtOH.Aq. M.p. 155° .

Picrate: yellow prisms. M.p. 239° decomp.

Kenner, Mathews, *J. Chem. Soc.*, 1914, **105**, 746.

Levin, Graham, Kolloff, *J. Org. Chem.*, 1944, **9**, 380.

4-Hydrindamine (4-*Aminohydrindene*, 4-indanamine).

M.p. -3° . B.p. $235^\circ/754$ mm.

N-Acetyl: m.p. 126° .

N-Benzoyl: white plates from EtOH. M.p. 136°.

Goth, *Ber.*, 1928, 61, 1459.

5-Hydrindamine (5-Aminohydrindene, 5-indanamine).

Needles from pet. ether. M.p. 37–8°. B.p. 247–9°/745 mm., 146–7°/25 mm., 131°/15 mm.

Very sol. most org. solvents.

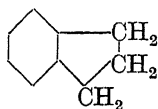
N-Acetyl: m.p. 106°.

N-Benzoyl: m.p. 137°.

Borsche, John, *Ber.*, 1924, 57, 658.

Lindner, Bruhin, *Ber.*, 1927, 60, 439.

Hydrindene (Dihydroindene, indane)

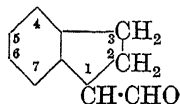


C_9H_{10} MW, 118

Oil. B.p. 177°. D_4^{20} 0.9645. n_D 1.5381.

Borsche, Pommer, *Ber.*, 1921, 54, 102.

Hydrindene-1-aldehyde (1-Indanaldehyde, 1-aldehydohydrindene)



$C_{10}H_{10}O$ MW, 146

Oil. B.p. 135°/30 mm.

Oxime: cryst. from toluene. M.p. 103–4°.

Semicarbazone: needles from EtOH. M.p. 167–8°.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, 27, 789.

Hydrindene-2-aldehyde (2-Indanaldehyde, 2-aldehydohydrindene).

Oil. B.p. 122°/12 mm.

Semicarbazone: needles from EtOH. M.p. 174°.

Kenner, *J. Chem. Soc.*, 1914, 105, 2694.

Hydrindene-5-aldehyde (5-Indanaldehyde, 5-aldehydohydrindene).

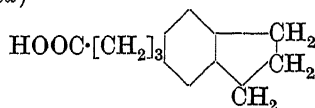
Oil. B.p. 255–7°, 135–8°/23 mm.

Oxime: plates from EtOH. M.p. 65°.

Gattermann, *Ann.*, 1906, 347, 385.

Hinkel, Ayling, Beynon, *J. Chem. Soc.*, 1936, 339.

5-Hydrindene-butyric Acid (5-Indanebutyric acid)



$C_{13}H_{16}O_2$ MW, 204

B.p. 202°/5 mm., 169–71°/0.8 mm. M.p. 54.9–55.2°. $H_2SO_4 \rightarrow$ 5:6-cyclopenteno-1-tetralone.

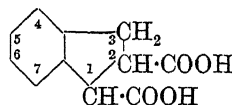
Chloride: b.p. 170°/10 mm.

Fieser, Seligman, *J. Am. Chem. Soc.*, 1937, 59, 883.

Hydrindene-carboxylic Acid.

See Hydrindenic Acid.

Hydrindene-1:2-dicarboxylic Acid (Indane-1:2-dicarboxylic acid)



$C_{11}H_{10}O_4$ MW, 206

Cis-.

M.p. 228° (222°). Sol. EtOH, Me_2CO . Spar. sol. Et_2O , C_6H_6 .

Mono-Et ester: m.p. 123–4°.

Anhydride: colourless plates from C_6H_6 -cyclohexane. M.p. 97–8°.

Bougault, *Compt. rend.*, 1914, 159, 747.

Cook, Preston, *J. Chem. Soc.*, 1944, 553.

Hydrindene-2:2-dicarboxylic Acid (Indane-2:2-dicarboxylic acid).

Plates from H_2O . M.p. 199°. Heat above m.p. \rightarrow hydrindene-2-carboxylic acid.

Di-Et ester: $C_{15}H_{18}O_4$. MW, 262. Needles from EtOH. M.p. 38°. B.p. 186°/19 mm.

Dichloride: $C_{11}H_8O_2Cl_2$. MW, 243. Plates from pet. ether. M.p. 45°. B.p. 173–5°/20 mm.

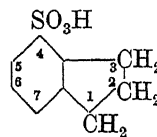
Perkin, *J. Chem. Soc.*, 1888, 53, 7.

Perkin, Révay, *J. Chem. Soc.*, 1894, 65, 232.

Thole, Thorpe, *J. Chem. Soc.*, 1911, 99, 2186.

Kenner, *J. Chem. Soc.*, 1914, 105, 2697.

Hydrindene-4-sulphonic Acid (Indane-4-sulphonic acid)



$C_9H_{10}O_3S$ MW, 198

Chloride: m.p. 53–53.5°. B.p. 140–1°/4 mm.

Amide: cryst. from H_2O . M.p. 118–19°.

Arnold, Zaugg, *J. Am. Chem. Soc.*, 1941, 63, 1317.

Hydrindene-5-sulphonic Acid (Indane-5-sulphonic acid).

Cryst. M.p. 92°.

Chloride: cryst. from Et_2O . M.p. 46–7°. B.p. 148–9°/4 mm.

Amide: plates from H_2O . M.p. 135.5–136°. Sol. EtOH.

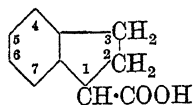
Anilide: needles from EtOH. M.p. 129°.

Spilker, *Ber.*, 1893, 26, 1540.

Moschner, *Ber.*, 1900, 33, 739.

Arnold, Zaugg, *J. Am. Chem. Soc.*, 1941, 63, 1317.

1-Hydrindenic Acid (*Hydrindene-1-carboxylic acid, indane-1-carboxylic acid*)



$C_{10}H_{10}O_2$ MW, 162

Needles from Et_2O . M.p. 59–60°.

Amide: $C_{10}H_{11}ON$. MW, 161. M.p. 162–3°.

Tiffeneau, Orékhoff, *Bull. soc. chim.*, 1920, 27, 789.

Kuck, Elderfield, *J. Org. Chem.*, 1942, 7, 374.

2-Hydrindenic Acid (*Hydrindene-2-carboxylic acid, indane-2-carboxylic acid*).

Needles from H_2O . M.p. 130°. B.p. 182–92°/18 mm. Very sol. C_6H_6 . Sol. 120 parts boiling H_2O .

Me ester: $C_{11}H_{12}O_2$. MW, 176. Low melting solid. B.p. 170°/60 mm.

Chloride: $C_{10}H_9OCl$. MW, 180.5. Prisms. M.p. 35–8°. B.p. 180°/100 mm.

Amide: $C_{10}H_{11}ON$. MW, 161. Prisms from MeOH. M.p. 178°. Very sol. EtOH. Spar. sol. $CHCl_3$.

Anilide: $C_{16}H_{15}ON$. MW, 237. Plates from EtOH. M.p. 182°. Sol. AcOH. Spar. sol. $CHCl_3$, pet. ether.

Perkin, Révay, *J. Chem. Soc.*, 1894, 65, 233.

4-Hydrindenic Acid (*Hydrindene-4-carboxylic acid, indane-4-carboxylic acid*).

M.p. 152.5–53.5°.

Amide: m.p. 173–3.5°.

Nitrile: b.p. 139–41°/22 mm.

Fieser, Hershberg, *J. Am. Chem. Soc.*, 1937, 59, 394.

5-Hydrindenic Acid (*Hydrindene-β-carboxylic acid, hydrindene-5-carboxylic acid, indane-5-carboxylic acid*).

Cryst. from EtOH.Aq. or C_6H_6 . M.p. 178–9° (183°). Very sol. EtOH.

Amide: cryst. from EtOH. M.p. 137–8°.

Chloride: b.p. 140–2°/12 mm.

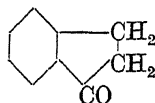
Anilide: needles from EtOH. M.p. 126°.

v. Braun, Kirschbaum, Schulmann, *Ber.*, 1920, 53, 1159.

Borsch, Pommer, *Ber.*, 1921, 54, 107.

McQuillin, Robinson, *J. Chem. Soc.*, 1941, 586.

1-Hydrindone (1-Indanone, 1-ketohydrindene)



C_9H_8O

MW, 132

Plates from pet. ether. M.p. 42°. B.p. 241–2°/739 mm., 129°/13 mm., 111–16°/23 mm.

Very sol. EtOH, Et_2O , $CHCl_3$. Sol. pet. ether. Spar. sol. H_2O . D_{40}^{20} 1.1028. n_D^{25} 1.561.

Oxime: needles from EtOH. M.p. 146°. Sol. EtOH, Et_2O , AcOH, C_6H_6 .

Semicarbazone: plates + 7 H_2O from AcOH.Aq. M.p. 239° (233°, 247°). Spar. sol. EtOH.Aq. Insol. $CHCl_3$, pet. ether, C_6H_6 .

Phenylhydrazone: m.p. 134–5° (in vacuo).

2:4-Dinitrophenylhydrazone: orange red cryst. M.p. 258°.

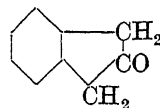
Courtot, Krolkowski, *Compt. rend.*, 1926, 182, 322.

Revis, Kipping, *J. Chem. Soc.*, 1897, 71, 241.

Wislicenus, König, *Ann.*, 1893, 275, 342. Pacaud, Allen, *Organic Syntheses*, 1938, XVIII, 47.

Levin, Graham, Kolloff, *J. Org. Chem.*, 1944, 9, 380.

2-Hydrindone (2-Indanone, 2-ketohydrindene)



C_9H_8O

MW, 132

Needles from EtOH or Et_2O . M.p. 58° (59°, 61°). Very sol. EtOH, Et_2O , Me_2CO , $CHCl_3$. Insol. H_2O . Volatile in steam. Ox. → homophthalic acid.

Oxime: needles from EtOH.Aq. or $CHCl_3$. M.p. 155° (153–4°). Very sol. EtOH, Et_2O , Me_2CO , $CHCl_3$.

Semicarbazone: needles from EtOH. M.p. 218° decomp. (252°).

p-Nitrophenylhydrazone: yellow. M.p. 232° decomp.

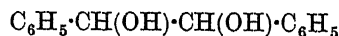
Di-(o-nitrobenzylidene) deriv.: cis: greenish-yellow, m.p. 141.5°. Trans: greenish-yellow. M.p. 199° decomp.

Walters, *J. Soc. Chem. Ind.*, 1927, 46, 150.

Wislicenus, Benedikt, *Ann.*, 1893, 275, 255.

Levin, Graham, Kolloff, *J. Org. Chem.*, 1944, 9, 380.

Hydrobenzoin (*Diphenylethylene glycol, α,β-dihydroxy-sym.-diphenylethane, α,β-dihydroxydibenzyl*)



$C_{14}H_{14}O_2$

MW, 214

Plates from EtOH. M.p. 138° (134°). Very sol. hot EtOH. Sol. 80 parts boiling H_2O . Ox. → benzoin.

Me ether: $C_{15}H_{16}O_2$. MW, 228. Prisms from EtOH–pet. ether. M.p. 100–2°.

Di-Me ether: $C_{16}H_{18}O_2$. MW, 242. Prisms from Et_2O . M.p. 140–2°.

Mono-acetyl: needles from AcOH.Aq. M.p. 84°. Very sol. EtOH, Et_2O , AcOH.

Diacyl: prisms from Et_2O . M.p. 134° (135°).
Sol. EtOH , Et_2O , CHCl_3 , C_6H_6 .

Dibenzoyl: m.p. 247° .

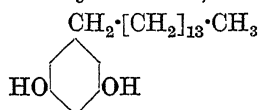
Di-allophanate: m.p. 280° .

Buck, Jenkins, *J. Am. Chem. Soc.*, 1929, 51, 2163.

Forst, Zincke, *Ann.*, 1876, 182, 262, 275.

Irvine, Weir, *J. Chem. Soc.*, 1907, 91, 1390.

Hydrobilobol (3 : 5-Dihydroxypentadecylbenzene, 5-pentadecylresorcinol)



$\text{C}_{21}\text{H}_{36}\text{O}_2$ MW, 320
Needles from ligroin. M.p. $89-90^\circ$. FeCl_3 gives no col.

Diacyl: needles from EtOH . Aq. M.p. 56° .

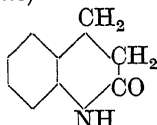
Kawamura, *Japan J. Chem.*, 1928, 3, 103.

Furakawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, 26, 178.

Hydrocaffeic Acid.

See 3 : 4-Dihydroxyhydrocinnamic Acid.

Hydrocarbostyryl (2-Keto-1 : 2 : 3 : 4-tetrahydroquinoline, o-aminohydrocinnamic lactam, dihydro- α -quinolone)



$\text{C}_9\text{H}_9\text{ON}$ MW, 147
Prisms from MeOH . Aq. M.p. 163° . Very sol. EtOH , Et_2O . Insol. H_2O .
N-Me: $\text{C}_{10}\text{H}_{11}\text{ON}$. MW, 161. Oil. B.p. $160^\circ/15$ mm.

N-Benzoyl: prisms. M.p. $155-8^\circ$.

sym.-Trinitrobenzene add. comp.:

$2\text{C}_9\text{H}_9\text{ON} \cdot \text{C}_6\text{H}_3\text{O}_6\text{N}_3$. Yellow plates. M.p. $137-8^\circ$.

Mayer, Zütphen, Philipps, *Ber.*, 1927, 60, 861.

Mayer, Philipps, Rupert, Schmitt, *Ber.*, 1928, 61, 1966.

Blout, Silverman, *J. Am. Chem. Soc.*, 1944, 66, 1442.

Hydrocellulose.

Water soluble mixtures resulting from acid degradation of cellulose, and constituted of fragments of original cellulose chain molecules. Sol. to 30% in 15% NaOH . Aq. $\text{I}_2 \rightarrow$ bright yellow col.

Müller, Willimann, *Helv. Chim. Acta*, 1939, 22, 376.

Carrington, Haworth, Hirst, Stacey, *J. Chem. Soc.*, 1939, 1901.

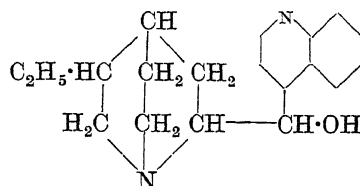
Haworth, Peat, Wilson, *ibid.*, 1904.

Dict. of Org. Comp.—II.

Hydrochelidonic Acid.

See 3-Ketopimelic Acid.

Hydrocinchonidine



$\text{C}_{19}\text{H}_{24}\text{ON}_2$ MW, 296

Constituent of cinchona bark. Leaflets from EtOH . M.p. 229° . $[\alpha]_D - 98.4^\circ$ in EtOH . Spar. sol. most solvents except EtOH . Acts as an antipyretic in rats.

B, $\text{HCl} \cdot 2\text{H}_2\text{O}$: prisms. M.p. 202.3° anhyd. $[\alpha]_D - 98.4^\circ$. Very sol. H_2O , EtOH .

Methiodide: m.p. 248° .

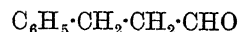
Skita, Nord, *Ber.*, 1912, 45, 3312.

Emde, *Helv. Chim. Acta*, 1932, 15, 557.

Hydrocinchonine.

See Cinchotine.

Hydrocinnamaldehyde (2-Phenylpropionaldehyde, benzylacetaldehyde, hydrocinnamic aldehyde)



$\text{C}_9\text{H}_{10}\text{O}$ MW, 134

Present in cortex of *Cinnamomum ceylanicum*, Nees, and leaves of *Cinnamomum cassia*, Bl. B.p. $221-4^\circ/744$ mm., $104-5^\circ/13$ mm.

Di-Me acetal: $\text{C}_{11}\text{H}_{16}\text{O}_2$. MW, 180. B.p. 240° , $114^\circ/15$ mm.

Oxime: prisms from EtOH . M.p. $93-94.5^\circ$.

Semicarbazone: plates. M.p. 127° .

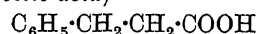
p-Nitrophenylhydrazone: m.p. $122-3^\circ$.

Fischer, Hoffa, *Ber.*, 1898, 31, 1992.

Dollfus, *Ber.*, 1893, 26, 1971.

Michael, Garner, *Am. Chem. J.*, 1906, 35, 266.

Hydrocinnamic Acid (2-Phenylpropionic acid, benzylacetic acid)



$\text{C}_9\text{H}_{10}\text{O}_2$ MW, 150

Prisms from pet. ether. M.p. 47° (48.5°). B.p. $280^\circ/754$, $125-9^\circ/6$ mm. $D_4^{25} 1.07115$. $k = 2.2 \times 10^{-5}$ at 25° . Sol. EtOH , Et_2O , CHCl_3 , CS_2 , AcOH , C_6H_6 . Sol. 6 to 7 parts pet. ether. Sol. 168 parts H_2O at 20° . Volatile in steam.

Me ester: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. $238-9^\circ/756.5$ mm. $D_4^{20} 1.0455$.

Et ester: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. B.p. $247.2^\circ/760$ mm. $D_4^{20} 1.0343$, $D_4^{25} 1.0302$. $n_D^{20} 1.49542$.

Chloride: $\text{C}_9\text{H}_9\text{OCl}$. MW, 168.5. B.p. $105^\circ/10$ mm., $115-16^\circ/11-12$ mm.

Amide: $\text{C}_9\text{H}_{11}\text{ON}$. MW, 149. Needles from H_2O . M.p. 105° . Very sol. EtOH , Et_2O .

Nitrile: $\text{C}_9\text{H}_9\text{N}$. MW, 131. B.p. 261° , $114-18^\circ/8$ mm. $D^{18} 1.0014$.

Anhydride: $C_{18}H_{18}O_3$. MW, 282. B.p. 216–17°/14 mm.

Anilide: cryst. from pet. ether. M.p. 98°.

2 : 4-Dinitrophenylhydrazide : m.p. 196–7°.

Strychnine salt : m.p. 100° decomp.

Ingersoll, *Organic Syntheses*, Collective Vol. I, 311.

Erlenmeyer, *Ann.*, 1866, 137, 334.

Hoffmann, *Ber.*, 1885, 18, 2740.

Schwenk, Papa, *J. Org. Chem.*, 1946, 11, 798.

Lagerev, *J. Gen. Chem. U.S.S.R.*, 1935, 5, 517, (*Chem. Abstracts*, 1935, 29, 6887).

Hydrocinnamic Aldehyde.

See Hydrocinnamaldehyde.

Hydrocinnamoin (*Distyrylethylene glycol*, 3 : 4-dihydroxy-1 : 6-diphenylhexadiene-1 : 5, 1 : 4-dibenzylidene- ψ -butylene glycol)

$C_6H_5 \cdot CH : CH \cdot CH(OH) \cdot CH(OH) \cdot CH : CH \cdot C_6H_5$
 $C_{18}H_{18}O_2$ MW, 266

Plates from EtOH. M.p. 156°. Spar. sol. EtOH, Et₂O. Heat \rightarrow terphenyl.

Diacetyl : prisms from EtOH. M.p. 118–19°. Sol. CHCl₃. Mod. sol. EtOH, AcOH.

Dibenzoyl : m.p. 169–70°.

Thiele, *Ber.*, 1899, 32, 1296.

Kuhn, Winterstein, *Ber.*, 1927, 60, 433.

Kuhn, Winterstein, *Helv. Chim. Acta*, 1928, 11, 104.

Hydrocinnamyl Alcohol (3-Phenyl-n-propyl alcohol, 3-phenylpropanol-1, γ -hydroxypropylbenzene)

$C_6H_5 \cdot CH_2 \cdot CH_2 \cdot CH_2OH$
 $C_9H_{12}O$ MW, 136

B.p. 235°, 119°/12 mm. D_{17}^{25} 1.007, D_4^{25} 0.995. n_D^{25} 1.53565, n_D^{25} 1.526.

Me ether : $C_{10}H_{14}O$. MW, 150. B.p. 206.5°, 92–4°/12 mm. D_4^{15} 0.999.

Et ether : $C_{11}H_{16}O$. MW, 164. B.p. 224°. D_4^{15} 0.824.

Phenyl ether : b.p. 171–2°/11 mm.

p-Nitrobenzoyl : cryst. from EtOH. M.p. 45–6°.

Phenylurethane : m.p. 47°.

Straus, Berkow, *Ann.*, 1913, 401, 151.

Delépine, Hanegraaff, *Bull. soc. chim.*, 1937, 4, 2087.

Huston, Agett, *J. Org. Chem.*, 1941, 6, 123.

Shorygin, Bogacheva, Shepeleva, *Chem. Abstracts*, 1942, 36, 3793.

Papa, Schwenk, Whitman, *J. Org. Chem.*, 1942, 7, 587.

Palfray, Sabetay, Gauthier, *Compt. rend.*, 1944, 218, 553.

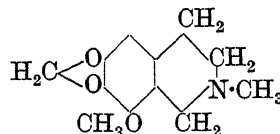
Hydroconchinene.

See Hydroquinidine.

Hydroconquinine.

See Hydroquinidine.

Hydrocotarnine (8-Methoxy-6 : 7-methylene-dioxy-N-methyltetrahydroisoquinoline)



$C_{12}H_{15}O_3N$

MW, 221

Constituent of opium alkaloids. Cryst. + $\frac{1}{2}H_2O$ from EtOH. M.p. 55–6°. Sol. most org. solvents. Insol. H₂O, alkalis.

B, HBr : m.p. 236–7°. Spar. sol. H₂O.

B, HI : colourless needles from MeOH. M.p. 195–6°.

Methiodide : prisms from MeOH. M.p. 206–7°.

Beckett, Wright, *J. Chem. Soc.*, 1875, 28, 577.

Badow, Wolfenstein, *Ber.*, 1898, 31, 1577.

Steiner, *Compt. rend.*, 1923, 176, 224.

Dey, Kantam, *J. Indian Chem. Soc.*, 1935, 12, 421.

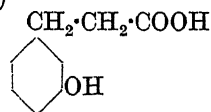
Hydrocotoin.

See under Cotoin.

o-Hydrocoumaric Acid.

See Melilotic Acid.

m-Hydrocoumaric Acid (*m-Hydroxyhydrocinnamic acid*)



$C_9H_{10}O_3$

MW, 166

Needles from C₆H₆-pet. ether. M.p. 111°, (99–100°).

Me ether : see m-Methoxyhydrocinnamic Acid.

Tiemann, Ludwig, *Ber.*, 1882, 15, 2050.

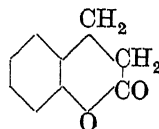
Braunstein, *Ber.*, 1882, 15, 2051.

Schwenk, Papa, *J. Org. Chem.*, 1945, 10, 232.

p-Hydrocoumaric Acid.

See Phloretic Acid.

Hydrocoumarin (3 : 4-Dihydrocoumarin, 2-hydroxyhydrocinnamic lactone, melilotol, melilotic lactone)

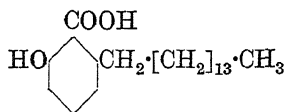


$C_9H_8O_2$

MW, 148

Occurs in *Melilotus officinalis*. Leaflets. M.p. 25°. B.p. 272°, 145°/13 mm. Sol. CHCl₃. Mod. sol. EtOH, Et₂O. Insol. cold H₂O. KOH \rightarrow melilotic acid.

Hydroginkgolic Acid (6-Hydroxy-2-pentadecylbenzoic acid, 6-pentadecylsalicylic acid, cyclogallipharic acid)



$C_{22}H_{36}O_3$ MW, 348

Needles from pet. ether. M.p. 92.5–93° (90.5–91°, 86–8°). Very sol. EtOH, Me₂CO, Et₂O, C₆H₆, CHCl₃.

Me ester: m.p. 35–7°.

Acetyl: needles from pet. ether. M.p. 73–74.5°.

p-Nitrobenzoyl: needles from ligroin. M.p. 87–9°.

Furukawa, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1935, 26, 178.

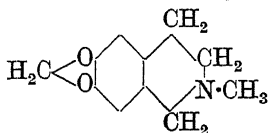
Eichbaum, Hauptmann, Rothschild, *Chem. Abstracts*, 1946, 40, 6443.

Backer, Haack, *Rev. trav. chim.*, 1941, 60, 661.

Pillay, *J. Indian Chem. Soc.*, 1935, 12, 226.

Kawamura, *Japan J. Chem.*, 1928, 3, 89.

Hydrohydrastinine (6:7-Methylenedioxy-N-methyltetrahydroisoquinoline)



$C_{11}H_{13}O_2N$ MW, 191

Cryst. M.p. 66° (60–1°). Ox. → hydrastinine. Sol. EtOH, MeOH, Me₂CO, CS₂, C₆H₆.

B.HCl: cryst. M.p. 273–4°.

B.HBr: cryst. M.p. 272°.

B.HI: cryst. M.p. 232°.

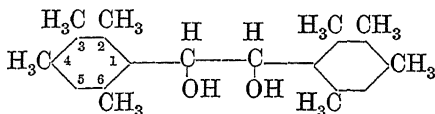
Methiodide: needles from H₂O. M.p. 227–8°.

Fritsch, *Ann.*, 1895, 286, 18.

Freund, Dormeyer, *Ber.*, 1891, 24, 2734.

Polonovski, Polonovski, *Bull. soc. chim.*, 1936, [5], 3, 885.

Hydroisoduroin (2:3:4:6:2':3':4':6'-Octamethylhydrobenzoin)



$C_{22}H_{30}O_2$ MW, 326

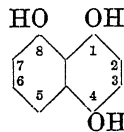
White needles from MeOH. M.p. 225.5–226.5°. Insol. pet. ether.

Fuson, Southwick, Rowland, *J. Am. Chem. Soc.*, 1944, 66, 1112.

Hydroisoferulic Acid.

See under 3:4-Dihydroxyhydrocinnamic Acid.

α-Hydrojuglone (1:4:8-Trihydroxynaphthalene)



$C_{10}H_8O_3$

MW, 176

Present in leaves of *Juglans regia*, Linn. Leaflets or needles. M.p. 168–9°. Sol. EtOH, Et₂O. Spar. sol. H₂O, C₆H₆. Insol. CHCl₃. Heat. → β-hydrojuglone.

Mylius, *Ber.*, 1885, 18, 2569.

Willstätter, Wheeler, *Ber.*, 1914, 47, 2799.

β-Hydrojuglone (1:4:7-Trihydroxynaphthalene).

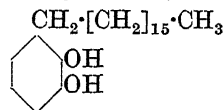
Present in leaves of *Juglans regia*, Linn. Plates or needles from EtOH. M.p. 96–7°. Sol. CHCl₃, C₆H₆. Spar. sol. EtOH, Et₂O. Volatile in steam. FeCl₃ → deep red col. Heat with dil. HCl → α-hydrojuglone.

Triacetyl: prisms from EtOH. M.p. 129–30°. Insol. H₂O. Sublimes undecomp.

Mylius, *Ber.*, 1885, 18, 2569.

Willstätter, Wheeler, *Ber.*, 1914, 47, 2799.

Hydrolaccol (2:3-Dihydroxy-1-heptadecylbenzene, 3-heptadecylcatechol)



$C_{23}H_{40}O_2$

MW, 348

Cryst. from pet. ether. M.p. 63–4°. B.p. 200–20°/0.05 mm.

Di-Me ether: $C_{25}H_{44}O_2$. MW, 376. Prisms from EtOH. M.p. 43–4°.

Diacetyl: m.p. 56–9° (57.8–58.3°).

Majima, *Ber.*, 1922, 55, 197.

Backer, Haack, *Rev. trav. chim.*, 1941, 60, 656.

Bertrand, Backer, Haack, *Bull. soc. chim.*, 1939, 6, 1670.

Hydromenisarine

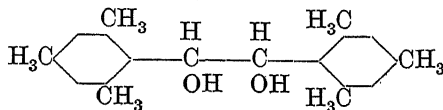
$C_{36}H_{36}O_6N_2$

MW, 592

Alkaloid from *Cocculus sarmentosus*, Diels. M.p. 164°. $[\alpha]_D^{25} + 265.8^\circ$ in CHCl₃. Gives Liebermann nitroso reaction. Gives blue col. with H₂SO₄/HNO₃, characteristic of diphenylenedioxides. Ox. with KMnO₄ → 6-methoxydiphenyl ether-3:4'-dicarboxylic acid.

Kondo, Tomita, *J. Pharm. Soc. Japan*, 1935, 55, 100, 637.

Hydromesitoin (2:4:6:2':4':6'-Hexamethylhydrobenzoin)



$C_{20}H_{26}O_2$

MW, 298

Cryst. from MeOH. M.p. 214–15°.

Fuson *et al.*, *J. Am. Chem. Soc.*, 1942, **64**, 30.

Fuson, Denton, Best, *J. Org. Chem.*, 1943, **8**, 64.

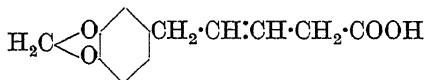
β-Hydromuconic Acid.

See Dihydromuconic Acid.

Hydrophlorone.

See 2 : 5-Dihydroxy-*p*-xylene.

α-Hydropiperic Acid (4-[3 : 4-Methylenedioxyphenyl]-2-butylene-1-carboxylic acid, 3 : 4-methylenedioxyphenylethylidenepropionic acid, 3 : 4-methylenedioxyphenylpropenylacetic acid)

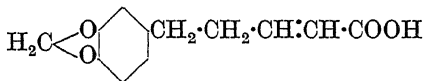


C₁₂H₁₂O₄ MW, 220

Cryst. from pet. ether. M.p. 75–6° (78°). NaOH → β-hydropiperic acid.

Weinstein, *Ann.*, 1885, **227**, 32.

β-Hydropiperic Acid (2-[3 : 4-Methylenedioxyphenylethyl]-acrylic acid, 4-[3 : 4-methylenedioxyphenyl]-1-butylene-1-carboxylic acid)

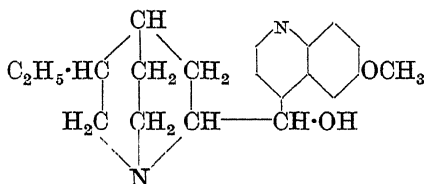


C₁₂H₁₂O₄ MW, 220

Needles from EtOH. M.p. 130–1°.

Weinstein, *Ann.*, 1885, **227**, 32.

Hydroquinidine (Hydroconquinine, hydroconchinene, quinotidine)



C₂₀H₂₆O₂N₂ MW, 326

Needles from EtOH. M.p. 168–9°. [α]_D¹⁸ + 229.6°.

B.HCl: cryst. from H₂O. M.p. 273–4°. [α]_D²⁶ + 183.9°. Sol. MeOH, CHCl₃, EtOH, H₂O. Spar. sol. Me₂CO.

Rabe *et al.*, *Ber.*, 1931, **64**, 2499.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 826.

Hydroquinine (Quinotine).

Stereoisomer of hydroquinidine (*above*). Constituent of most cinchona barks. Needles from Et₂O or CHCl₃. M.p. anhyd. 172.3° (169°). [α]_D²⁰ – 142.2° in EtOH. Easily sol. Et₂O, EtOH, CHCl₃, Me₂CO.

B.HCl: m.p. anhyd. 235–40°.

Me ether: m.p. 93°.

Benzyl ether: hydrobromide, m.p. 164°.

Benzoyl deriv.: cryst. M.p. 102–7°.

Methiodide: yellow prisms from EtOH. M.p. 233–5° decomp. after sintering at 170°. [α]_D²⁰ – 107.6°.

Heidelberger, Jacobs, *J. Am. Chem. Soc.*, 1919, **41**, 819, 2101.

Rabe *et al.*, *Ber.*, 1931, **64**, 2499.

Hydroquinol.

See Hydroquinone.

Hydroquinone (Hydroquinol, quinol, 1 : 4-dihydroxybenzene)



C₆H₆O₂ MW, 110

Needles from H₂O. M.p. 170.3°. Dimorphous. Stable form from H₂O; labile form on sublimation. B.p. 285°/730 mm. Very sol. hot H₂O, EtOH, Et₂O. Spar. sol. C₆H₆. Ox. → quinhydrone → *p*-benzoquinone.

Me ether: *p*-hydroxyanisole, *p*-methoxyphenol. C₇H₈O₂. MW, 124. Plates from H₂O. M.p. 53°. B.p. 243°. Reduces NH₃.AgNO₃. *Acetyl*: *p*-methoxyphenyl acetate. C₉H₁₀O₃. MW, 166. M.p. 31–2°. B.p. 243°/751 mm., 135°/18 mm. (Klemenc, *Monatsh.*, 1914, **35**, 85).

Di-Me ether: 1 : 4-dimethoxybenzene. C₈H₁₀O₂. MW, 138. Plates. M.p. 56°. B.p. 212.5°, 109°/20 mm. D₄²⁵ 1.0526, D₁₀₀²⁰ 1.0386.

Et ether: *p*-hydroxyphenetole, *p*-ethoxyphenol. C₈H₁₀O₂. MW, 138. Prisms from H₂O. M.p. 66–7°. B.p. 246–7°.

Di-Et ether: 1 : 4-diethoxybenzene. C₁₀H₁₄O₂. MW, 166. Prisms. M.p. 71–2°. Very sol. EtOH, Et₂O, CHCl₃, C₆H₆.

Phenyl ether: see 4-Hydroxydiphenyl Ether. *Benzyl ether*: *p*-Hydroxyphenyl benzyl Ether. *Phenacyl ether*: see *p*-Hydroxyphenyl phenacyl ether.

Diacetyl: plates from EtOH. M.p. 121° (123–4°). Very sol. Et₂O, CHCl₃, hot EtOH. Sol. hot H₂O.

Dibenzoyl: needles. M.p. 199°.

Nietzki, *Ann.*, 1882, **215**, 127.

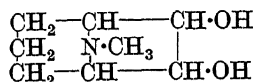
Hydroquinone-carboxylic Acid.

See Gentisic Acid.

Hydroquinone-dicarboxylic Acid.

See 3 : 6-Dihydroxyphthalic Acid and 2 : 5-Dihydroxyterephthalic Acid.

Hydroscopoline (Dihydroxytropene)



C₈H₁₅O₂N MW, 157

Cryst. from Me₂CO–MeOH. M.p. 165°. Reduces NH₃.AgNO₃. HI + P → tropane.

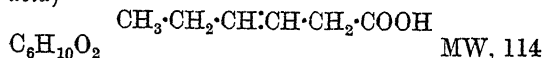
B.HBr: m.p. 260° decomp.

Picrate: needles from EtOH. M.p. 232°.

Hess, Suchier, *Ber.*, 1915, **48**, 2063.

Hess, *Ber.*, 1918, **51**, 1011.

Hydrosorbic Acid (2-Hexenic acid, β -amylene- α -carboxylic acid, hexenoic acid, 2-pentene-1-carboxylic acid, propyldenepropionic acid)



M.p. 12°. B.p. 208°, 118–19°/22 mm., 103°/9–10 mm. D_4^{25} 0.964. n_D^{25} 1.4365. $k = 2.41 \times 10^{-5}$ at 25°.

Et ester: $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. 166–7°, 64°/12 mm. D_4^{20} 0.8957. n_D^{20} 1.4255. Boiling alkalis \rightarrow 2-propylacrylic acid.

Chloride: $\text{C}_6\text{H}_9\text{OCl}$. MW, 132.5. B.p. 41–2°/12 mm.

Amide: $\text{C}_6\text{H}_{11}\text{ON}$. MW, 113. Plates from C_6H_6 . M.p. 60°.

Nitrile: $\text{C}_6\text{H}_7\text{N}$. MW, 95. B.p. 103–4°/91 mm.

Anilide: needles. M.p. 55°.

Boxer, Linstead, *J. Chem. Soc.*, 1931, 748.

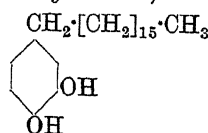
Kon, Linstead, MacLennan, *J. Chem. Soc.*, 1932, 2457.

Letch, Linstead, *J. Chem. Soc.*, 1934, 1994.

Takei, Imaki, Tuda, *Ber.*, 1935, **68**, 953.

Isaacs, Wilson, *J. Chem. Soc.*, 1936, 202.

Hydrothitsiol (3:4-Dihydroxy-1-heptadecyl benzene, 4-heptadecylcatechol)



Cryst. from xylene or pet. ether. M.p. 94–6°. B.p. 216–30°/0.18 mm.

Di-Me ether: $\text{C}_{25}\text{H}_{44}\text{O}_2$. MW, 376. Plates from EtOH. M.p. 56–7°.

Majima, *Ber.*, 1922, **55**, 204.

Hydrothymoquinone.

See Thymohydroquinone.

Hydrotoluquinone.

See Toluhydroquinone.

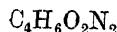
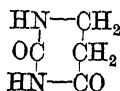
Hydrotropilidene.

See $\Delta^{1,3}$ -Cycloheptadiene.

Hydroumbellic Acid.

See 2:4-Dihydroxyhydrocinnamic Acid.

Hydouracil (β -Lactylurea, 2:4-diketohexahydro-1:3-diazine, 2:4-diketohexahydropyrimidine)



MW, 114

Needles from H_2O . M.p. 275°. Very sol. EtOH. Sol. MeOH. Spar. sol. CHCl_3 , Me_2CO , AcOEt. Sol. 5 parts boiling H_2O .

Acetyl deriv.: $\text{C}_6\text{H}_8\text{O}_3\text{N}_2$. MW, 156. Needles from AcOEt. M.p. 180°. Very sol. hot EtOH, Et_2O . Sublimes.

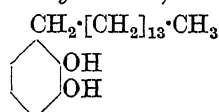
Oxazone: m.p. 163–4°.

Tafel, Weinschenk, *Ber.*, 1900, **33**, 3385.

Gabriel, *Ber.*, 1905, **38**, 635.

Brown, Johnson, *J. Am. Chem. Soc.*, 1923, **45**, 2702.

Hydourushiol (2:3-Dihydroxy-1-pentadecyl benzene, 3-pentadecylcatechol)



Needles from xylene or pet. ether. M.p. 58–5–59°. Very sol. EtOH, Et_2O , AcOH, CHCl_3 , C_6H_6 .

Me ether: $\text{C}_{22}\text{H}_{38}\text{O}_2$. MW, 334. M.p. 45–6°.

Di-Me ether: $\text{C}_{23}\text{H}_{40}\text{O}_2$. MW, 348. Prisms from EtOH. M.p. 36–7°.

Diacetyl: plates from MeOH. M.p. 50–1°.

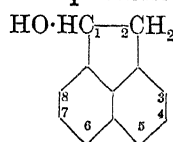
Majima, Tahara, *Ber.*, 1915, **48**, 1606.

Backer, Haack, *Rev. trav. chim.*, 1938, **57**, 225.

Mason, *J. Am. Chem. Soc.*, 1945, **67**, 1538.

Dawson, Wasserman, Keil, *J. Am. Chem. Soc.*, 1946, **68**, 534.

1-Hydroxyacenaphthene



Needles from C_6H_6 . M.p. 144.5–5.5° corr. (148°).

Acetyl: b.p. 166–8°/5 mm., 140–6°/1 mm.

Phenylurethane: m.p. 137°.

Fieser, Cason, *J. Am. Chem. Soc.*, 1940, **62**, 432.

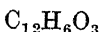
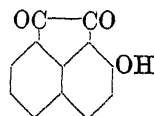
Cason, *Organic Syntheses*, 1941, **XXI**, 1.

5-Hydroxyacenaphthene.

Needles from C_6H_6 . M.p. 126°. B.p. 221°/40 mm.

Baeyer D.R.P., 237,266, (*Chem. Zentr.*, 1911, **II**, 499).

3-Hydroxyacenaphthenequinone (1-Hydroxyacenaphthenequinone. See numbering under Acenaphthene)



MW, 198

Me ether: 3-methoxyacenaphthenequinone. $C_{13}H_8O_3$. MW, 212. Yellow leaflets from AcOH. M.p. 215–16°. Spar. sol. Et_2O , C_6H_6 , EtOH. Red sol. in conc. H_2SO_4 .

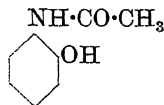
Et ether: 3-ethoxyacenaphthenequinone. $C_{14}H_{10}O_3$. MW, 226. Cryst. from AcOH. M.p. 141–2°. More sol. than *Me ether*.

Staudinger, Goldstein, Schlenker, *Helv. Chim. Acta*, 1921, 4, 350.

Hydroxyacetaldehyde.

See Glycollic Aldehyde.

***o*-Hydroxyacetanilide** (*N*-Acetyl-*o*-amino-phenol)



$C_8H_9O_2N$ MW, 151

Plates from EtOH.Aq. M.p. 209° (201°). Sol. EtOH, hot H_2O . $FeCl_3 \rightarrow$ green col.

O-Benzoyl: m.p. 140°.

Me ether: *o*-acetanisidide. See under *o*-Anisidine.

Et ether: *o*-acetphenetide. See under *o*-Phenetidine.

Bamberger, *Ber.*, 1903, 36, 2050.

Ladenburg, *Ber.*, 1876, 9, 1526.

Bell, *J. Chem. Soc.*, 1931, 2962.

Fierz-David, Kuster, *Helv. Chim. Acta*, 1939, 22, 82.

Crounse, Raiford, *J. Org. Chem.*, 1945, 10, 419.

***m*-Hydroxyacetanilide** (*N*-Acetyl-*m*-amino-phenol).

Needles from H_2O . M.p. 148–9°. Sol. H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 .

Me ether: *m*-acetanisidide. See under *m*-Anisidine.

Et ether: *m*-acetphenetide. See under *m*-Phenetidine.

Kehrmann, Dengler, *Ber.*, 1908, 41, 3442.

Ikuta, *Am. Chem. J.*, 1893, 15, 41.

***p*-Hydroxyacetanilide** (*N*-Acetyl-*p*-amino-phenol).

Prisms from EtOH. M.p. 168°. Sol. hot H_2O , EtOH. Insol. cold H_2O . $H_2SO_4 + HNO_3 \rightarrow$ 2 : 6-dinitro-4-acetylaminophenol.

O-Acetyl: m.p. 150–1°.

Me ether: *p*-acetanisidide. See under *p*-Anisidine.

Et ether: *p*-acetphenetide. See under *p*-Phenetidine.

Phenacyl ether: see Hypnoacetin.

Friedländer, *Ber.*, 1893, 26, 178.

Tingle, Williams, *Am. Chem. J.*, 1907, 37, 63.

Vignolo, *Atti accad. Lincei*, 1897, 6, I, 71.

Vladuta, *Chem. Abstracts*, 1935, 29, 7304.

Fierz-David, Küster, *Helv. Chim. Acta*, 1939, 22, 82.

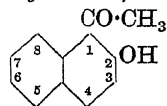
Hydroxyacetic Acid.

See Glycollic Acid.

3-Hydroxyacetoacetic Acid Lactone.

See Tetronic Acid.

2-Hydroxy-1-acetonaphthone (1-Aceto-2-naphthol, 2-hydroxy-1-acetylnaphthalene, methyl 2-hydroxy-1-naphthyl ketone)



$C_{12}H_{10}O_2$ MW, 186

Light yellow needles from pet. ether. M.p. 64°.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 59°.

Benzoyl: m.p. 85–6°.

Hydrazone: m.p. 130°.

Fries, Schimmelschmidt, *Ber.*, 1925, 58, 2835.

Fries, Frellstedt, *Ber.*, 1921, 54, 712.

Imoto, *Chem. Abstracts*, 1938, 32, 534.

4-Hydroxy-1-acetonaphthone (4-Aceto-1-naphthol, 1-hydroxy-4-acetylnaphthalene, methyl 4-hydroxy-1-naphthyl ketone).

Pale yellow prisms from EtOH. M.p. 198° (188°). Sol. alkalis, conc. H_2SO_4 .

Me ether: m.p. 72°.

Et ether: $C_{14}H_{14}O_2$. MW, 214. M.p. 78–9°.

Acetyl: m.p. 140° (83–4°).

Oxime: m.p. 164°.

Phenylhydrazone: m.p. 133°.

Picrate: m.p. 160–1°.

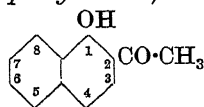
Witt, v. Braun, *Ber.*, 1914, 47, 3219.

Gattermann, Ehrhardt, Maisch, *Ber.*, 1890, 23, 1208.

Akram, Desai, *Proc. Indian Acad. Sci.*, 1940, 11A, 149.

Imoto, *Chem. Abstracts*, 1938, 32, 534.

1-Hydroxy-2-acetonaphthone (2-Aceto-1-naphthol, 1-hydroxy-2-acetylnaphthalene, methyl 1-hydroxy-2-naphthyl ketone)



$C_{12}H_{10}O_2$ MW, 186

Exists in two cryst. forms. (1) Greenish yellow needles from EtOH. M.p. 103°. (2) Prisms from C_6H_6 or ligroin. M.p. 98°. B.p. 325° slight decomp. Sol. AcOH, $CHCl_3$, CS_2 , C_6H_6 . Spar. sol. EtOH. Insol. H_2O . Lower melting form is the more sol. Sol. alkalis and conc. H_2SO_4 . All sols. are weakly yellow except in ligroin, which are colourless.

Me ether: $C_{13}H_{12}O_2$. MW, 200. M.p. 49°.

Et ether: $C_{14}H_{14}O_2$. MW, 214. B.p. 320°.

Acetyl: m.p. 107°.

m-Nitrobenzoyl: cryst. from AcOH. M.p. 152°.

Oxime: m.p. 168–9°.

Semicarbazone: m.p. 245–50° (306°).

Phenylhydrazone: m.p. 141°.

Picrate: m.p. 112°.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.

Friedländer, *Ber.*, 1895, **28**, 1946.

Ullmann, *Ber.*, 1897, **30**, 1466.

Akram, Desai, *Proc. Indian Acad. Sci.*, 1940, **11A**, 149, 156, (*Chem. Abstracts*, 1940, **34**, 5436-7).

Imoto, *Chem. Abstracts*, 1938, **32**, 534.

Stroughton, *J. Am. Chem. Soc.*, 1935, **57**, 202.

3-Hydroxy-2-acetonaphthone (3-*Aceto-2-naphthol*, 2-hydroxy-3-acetylnaphthalene, methyl 3-hydroxy-2-naphthyl ketone).

Needles from ligroin. M.p. 112°. Sol. alkalis, conc. H_2SO_4 .

Me ether: m.p. 48°. *Oxime*: m.p. 121.5°.

Semicarbazone: m.p. 238-40°. *Phenylhydrazone*:

m.p. 146°. *p*-Nitrophenylhydrazone: m.p. 226°.

Oxime: m.p. 151°.

Azine: m.p. 217°.

Wahl, *Compt. rend.*, 1938, **206**, 521.

Fries, Schimmelschmidt, *Ber.*, 1925, **58**, 2835.

Witt, v. Braun, *Ber.*, 1914, **47**, 3219.

4-Hydroxy-2-acetonaphthone (3-*Aceto-1-naphthol*, 1-hydroxy-3-acetylnaphthalene, methyl 4-hydroxy-2-naphthyl ketone).

Needles from C_6H_6 . M.p. 173-4°. Sol. EtOH, AcOH. Sol. alkalis. Sol. conc. H_2SO_4 to orange sol. Ox. \rightarrow phthalic acid.

Acetyl: m.p. 108-9°.

Erdmann, Henke, *Ann.*, 1893, **275**, 292.

6-Hydroxy-2-acetonaphthone (6-*Aceto-2-naphthol*, 2-hydroxy-6-acetylnaphthalene, methyl 6-hydroxy-2-naphthyl ketone).

Prisms from C_6H_6 . M.p. 171°. Yellow sols. in alkalis. Ox. \rightarrow trimellitic acid.

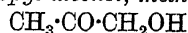
Me ether: m.p. 106-7°. *p*-Nitrophenylhydrazone: m.p. 239-40°.

Hydrazone: m.p. 295°.

p-Nitrophenylhydrazone: m.p. 253-4°.

Waravdekar, *Proc. Indian Acad. Sci.*, 1946, **24A**, 382, (*Chem. Abstracts*, 1947, **41**, 4481).

Hydroxyacetone (*Acetol*, *acetylcarbinol*, *acetonyl alcohol*, 1-propanolone-2, *pyroracemic alcohol*, *pyruvic alcohol*, methyl hydroxymethyl ketone, 2-ketopropyl alcohol, methylketol)



$\text{C}_3\text{H}_6\text{O}_2$ MW, 74

F.p. about -17°. B.p. 145-6°, 105-6°/200 mm., 96-7°/150 mm., 54°/18 mm. D_4^{20} 1.0824. n_D^{20} 1.4295. Sol. H_2O , EtOH, Et_2O . Somewhat unstable; stabilised by MeOH. Reduces $\text{NH}_3\cdot\text{AgNO}_3 \rightarrow \gamma$ -lactic acid. Fehling's \rightarrow $\text{H}\cdot\text{COOH} + \text{CH}_3\cdot\text{COOH}$. Gives bisulphite comp.

Me ether: see Methoxyacetone.

Et ether: see Ethoxyacetone.

Propyl ether: propyl acetonyl ether. $\text{C}_6\text{H}_{12}\text{O}_2$. MW, 116. B.p. 146°.

Isobutyl ether: isobutyl acetonyl ether. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. 157°/730 mm.

Isoamyl ether: isoamyl acetonyl ether. $\text{C}_8\text{H}_{16}\text{O}_2$. MW, 144. B.p. 181°/730 mm.

Acetyl: see Acetoxyacetone.

Salicyloyl: see Salacetol.

Di-Et acetal: 1-hydroxy-2:2-diethoxypropane, 2:2-diethoxypropyl alcohol. $\text{C}_7\text{H}_{16}\text{O}_3$. MW, 148. B.p. 68°/9 mm. D_4^{25} 0.9618.

Oxime: m.p. 71°.

Semicarbazone: m.p. 196°.

Phenylhydrazone: m.p. 103°.

Perkin, *J. Chem. Soc.*, 1891, **59**, 787.

Levene, Walti, *Organic Syntheses*, 1930, **X**, 1.

Hildesheimer, *Ber.*, 1910, **43**, 2804.

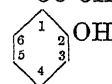
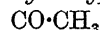
Nef, *Ann.*, 1904, **335**, 250.

Kling, *Ann. chim. phys.*, 1905, **5**, 496, 534.

ω-Hydroxyacetophenone.

See Phenacyl Alcohol.

o-Hydroxyacetophenone (*o*-*Acetophenol*, *o*-*acetylphenol*, methyl 2-hydroxyphenyl ketone)



$\text{C}_8\text{H}_8\text{O}_2$ MW, 136

Present in oil from *Chione glabra*. Oil. B.p. 213°/717 mm., 106°/17 mm., 96°/10 mm. D_4^{20} 1.1307. n_D^{21} 1.558. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O . $\text{FeCl}_3 \rightarrow$ reddish-violet col.

Me ether: *o*-methoxyacetophenone, *o*-acetoanisole, methyl *o*-methoxyphenyl ketone. $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 150. B.p. 245°, 131.2°/18 mm. $\text{D}_4^{23.6}$ 1.0849. $n_D^{23.5}$ 1.538. *Semicarbazone*: m.p. 182-3°. *Oxime*: needles. M.p. 83°. *Phenylhydrazone*: m.p. 114°.

Et ether: *o*-ethoxyacetophenone, *o*-aceto-phenetole, methyl *o*-ethoxyphenyl ketone. $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. Plates from ligroin. M.p. 43° (38.5-39.5°). B.p. 243-4°. Volatile in steam.

Acetyl: needles from EtOH. M.p. 89°. Sol. EtOH, Et_2O , AcOH. Insol. H_2O .

m-Nitrobenzoyl: cryst. from EtOH. M.p. 99-100°. B.p. 215-220°. *Semicarbazone*: 205-7°.

Oxime: m.p. 117°.

Semicarbazone: m.p. 209-10°.

Azine: cryst. from EtOH. M.p. 198°.

Hydrazone: cryst. from EtOH. M.p. 84°.

Phenylhydrazone: m.p. 109-10°.

Pauly, Lockemann, *Ber.*, 1915, **48**, 30.

Tahara, *Ber.*, 1892, **25**, 1308.

Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, **I**, 817.

Auwers, *Ann.*, 1915, **408**, 245.

Friedländer, Neudörfer, *Ber.*, 1897, **30**, 1080.

Norris, Sturgis, *J. Am. Chem. Soc.*, 1939, **61**, 1413.

m-Hydroxyacetophenone (*m*-Acetophenol, *m*-acetylphenol, methyl 3-hydroxyphenyl ketone).

Needles. M.p. 96°. B.p. 296°, 153°/5 mm. D_{10}^{109} 1.099. n_D^{109} 1.5348. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O. Insol. ligroin.

Me ether: *m*-methoxyacetophenone, *m*-acetoanisole, methyl *m*-methoxyphenyl ketone. Oil. B.p. 240° (252°), 125–6°/12 mm., 99°/4 mm. D_4^{15-35} 1.0993. n_D^{15-35} 1.5583. Semicarbazone: m.p. 195–7°.

Et ether: *m*-ethoxyacetophenone, *m*-aceto-phenetole, methyl *m*-ethoxyphenyl ketone. B.p. 255°.

Acetyl: m.p. 44–44.5°. B.p. 147°/9 mm.

Semicarbazone: m.p. 194–6°.

Pfeiffer, *Ann.*, 1911, **383**, 104, 141.

Besthorn, Banzhof, Jaeglé, *Ber.*, 1894, **27**, 3036.

Eijkmann, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.

Cobb, *Chem. Abstracts*, 1946, **40**, 7180.

p-Hydroxyacetophenone (*p*-Acetophenol, *p*-acetylphenol, methyl 4-hydroxyphenyl ketone).

Occurs in many natural glucosides. Needles from Et₂O or EtOH.Aq. M.p. 109°. B.p. 148°/3 mm. D^{109} 1.109. n_a^{109} 1.5577. FeCl₃ → weak violet col. Na₂O₂ → hydroquinone. CaO dist. → phenol.

Me ether: *p*-methoxyacetophenone, *p*-acetoanisole, methyl *p*-methoxyphenyl ketone. Plates from Et₂O. M.p. 38–9°. B.p. 258°, 138–9°/15 mm. D^{41-1} 1.0818. n_D^{41-3} 1.547. Semicarbazone: m.p. 195–6° (181–2°). *Oxime*: needles from pet. ether. M.p. 86–7°.

Et ether: *p*-ethoxyacetophenone, *p*-aceto-phenetole, methyl *p*-ethoxyphenyl ketone. Plates from Et₂O. M.p. 39° (36–7°).

Phenyl ether: 4-acetodiphenyl ether. C₁₄H₁₂O₂. MW, 212. Cryst. from EtOH.Aq. M.p. 45°. B.p. 318–25°.

Oxime: m.p. 144–5°.

Semicarbazone: m.p. 198–9°.

Azine: cryst. from EtOH. M.p. 221°.

Hydrazone: plates from EtOH. M.p. 155°.

Klingel, *Ber.*, 1885, **18**, 2691.

Pauly, Lockemann, *Ber.*, 1915, **48**, 30.

Eijkmann, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 817.

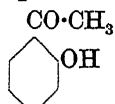
Perkin, *J. Chem. Soc.*, 1897, **71**, 810.

Norris, Sturgis, *J. Am. Chem. Soc.*, 1939, **61**, 1413.

Simons, Randall, Archer, *ibid.*, 1795.

Edkins, Linnell, *Quart. J. Pharm. Pharmacol.*, 1936, **9**, 75.

o-Hydroxyacetophenone-p-arsinic Acid



C₈H₉O₅As

O:As(OH)₂

MW, 260

Needles from H₂O. M.p. 156°.

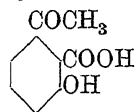
Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.

p-Hydroxyacetophenone-m-arsinic Acid. M.p. 225°.

Me ether: m.p. 212°.

Banks, Hamilton, *J. Am. Chem. Soc.*, 1939, **61**, 352.

3 - Hydroxyacetophenone - 2 - carboxylic Acid (6-Acetylsalicylic acid)



C₉H₈O₄

MW, 180

Degradation product of terramycin.

Me ether: C₁₀H₁₀O₄. MW, 194. *Me ester*: C₁₁H₁₂O₄. MW, 208. Needles from H₂O or cyclohexane. M.p. 119°.

Kuhn, Dury, *Ber.*, 1951, **84**, 848.

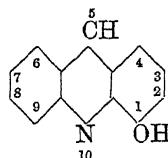
Hydroxyacet-toluidide.

See under Aminocresol.

Hydroxy-acetylnaphthalene.

See Hydroxyacetophenone.

1-Hydroxyacridine (see note under Acridine)



C₁₃H₉ON

MW, 195

Yellow needles from EtOH.Aq. M.p. 116–5°. Sol. Et₂O. Sol. conc. H₂SO₄ with green fluor.

B.HCl: orange needles. M.p. 252° decomp.

B₂H₂SO₄: orange needles. M.p. 240°.

Picrate: red needles from EtOH. M.p. 216°.

Me ether: C₁₄H₁₁ON. MW, 209. Pale yellow needles from EtOH.Aq. M.p. 130–1°.

Picrate: orange-red needles from EtOH. M.p. 250° decomp.

Et ether: C₁₅H₁₃ON. MW, 223. Yellow needles. M.p. 80°. Sol. Et₂O, EtOH, with bluish-green fluor. *B.HCl*: yellow needles. M.p. 220° decomp. *B₂H₂SO₄*: yellow needles. M.p. 250°. *Picrate*: yellow needles. M.p. 255°.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 810.

Jensen, Rethwisch, *J. Am. Chem. Soc.*, 1928, **50**, 1144.

Albert, Ritchie, *J. Chem. Soc.*, 1943, 458. Nitzsche, *Ber.*, 1943, **76**, 1187.

2-Hydroxyacridine.

M.p. 285° (sealed tube).

Albert, Ritchie, *J. Chem. Soc.*, 1943, 458. Nitzsche, *Ber.*, 1943, **76**, 1187.

3-Hydroxyacridine.

Yellow needles from EtOH. Does not melt below 250°.

Et ether: $C_{13}H_{13}ON$. MW, 223. Yellow plates from EtOH.Aq. M.p. 99°. *B.HCl*: yellow needles from EtOH. M.p. 200° decomp. *Picrate*: yellow needles from Me_2CO . Does not melt below 250°.

Albert, Ritchie, *J. Chem. Soc.*, 1943, 458.

Nitzsche, *Ber.*, 1943, 76, 1187.

Linnell, Stuckey, *Quart. J. Pharm.*

Pharmacol., 1940, 13, 162.

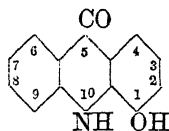
Jensen, Rethwisch, *J. Am. Chem. Soc.*, 1928, 50, 1144.

4-Hydroxyacridine.

Yellow needles from EtOH.Aq. M.p. about 250° decomp. (230°).

Albert, Ritchie, *J. Chem. Soc.*, 1943, 458.

Nitzsche, *Ber.*, 1943, 76, 1187.

1-Hydroxyacridone

$C_{13}H_9O_2N$

MW, 211

Yellow needles from AcOH.Aq. M.p. 300°. Sol. EtOH, AcOH with blue fluor. Spar. sol. C_6H_6 . Insol. ligroin. Sol. NaOH. Sol. conc. H_2SO_4 with green fluor.

Me ether: $C_{14}H_{11}O_2N$. MW, 225. Yellow needles from AcOH.Aq. M.p. 293°. Sol. EtOH, AcOH. Spar. sol. C_6H_6 . Insol. ligroin.

Et ether: $C_{15}H_{13}O_2N$. MW, 239. Yellow needles from AcOH.Aq. M.p. 320° decomp. Sol. EtOH, AcOH. Sol. conc. H_2SO_4 with green col.

Ullmann, *Ann.*, 1907, 355, 345.

Matsumura, *J. Am. Chem. Soc.*, 1927, 49, 810.

3-Hydroxyacridone.

Green cryst. from EtOH. M.p. 281–2°.

Me ether: m.p. 280–1°.

Linnell, Stuckey, *Quart. J. Pharm.*

Pharmacol., 1940, 13, 162.

10-Hydroxyacridone (N-Hydroxyacridone).

Yellow needles from AcOH. M.p. 255–6°. Sol. conc. H_2SO_4 . Spar. sol. Et_2O , C_6H_6 , $CHCl_3$, EtOH, H_2O .

Me ether: yellow needles from Me_2CO .Aq. M.p. 153°. Sol. Me_2CO , AcOH, EtOH, $CHCl_3$, C_6H_6 . Spar. sol. cold ligroin.

Kliegl, Fehrle, *Ber.*, 1914, 47, 1634.

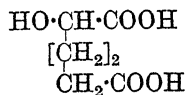
Tanasescu, Ramontianu, *Bull. soc. chim.*, 1936 [5], 3, 2009.

Kliegl, Brosamle, *Ber.*, 1936, 69, 197.

Lehmstedt, *Ber.*, 1937, 70, 172.

2-Hydroxyacrylic Acid.

See Formylacetic Acid.

1-Hydroxyadipic Acid

$C_6H_{10}O_5$

MW, 162

Cryst. from H_2O . M.p. 151°. Sol. H_2O , EtOH, Et_2O . Sublimes.

Di-Me ester: $C_8H_{14}O_5$. MW, 190. *Me ether*: $C_9H_{16}O_5$. MW, 204. B.p. 157–60°/11 mm.

Di-Et ester: $C_{10}H_{18}O_5$. MW, 218. B.p. 160–1°/17 mm. *Me ether*: $C_{11}H_{20}O_5$. MW, 232. B.p. 142–4°/12 mm. *Acetyl deriv.*: b.p. 155–60°/12 mm.

Ince, *J. Chem. Soc.*, 1895, 67, 159.

Borsche, Manteuffel, *Ann.*, 1933, 505, 190.

2-Hydroxy- α -alanine.

See Serine.

1-Hydroxy- β -alanine.

See Isoserine.

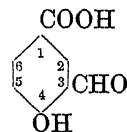
2-Hydroxy-1-aldehydoanthracene.

See 2-Anthrol-1-aldehyde.

2-Hydroxy-3-aldehydobenzoic Acid.

See 3-Aldehydosalicylic Acid.

4-Hydroxy-3-aldehydobenzoic Acid (4-Hydroxy-3-formylbenzoic acid, 4-hydroxyisophthalaldehydic acid)



$C_8H_6O_4$

MW, 166

Prisms from H_2O . M.p. 244°. Sol. EtOH, Et_2O . Spar. sol. cold H_2O , $CHCl_3$. Sublimes. Yellow sol. in NaOH.Aq. $FeCl_3 \rightarrow$ brick-red col. Ox. or KOH fusion \rightarrow 4-hydroxyisophthalic acid.

Phenylhydrazone: m.p. 257–8° decomp.

Reimer, Tiemann, *Ber.*, 1876, 9, 1274.

Chattaway, Prats, *J. Chem. Soc.*, 1927, 690.

3-Hydroxy-4-aldehydobenzoic Acid (3-Hydroxy-4-formylbenzoic acid, 3-hydroxyterephthalaldehydic acid).

Needles. M.p. 234°. Sol. EtOH, Et_2O . Spar. sol. hot H_2O . Sublimes. Deep yellow sol. in NaOH.Aq. $FeCl_3 \rightarrow$ violet col. Ox. or KOH fusion \rightarrow hydroxyterephthalic acid.

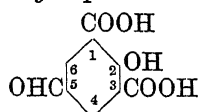
Reimer, Tiemann, *Ber.*, 1876, 9, 1274.

2-Hydroxy-5-aldehydobenzoic Acid.

See 5-Aldehydosalicylic Acid.

4-Hydroxy-1-aldehyde-1 : 3-butadiene.

See Glutacondialdehyde.

2-Hydroxy-5-aldehydoisophthalic Acid
(2-Hydroxy-5-formylisophthalic acid) $C_9H_6O_6$

MW, 210

Needles. M.p. 237–8° decomp. Sublimes without decomp. $FeCl_3 \rightarrow$ cherry-red col. Sols. shew blue fluor. (alk. sol. colourless). KOH fusion \rightarrow 2- and 4-hydroxyisophthalic acids. Ox. \rightarrow hydroxytrimesic acid.

Reimer, *Ber.*, 1878, 11, 795.**4-Hydroxy-5-aldehydoisophthalic Acid.**

Needles from H_2O . M.p. 260° decomp. Sol. EtOH, Et_2O , hot H_2O . Spar. sol. cold H_2O . $FeCl_3 \rightarrow$ bluish-red col. KOH fusion \rightarrow 2- and 4-hydroxyisophthalic acids. Ox. \rightarrow hydroxytrimesic acid. Neutral alkali salt is colourless, basic is yellow. Both salts shew green fluor.

Reimer, *Ber.*, 1878, 11, 793.**Hydroxyaldehydoquinaldine.**

See Hydroxyquinaldine-aldehyde.

Hydroxyaldehydoquinoline.

See Hydroxyquinoline-aldehyde.

Hydroxy-aldehydo-xylene.

See Hydroxydimethylbenzaldehyde.

Hydroxyallylene.

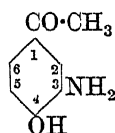
See Propargyl Alcohol.

p-Hydroxy- ω -aminoacetophenone.

See p-Hydroxyphenacylamine.

 ω -Hydroxy-aminoacetophenone.

See Aminophenacyl Alcohol.

4-Hydroxy-3-aminoacetophenone $C_8H_9O_2N$

MW, 151

M.p. 98°.

Me ether: $C_9H_{11}O_2N$. MW, 165. Prisms from EtOH. M.p. 102° (85°). Sol. C_6H_6 . Mod. sol. Et_2O . *B, HCl*: m.p. 170° decomp. *N-Acetyl*: prisms. M.p. 122–5°.

Bogert, Curtin, *J. Am. Chem. Soc.*, 1923, 45, 2164.Edkins, Linnell, *Quart. J. Pharm. Pharmacol.*, 1936, 9, 75.Banks, Hamilton, *J. Am. Chem. Soc.*, 1939, 61, 357.**6-Hydroxy-3-aminoacetophenone** (2-Hydroxy-5-aminoacetophenone).

Yellow needles or plates from H_2O . M.p. 121–2° (110°). Sol. EtOH, Et_2O .

B, HCl: m.p. 155° decomp.

N-Acetyl: yellow cryst. from EtOH. M.p. 165°. Sol. EtOH. Spar. sol. Et_2O , $CHCl_3$.

Na salt: yellow plates. M.p. 225° decomp. *Oxime*: needles. M.p. 160°. *Phenylhydrazone*: m.p. 207°.

Diacetyl: m.p. 173–4°.*Oxime*: m.p. 201–2° decomp.

Et ether: $C_{10}H_{13}O_2N$. MW, 179. Yellow needles. M.p. 60°. Sol. EtOH. *B, HCl*: cryst. M.p. 215°. *N-Acetyl*: needles from EtOH. M.p. 155°.

Kunckell, *Ber.*, 1901, 34, 125; *Chem. Zentr.*, 1913, II, 2124.Lindemann, Romanoff, *J. prakt. Chem.*, 1929, 122, 214.**2-Hydroxy-4-aminoacetophenone.**

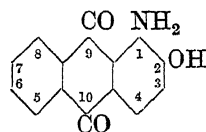
Plates from EtOH.Aq. M.p. 122–3°.

N-Acetyl: needles from EtOH or C_6H_6 . M.p. 91°.

N-Di-Me: $C_{10}H_{13}O_2N$. MW, 179. Plates from ligroin. M.p. 120°. Alc. $FeCl_3 \rightarrow$ violet-black col.

Gibson, Levin, *J. Chem. Soc.*, 1931, 2402.Pechmann, Schaal, *Ber.*, 1899, 32, 3691.**Hydroxyaminoanthracene.**

See Hydroxyanthramine.

2-Hydroxy-1-aminoanthraquinone $C_{14}H_9O_3N$

MW, 239

Brown needles from EtOH. M.p. 250°. Very stable. Sol. aq. alkalis, alkali carbonates, $Ba(OH)_2$. HNO_3 in hot EtOH \rightarrow 2-hydroxy-anthraquinone.

N-Acetyl: dark brown cryst. from AcOH, golden needles from EtOH. M.p. 170°. Sol. alkalis.

Et ether: $C_{16}H_{13}O_3N$. MW, 267. Red plates. M.p. 182°. Conc. H_2SO_4 at 200° \rightarrow 2-hydroxy-1-aminoanthraquinone.

Liebermann, Troschke, *Ann.*, 1876, 183, 206.Lagodzinski, *Ann.*, 1905, 342, 84.Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, 27, 5083).**4-Hydroxy-1-aminoanthraquinone** (1-Hydroxy-4-aminoanthraquinone, 4-aminoerythroxyanthraquinone).

Reddish-violet cryst. powder from EtOH.Aq. M.p. 207–8°. Sol. EtOH, C_6H_6 with reddish-brown col. Violet sol. in NaOH. Yellow sol. in conc. H_2SO_4 .

N-Me: $C_{15}H_{11}O_3N$. MW, 253. Bronze cryst. Violet sols. in $CHCl_3$, AcOH. Yellow sol. in conc. HCl.

N-Di-Me: $C_{16}H_{13}O_3N$. MW, 267. Brown-

ish-red needles from Py. M.p. 245°. Sol. CHCl_3 . Orange-red sol. in conc. $\text{H}_2\text{SO}_4 \rightarrow$ bluish-red on addn. of boric acid.

N-Phenyl: 4-hydroxy-1-anilinoanthraquinone. $\text{C}_{20}\text{H}_{13}\text{O}_3\text{N}$. MW, 315. Blue-black needles from AcOH, dark violet needles from MeOH. M.p. 158° (153°). Sol. CHCl_3 , AcOH. Spar. sol. EtOH. Green sol. in conc. $\text{H}_2\text{SO}_4 \rightarrow$ blue on addn. of boric acid.

Wacker, *Ber.*, 1902, 35, 3923.

Eckert, Steiner, *Monatsh.*, 1914, 35, 1144.
Bayer, D.R.P., 125,666, (*Chem. Zentr.*, 1901, II, 1190).

Koehler, U.S.P., 1,922,480, (*Chem. Abstracts*, 1933, 27, 5083).

5-Hydroxy-1-aminoanthraquinone (1-Hydroxy-5-aminoanthraquinone, 5-aminoerythroxyanthraquinone).

Brownish-red prisms from C_6H_6 . M.p. 210° (216°). Sol. EtOH, C_6H_6 . Spar. sol. H_2O . Sol. NaOH. Orange sol. in conc. H_2SO_4 .

Wacker, *Ber.*, 1902, 35, 3925.

Höchst, D.R.P., 149,781, (*Chem. Zentr.*, 1904, I, 1045).

8-Hydroxy-1-aminoanthraquinone (1-Hydroxy-8-aminoanthraquinone, 8-aminoerythroxyanthraquinone).

Brown needles from C_6H_6 . M.p. 230° (214-15°). Sol. EtOH, C_6H_6 . Sol. NaOH, $\text{Ba}(\text{OH})_2$. HNO_3 in hot EtOH \rightarrow 1-hydroxyanthraquinone.

N-Phenyl: phenyl ether, 8-phenoxy-1-anilinoanthraquinone. $\text{C}_{26}\text{H}_{17}\text{O}_3\text{N}$. MW, 391. Needles. M.p. 173-4°.

Schrobsdorff, *Ber.*, 1903, 36, 2936.

Höchst, D.R.P., 148,875, (*Chem. Zentr.*, 1904, I, 556).

1-Hydroxy-2-aminoanthraquinone (2-Aminoerythroxyanthraquinone).

Brown needles from EtOH. M.p. 226-7°. Sol. Et_2O , EtOH, C_6H_6 , Py. Sol. alkalis with bluish-violet col. Insol. H_2O . Sol. conc. H_2SO_4 with olive-green col. Hot alc. HNO_3 or $\text{H}_3\text{AsO}_4 \rightarrow$ 1-hydroxyanthraquinone. KOH fusion \rightarrow alizarin.

N-Acetyl: red needles from EtOH or AcOH. M.p. 243-4°. Sol. Et_2O , EtOH, AcOH. Spar. sol. KOH.Aq.

N-Diacyl: yellow cryst. M.p. 247-8°.

Brass, Zeigler, *Ber.*, 1925, 58, 755.

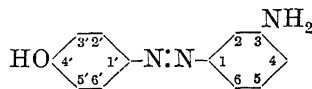
Tanaka, *Chem. Abstracts*, 1935, 29, 4353.

4-Hydroxy-2-aminoanthraquinone (1-Hydroxy-3-aminoanthraquinone, 3-aminoerythroxyanthraquinone).

Red needles. Does not melt below 310°. Sublimes.

Scholl, Schneider, Eberle, *Ber.*, 1904, 37, 4436.

4'-Hydroxy-3-aminoazobenzene



$\text{C}_{12}\text{H}_{11}\text{ON}_3$

MW, 213

Cryst. M.p. 168°.

N-Acetyl: red cryst. M.p. 208°.

Wallach, Schulze, *Ber.*, 1882, 15, 3021.

4'-Hydroxy-4-aminoazobenzene.

Cryst. M.p. 186°. Sol. EtOH. Orange sol. in conc. H_2SO_4 .

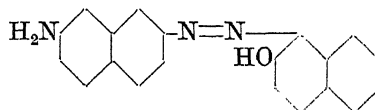
N-Di-Me: $\text{C}_{14}\text{H}_{15}\text{ON}_3$. MW, 241. Plates from EtOH. M.p. 203-4°. Dil. $\text{H}_2\text{SO}_4 \rightarrow$ red col. *Me ether*: $\text{C}_{15}\text{H}_{17}\text{ON}_3$. MW, 255. Prisms from Py or needles from EtOH. M.p. 161°. *Acetyl deriv.*: plates from EtOH. M.p. 137°.

N-Acetyl: plates from EtOH.Aq. M.p. 203° (198°). *Acetyl deriv.*: orange cryst. M.p. 236-7°.

Hewitt, Thomas, *J. Chem. Soc.*, 1909, 95, 1294.

Meldola, Williams, *Chem. News*, 1899, 80, 263.

2-Hydroxy-7'-amino-1:2'-azonaphthalene



$\text{C}_{20}\text{H}_{15}\text{ON}_3$

MW, 313

Cryst. from anisole. M.p. above 300°. Sol. Py, anisole. Spar. sol. EtOH, C_6H_6 , xylene. Insol. dil. alkalis.

Kauffer, Karrer, *Ber.*, 1907, 40, 3263.

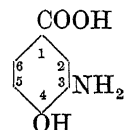
Hydroxy-*o*-aminobenzoic Acid.

See Hydroxyanthranilic Acid.

***o*-Hydroxy-aminobenzoic Acid.**

See Aminosalicyclic Acid.

4-Hydroxy-*m*-aminobenzoic Acid



$\text{C}_7\text{H}_7\text{O}_3\text{N}$

MW, 153

Prisms + H_2O from H_2O . Loses H_2O at 100°. M.p. anhyd. 210°. Sol. hot AcOH, H_2O . Spar. sol. hot EtOH. Insol. Et_2O , CHCl_3 , C_6H_6 . Dist. \rightarrow *o*-aminophenol.

Me ester: $\text{C}_8\text{H}_9\text{O}_3\text{N}$. MW, 167. Dimorphous. (1) Needles from C_6H_6 or AcOH. M.p. 142°. (2) Needles from CHCl_3 . M.p. 110-11°. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. C_6H_6 . Local anæsthetic (Orthoform New). *B.HCl*: needles from EtOH. M.p. 225°. Sol. H_2O . *B.HBr*: needles from EtOH. M.p. 232°.

Butyl ester: needles from EtOH.Aq. M.p. 64–5°.

Me ether: 3-aminoanisic acid, 3-amino-*p*-methoxybenzoic acid. C₈H₉O₃N. MW, 167. Needles from H₂O. M.p. 204°. Sol. hot EtOH, H₂O. Spar. sol. Et₂O, cold H₂O.

Et ether: 3-amino-*p*-ethoxybenzoic acid. C₉H₁₁O₃N. MW, 181. Cryst. M.p. 198–9°. Sol. hot EtOH, MeOH. Spar. sol. H₂O.

Einhorn, Pfyl, *Ann.*, 1900, 311, 43.

Einhorn, Ruppert, *Ann.*, 1902, 325, 305.

Auwers, Röhrig, *Ber.*, 1897, 30, 992.

Cavill, *J. Soc. Chem. Ind.*, 1945, 64, 212.

3-Hydroxy-*p*-aminobenzoic Acid.

Plates from EtOH.Aq. M.p. 216°. Sol. EtOH, Me₂CO. FeCl₃ → dark-blue col. or brown ppt.

Me ester: C₈H₉O₃N. MW, 167. Plates from C₆H₆ or H₂O. M.p. 120–1°. Sol. Et₂O, EtOH, Me₂CO, C₆H₆. Spar. sol. H₂O. Insol. ligroin. FeCl₃ → brown col. Local anæsthetic (Orthoform Old).

Et ester: C₉H₁₁O₃N. MW, 181. Plates from CHCl₃-ligroin. Sol. Et₂O, EtOH, Me₂CO, C₆H₆. Spar. sol. H₂O, CHCl₃, ligroin. FeCl₃ → yellowish-brown col.

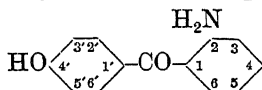
Einhorn, D.R.P., 97,335, (*Chem. Zentr.*, 1898, II, 526).

Einhorn, Pfyl, *Ann.*, 1900, 311, 43.

Hydroxyaminobenzonitrile.

See under Aminosalicic Acid.

4'-Hydroxy-2-aminobenzophenone



C₁₃H₁₁O₂N

MW, 213

Needles. M.p. 165°. Sol. EtOH. Spar. sol. Et₂O, C₆H₆.

Me ether: C₁₄H₁₃O₂N. MW, 227. Cryst. from C₆H₆-pet. ether. M.p. 76°.

Stoermer, Gaus, *Ber.*, 1912, 45, 3106.

Ullmann, Bleier, *Ber.*, 1902, 35, 4278.

6-Hydroxy-3-aminobenzophenone (2-Hydroxy-5-aminobenzophenone).

Plates from hot H₂O. M.p. 107°.

Gattermann, *Ber.*, 1896, 29, 3035.

4'-Hydroxy-4-aminobenzophenone.

B.HCl: m.p. 167–70°.

Oxime: m.p. 164°.

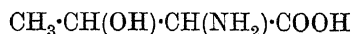
Phenyl ether: 4-*p*-aminobenzoyldiphenylether. C₁₉H₁₅O₂N. MW, 289. M.p. 125°.

Dilthey, Blankenburg, Brandt, Huthwelker, *J. prakt. Chem.*, 1932, 135, 36.

2-Hydroxy-5-aminobenzyl Alcohol.

See 5-Aminosaligenin.

2-Hydroxy-1-aminobutyric Acid (*Threonine*)



C₄H₉O₃N

MW, 119

d(–) :-

Cryst. from 80% EtOH. M.p. 251–3°. [α]_D²⁵ –28.3°.

Me ether: cryst. from EtOH.Aq. M.p. 214–16°. [α]_D²⁵ –37.8. *Formyl*: cryst. from H₂O. M.p. 163–4°. [α]_D²⁵ +11.8°.

Brucine salt of formyl deriv.: cryst. from EtOH. M.p. 186–8°. [α]_D²⁵ –19.4°.

N-Benzoyl: cryst. from AcOEt. M.p. 147–8°. [α]_D²⁵ +25.1°.

l(+) :-

Cryst. from 80% EtOH. M.p. 251–2°. [α]_D²⁵ +28.4°.

Me ether: cryst. from EtOH.Aq. M.p. 214–16°. [α]_D²⁵ +38.2°. *Formyl*: cryst. from H₂O. M.p. 164.5°. [α]_D²⁵ –11.9°.

Brucine salt of formyl deriv.: cryst. from EtOH. M.p. 139–41°. [α]_D²⁵ –21.5°.

N-Benzoyl: cryst. from AcOEt. M.p. 147–8°. [α]_D²⁵ –25.5°.

dl-.

Cryst. from EtOH.Aq. M.p. 234–5° decomp.

Me ether: cryst. from EtOH.Aq. M.p. 215–18°. *Formyl*: cryst. from H₂O. M.p. 174–5°. *Benzoyl*: cryst. from H₂O. M.p. 158–9°.

O-Acetyl: 146–9° decomp.

N-Benzoyl: cryst. from AcOEt. M.p. 143–4°.

Allo-.

Cryst. from EtOH.Aq. M.p. 242–3°.

Me ether: cryst. from EtOH.Aq. M.p. 230–3°. *Formyl*: cryst. from EtOH. M.p. 153–4°. *Benzoyl*: cryst. from C₆H₆. M.p. 129–30°.

N-Benzoyl: cryst. from H₂O. M.p. 175–6°.

West, Carter, *J. Biol. Chem.*, 1937, 119, 103, 109; 1938, 122, 605, 611; *Organic Syntheses*, 1940, XX, 101.

Maeda, Higasi, Matuoka, *Chem. Abstracts*, 1939, 33, 2948.

3-Hydroxy-1-aminobutyric Acid



C₄H₉O₃N

MW, 119

Needles from EtOH.Aq. M.p. 187° decomp. (180°, 176–7°), (rapid heat.). Very sol. H₂O. Spar. sol. EtOH. Insol. Et₂O. Passes readily into the lactone.

N-Benzoyl: needles from H₂O. M.p. 121° (126–7°, 140–4°).

O : N-Dibenzoyl : plates from EtOH.Aq. M.p. 198°.

Fischer, Blumenthal, *Ber.*, 1907, **40**, 111.
Sørensen, Andersen, *Z. physiol. Chem.*, 1908, **56**, 255, 273, 279.

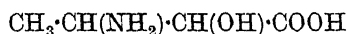
Kitagawa, *Chem. Abstracts*, 1937, **31**, 1362.
Dem'yanov, Feofilaktov, *J. Gen. Chem. U.S.S.R.*, 1939, **9**, 340, (*Chem. Abstracts*, 1940, **34**, 385).

Feofilaktov, Onishchenko, *J. Gen. Chem. U.S.S.R.*, 1939, **9**, 314, (*Chem. Abstracts*, 1940, **34**, 378).

Livak et al., *J. Am. Chem. Soc.*, 1945, **67**, 2218.

Stein, Moore, *J. Org. Chem.*, 1946, **11**, 681.
Klostermann, Painter, *J. Am. Chem. Soc.*, 1947, **69**, 1674.

1-Hydroxy-2-aminobutyric Acid (2-Methylisoserine)

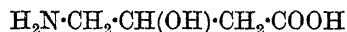


$\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

Prisms from EtOH.Aq. M.p. 200° decomp. Sol. to about 5% in H_2O at ord. temp. Spar. sol. EtOH. Insol. Et_2O .

Neuberg, *Chem. Zentr.*, 1906, **II**, 166.

2-Hydroxy-3-aminobutyric Acid



$\text{C}_4\text{H}_9\text{O}_3\text{N}$ MW, 119

d.

M.p. 214°. $[\alpha]_{\text{D}}^{20} + 18.30^\circ$.

N-Benzoyl : m.p. 78–80° (+ $1\text{H}_2\text{O}$), 116° (anhyd.). $[\alpha]_{\text{D}}^{20} + 10.0^\circ$ in H_2O .

l.

M.p. 212° decomp. $[\alpha]_{\text{D}}^{20} - 20.98^\circ$.

N-Benzoyl : m.p. 80–1° (+ $1\text{H}_2\text{O}$). 114° (anhyd.). $[\alpha]_{\text{D}}^{20} - 11.84^\circ$ in H_2O .

dl.

Cryst. from EtOH.Aq. M.p. 218°. Very sol. hot H_2O . Spar. sol. cold H_2O and most org. solvents. Neutral to litmus.

B₂HBr : needles from H_2O . M.p. 78°.

N-Benzoyl : needles from H_2O . M.p. 176–7°. Et ester : m.p. 99–100°. Sol. EtOH, Me_2CO , C_6H_6 , AcOEt. Spar. sol. ligroin. Amide : prisms. M.p. 130°. Nitrile : needles. M.p. 128–9°.

O-Benzoyl : hydrochloride, needles from H_2O . M.p. 215° decomp.

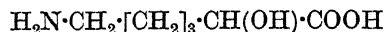
O : N-Dibenzoyl : m.p. 162°.

Bergmann, Brand, Weinmann, *Z. physiol. Chem.*, 1923, **131**, 1.

Tomita, Sendju, *Z. physiol. Chem.*, 1927, **169**, 266.

Bergmann, Lissitzin, *Ber.*, 1930, **63**, 310.
Tomita, Seika, *Chem. Abstracts*, 1939, **33**, 9285.

1-Hydroxy-5-aminocaproic Acid



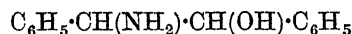
$\text{C}_6\text{H}_{13}\text{O}_3\text{N}$ MW, 147

Plates from EtOH. M.p. 225–30° decomp. Very sol. H_2O . Spar. sol. MeOH, EtOH.

N-Benzoyl : prisms from H_2O . M.p. 108°. Very sol. EtOH, Me_2CO . Spar. sol. Et_2O .

Fischer, Zemplén, *Ber.*, 1909, **42**, 4889.

α -Hydroxy- β -aminodibenzyl (2-Hydroxy-1 : 2-diphenylethylamine, 1-hydroxy-2-aminodiphenylethane, sym.-diphenylethanolamine)



$\text{C}_{14}\text{H}_{15}\text{ON}$ MW, 213

Exists in two isomeric forms.

(1) Needles from EtOH. M.p. 165° decomp. (161°). Sol. hot EtOH. Spar. sol. Et_2O . Insol. H_2O . Heat above m.p. \rightarrow benzylamine + benzaldehyde.

B₂HCl : decomp. at 234° (210°).

N-Formyl : needles from EtOH. M.p. 182–3°.

N-Acetyl : needles from EtOH. M.p. 196–7°.

O : N-Diacetyl : plates from EtOH. M.p. 212–13°.

N-Benzoyl : needles. M.p. 236–7°.

O : N-Dibenzoyl : plates. M.p. 254°.

(2) Isohydroxyaminodibenzyl, isodiphenyloxyethylamine.

d.

Needles from C_6H_6 . M.p. 114°. $[\alpha]_{\text{D}} + 109.69^\circ$ in EtOH.

B₂HCl : cryst. from EtOH. M.p. 228°. $[\alpha]_{\text{D}} + 79.57^\circ$ in H_2O .

O-Acetyl : m.p. 159°. $[\alpha]_{\text{D}} + 11.99^\circ$ in EtOH.

B₂HCl : m.p. 196–7°.

N-Benzoyl : needles from EtOH. M.p. 215°. $[\alpha]_{\text{D}} + 29.63^\circ$ in MeOH.

l.

Cryst. from C_6H_6 . M.p. 114°. $[\alpha]_{\text{D}} - 109.66^\circ$ in EtOH.

B₂HCl : cryst. from EtOH. M.p. 228°. $[\alpha]_{\text{D}} - 79.38^\circ$ in H_2O .

O-Acetyl : m.p. 159°. $[\alpha]_{\text{D}} - 12.39^\circ$ in EtOH.

B₂HCl : m.p. 196°.

N-Benzoyl : m.p. 214–15°. $[\alpha]_{\text{D}} - 29.42^\circ$ in MeOH.

dl.

Prisms from MeOH. M.p. 129–30°. Sol. C_6H_6 , hot EtOH. Spar. sol. ligroin. $\text{HNO}_3 \rightarrow$ benzil. Heat above m.p. \rightarrow benzylamine + benzaldehyde. Zn dust dist. \rightarrow stilbene. $\text{HNO}_2 \rightarrow$ isohydrobenzoin.

B₂HCl : plates from H_2O . M.p. 211°.

O-Acetyl : prisms from EtOH. M.p. 153°.

B₂HCl : m.p. 193°.

N-Benzoyl : needles from EtOH. M.p. 223°.

O:N-Dibenzoyl: cryst. from C_6H_6 . M.p. 186-7°.

Erlenmeyer, jun., *Ber.*, 1897, 30, 1525.

Söderbaum, *Ber.*, 1895, 28, 2522.

Erlenmeyer, *Ber.*, 1899, 32, 2378; *Ann.*, 1899, 307, 114, 131.

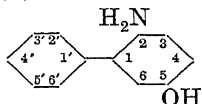
Erlenmeyer, Arnold, *Ann.*, 1904, 337, 307.

McKenzie, Pirie, *Ber.*, 1936, 69, 876.

Coleman, Nicholopoulos, *Chem. Abstracts*, 1943, 37, 5707.

Birkofer, *Ber.*, 1947, 80, 83.

5-Hydroxy-2-aminodiphenyl (3-Hydroxy-6-aminodiphenyl)



$C_{12}H_{11}ON$ MW, 185
M.p. 116-17°.

Kosolapoff, U.S.P. 2,355,593, (*Chem. Abstracts*, 1945, 39, 92).

2'-Hydroxy-2-aminodiphenyl.

M.p. 92-3°.

Mascarelli, Pirona, *Chem. Abstracts*, 1938, 32, 6235.

4'-Hydroxy-2-aminodiphenyl.

Cryst. from H_2O . M.p. 164-5°.

Glahn, Rottschaefer, U.S.P. 2,363,819, (*Chem. Abstracts*, 1945, 39, 3675).

2-Hydroxy-3-aminodiphenyl.

M.p. 121-2°.

Vorozhtsov, Troshchenko, *J. Gen. Chem. U.S.S.R.*, 1938, 8, 431, (*Chem. Abstracts*, 1938, 32, 7907).

6-Hydroxy-3-aminodiphenyl.

Needles from EtOH. M.p. 201° (199°). Sol. hot EtOH, C_6H_6 . Spar. sol. Et_2O , $CHCl_3$. Insol. ligroin, H_2O . Ox. \rightarrow 2-phenyl-p-benzoquinone.

Me ether: hydrochloride, m.p. 220° decomp.

Et ether: hydrochloride, m.p. 216-18°.

B,HCl: cryst. M.p. 214°.

N-Acetyl: m.p. 156-7°.

Borsche, Scholten, *Ber.*, 1917, 50, 602.

Hill, Hale, *Am. Chem. J.*, 1905, 33, 11.

2'-Hydroxy-4-aminodiphenyl.

Needles from toluene. M.p. 181-2° (167°). Spar. sol. H_2O . Sol. alkalis. Warm $FeCl_3$ + HCl \rightarrow red col.

Me ether: *N-acetyl*, m.p. 147-8°.

Bamberger, *Ann.*, 1912, 390, 161.

Christiansen, Harris, U.S.P. 2,001,523 (*Chem. Abstracts*, 1935, 29, 4382).

4'-Hydroxy-4-aminodiphenyl (4'-Hydroxy-xenylamine).

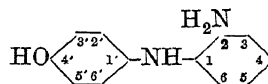
Plates from EtOH.Aq. M.p. 273°. Spar. sol. C_6H_6 . Prac. insol. H_2O , Et_2O , Me_2CO . $FeCl_3$ + HCl \rightarrow greenish-brown col. \rightarrow violet on warming.

N-Acetyl: plates or prisms from EtOH.Aq. M.p. 225°. Sol. EtOH, alkalis. Insol. H_2O .

Täuber, *Ber.*, 1894, 27, 2629.

Bamberger, *Ann.*, 1912, 390, 152.

4'-Hydroxy-2-aminodiphenylamine



$C_{12}H_{12}ON_2$ MW, 200

Colourless needles from EtOH.Aq. M.p. 149-5°. Very sol. EtOH, AcOH, boiling C_6H_6 . Spar. sol. boiling H_2O . Insol. ligroin.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles from EtOH.Aq. M.p. 95°.

Ullmann, Fukui, *Ber.*, 1908, 41, 624.

Jacobson, Fertsch, Fischer, *Ber.*, 1893, 26, 683.

4'-Hydroxy-4-aminodiphenylamine.

Plates from H_2O or toluene. M.p. 166°. Very sol. EtOH, AcOH, Me_2CO . Spar. sol. ligroin.

Diacetyl deriv.: plates from toluene. M.p. 141°.

Me ether: $C_{13}H_{14}ON_2$. MW, 214. Needles from ligroin. M.p. 102°. B.p. 238°/12 mm.

Et ether: needles from ligroin. M.p. 98-9°. *Acetyl deriv.*: needles from EtOH.Aq. M.p. 134°.

Ullmann, Jüngel, *Ber.*, 1909, 42, 1080.

Jacobson, Henrich, Klein, *Ber.*, 1893, 26, 693.

Willstätter, Kubli, *Ber.*, 1909, 42, 4139.

α -Hydroxy- β -aminoethylbenzene (2-Amino-1-phenylethyl alcohol, aminomethylphenylcarbinol, 2-hydroxy-2-phenylethylamine, 1-phenylethanolamine)

$C_8H_9 \cdot CH(OH) \cdot CH_2NH_2$ MW, 137

Needles from EtOH- Et_2O -pet. ether. M.p. about 40°. B.p. 160°/17 mm.

B,HCl: m.p. 176-7° (211°). *O-Benzoyl*: needles from 90% EtOH. M.p. 198°.

B,HI: plates from AcOEt. M.p. 121°.

B_2,H_2PtCl_6: yellow plates from H_2O . M.p. above 260°.

Picrate: leaflets from EtOH. M.p. 157-158.5°. *O-Benzoyl*: yellow cryst. from EtOH. M.p. 166.5-167.5°.

N-Benzoyl: leaflets from EtOH. M.p. 148-

149.5°. O-Acetyl: needles from EtOH.Aq. M.p. 112–13°.

Wolfheim, *Ber.*, 1914, 47, 1444.

Kolshorn, *Ber.*, 1940, 37, 2482.

Rosenmund, D.R.P. 244,321, (*Chem. Zentr.*, 1912, I, 961).

Höchst, D.R.P. 193,634, (*Chem. Zentr.*, 1908, I, 430).

β -Hydroxy- α -aminoethylbenzene (2-Amino-2-phenylethyl alcohol, 2-hydroxy-1-phenylethylamine, 2-phenylethanolamine)



$\text{C}_8\text{H}_{11}\text{ON}$

MW, 137

Cryst. M.p. 50–60°. B.p. 261°.

B.HCl: plates from EtOH-AcOEt. M.p. 137–8°, solidifying and remelting about 148°.

O-Benzoyl: needles from EtOH. M.p. 154–154.5°. *B.HCl*: needles from H_2O . M.p. 205–205.5°. Picrate: needles. M.p. 188–9°.

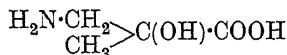
O:N-Diacetyl: cryst. from C_6H_6 . M.p. 103°.

Picrate: prisms from H_2O . M.p. 207°.

Reihlen, Knöpfe, Sapper, *Ann.*, 1938, 534, 268.

Gabriel, Colman, *Ber.*, 1914, 47, 1867.

1-Hydroxy-2-aminoisobutyric Acid (1-Methylisoserine, 1-aminomethyl-lactic acid)



$\text{C}_4\text{H}_9\text{O}_3\text{N}$

MW, 119

d-.

Cryst. from EtOH.Aq. M.p. 230° decomp. Sol. H_2O , MeOH. Mod. sol. EtOH. $[\alpha]_D +4.34^\circ$ in H_2O . Nitrosyl bromide in HBr \rightarrow *d*-2-bromo-1-hydroxyisobutyric acid.

N-Benzoyl: needles from H_2O . M.p. 124°.

l-.

Has similar properties to *d*-. $[\alpha]_D -4.15^\circ$ in H_2O .

dl-.

Plates from H_2O . M.p. 281° decomp. Sol. H_2O . Insol. EtOH, Me_2CO .

B.HCl: cryst. M.p. 132–4°. Hygroscopic.

Et ester: $\text{C}_6\text{H}_{13}\text{O}_3\text{N}$. MW, 147. Needles. M.p. 60°. B.p. 107°/15 mm. Sol. Et_2O , CHCl_3 .

N-Me: needles from EtOH.Aq. M.p. 248°. Sol. H_2O . Spar. sol. EtOH. Insol. Et_2O , Me_2CO .

N-Di-Me: plates from EtOH- Me_2CO . M.p. 174°. Sol. H_2O , EtOH. Spar. sol. Me_2CO . Insol. Et_2O . Hygroscopic. *Me ester*: b.p. 107°/35 mm.

N-Benzoyl: plates. M.p. 153°.

Kay, *Ann.*, 1908, 362, 330.

Fourneau, *Bull. soc. chim.*, 1909, 5, 230.

2-Hydroxy-1-aminoisopentane.

See 2-Hydroxy-2-methyl-*n*-butylamine.

4-Hydroxy-2-amino-2-methylpentane.

See Diacetonealkamine.

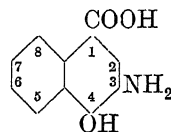
2-Hydroxy-4-amino-2-methylpentane.

See Dimethyl-2-aminopropylcarbinol.

1-Hydroxy-2-amino-4-methylpentane.

See 2-Amino-4-methyl-*n*-amyl Alcohol.

4-Hydroxy-3-amino-1-naphthoic Acid



$\text{C}_{11}\text{H}_9\text{O}_3\text{N}$

MW, 203

Cryst. M.p. 143° decomp. Sol. EtOH, Me_2CO . Spar. sol. hot $\text{H}_2\text{O} \rightarrow$ red col. FeCl_3 on alc. sol. \rightarrow bluish-red col. Conc. $\text{HNO}_3 \rightarrow$ 1:2-naphthoquinone-4-carboxylic acid.

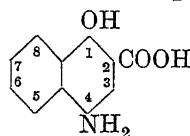
Heller, *Ber.*, 1912, 45, 677.

3-Hydroxy-4-amino-1-naphthoic Acid.

Needles. M.p. 204° decomp. Hot dil. HCl \rightarrow 1-amino-2-naphthol. Ox. \rightarrow 1:2-naphthoquinone. $\text{HNO}_3 \rightarrow$ 1:2-naphthoquinone-4-carboxylic acid.

Lesser, Gad, *Ber.*, 1925, 58, 2554.

1-Hydroxy-4-amino-2-naphthoic Acid



$\text{C}_{11}\text{H}_9\text{O}_3\text{N}$

MW, 203

Needles from AcOH. Insol. H_2O , EtOH, Et_2O , C_6H_6 . Decomp. above 200° with loss of CO_2 . Hot dry HCl \rightarrow 4-amino-1-naphthol. $\text{HNO}_3 \rightarrow$ 1:4-naphthoquinone.

Me ether: $\text{C}_{12}\text{H}_{11}\text{O}_3\text{N}$. MW, 217. Brown needles from H_2O . M.p. 190–1° decomp. Insol. EtOH, AcOH, C_6H_6 .

Nietzki, Guitermann, *Ber.*, 1887, 20, 1276.

Froelicher, Cohen, *J. Chem. Soc.*, 1922, 121, 1658.

3-Hydroxy-4-amino-2-naphthoic Acid.

Yellow prisms from EtOH. Decomp. at 205°. Sol. Me_2CO , EtOH, Et_2O . Spar. sol. C_6H_6 , CHCl_3 . Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ 3:4-dihydroxy-2-naphthoic acid.

Me ester: $\text{C}_{12}\text{H}_{11}\text{O}_3\text{N}$. MW, 217. Yellow needles from MeOH. M.p. 106°. Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ 3:4-dihydroxy-2-naphthoic acid *Me ester*. Anaesthetic.

Möhlau, Kriebel, *Ber.*, 1895, 28, 3091.

Gradenwitz, *Ber.*, 1894, 27, 2623.

Weil, Heerdt, *Ber.*, 1922, 55, 226.

3-Hydroxy-7-amino-2-naphthoic Acid.

Yellow needles from EtOH.Aq. M.p. 230–2° (293°). Sol. EtOH, Et_2O , CHCl_3 , AcOEt. Spar. sol. H_2O , C_6H_6 . Insol. pet. ether. $\text{FeCl}_3 \rightarrow$ red col. $\text{H}_2\text{SO}_4 \rightarrow$ green col. Hot dil. $\text{H}_2\text{SO}_4 \rightarrow$ 3:7-dihydroxy-2-naphthoic acid.

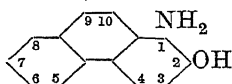
Me ether: $C_{12}H_{11}O_3N$. MW, 217. Leaflets from Py. M.p. 310° . Sol. H_2O , EtOH, AcOH, Py. Insol. Et_2O , C_6H_6 . *N-Acetyl*: brown prisms from EtOH.Aq. M.p. 193° .

Froelicher, Cohen, *J. Chem. Soc.*, 1922, 121, 1658.

Heyn, U.S.P., 1,754,390, (*Chem. Abstracts*, 1930, 24, 2895).

I.G., D.R.P. 623,496, (*Chem. Abstracts*, 1936, 30, 2204); D.R.P. 630,394, (*Chem. Abstracts*, 1936, 30, 5594); D.R.P. 642,380, (*Chem. Abstracts*, 1937, 31, 3508).

2-Hydroxy-1-aminophenanthrene (1-Amino-2-phenanthrol)



$C_{14}H_{11}ON$

MW, 209

Plates from EtOH. M.p. indefinite (darkens at 210°). Sol. EtOH. Spar. sol. Et_2O , C_6H_6 .

B, HCl: needles from EtOH. M.p. 250° decomp. Sol. EtOH. Spar. sol. H_2O . H_2SO_4 \rightarrow cherry-red col.

N-Acetyl: cryst. from $PhNO_2$. M.p. 295° .

Diacetyl deriv.: needles from C_6H_6 . M.p. 227° .

Triacetyl: cryst. from ligroin. M.p. $122-3^\circ$.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 1899.

9-Hydroxy-2-aminophenanthrene (2-Amino-9-phenanthrol).

White cryst. M.p. $194-5^\circ$. Very sol. EtOH. Very spar. sol. ligroin, $CHCl_3$, CCl_4 .

N-Benzoyl: cryst. from EtOH. M.p. 160° decomp.

Schmidt, Spoun, *Ber.*, 1922, 55, 1211.

10-Hydroxy-2-aminophenanthrene (2-Amino-10-phenanthrol).

Cryst. from EtOH. M.p. 221° .

O : *N-Diacetyl*: cryst. M.p. 182° .

O : *N-Dibenzoyl*: cryst. from EtOH. M.p. $225-6^\circ$.

Schmidt, Spoun, *Ber.*, 1922, 55, 1210.

1-Hydroxy-4-aminophenanthrene (4-Amino-1-phenanthrol).

Powder. Extremely sensitive to oxidation.

Triacetyl deriv.: colourless plates. M.p. 143° . Readily sol. MeOH.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2469.

3-Hydroxy-4-aminophenanthrene (4-Amino-3-phenanthrol).

Needles from EtOH. M.p. $159-61^\circ$ (162°) decomp. Very sol. EtOH, Et_2O , Me_2CO , C_6H_6 .

Triacetyl deriv.: needles from EtOH. M.p. $169-70^\circ$.

Werner, Löwenstein, Wack, Kunz, *Ann.*, 1902, 321, 297.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 945.

Dict. of Org. Comp.—II.

3-Hydroxy-9-aminophenanthrene (9-Amino-3-phenanthrol).

Cryst. from EtOH. M.p. $265-7^\circ$ decomp.

Me ether: needles from MeOH. M.p. $117-18^\circ$. *Picrate*: m.p. 179° decomp. *Diacetyl*: plates from EtOH. M.p. 151° .

Werner, *Ann.*, 1902, 321, 286.

Burger, Mosettig, *J. Am. Chem. Soc.*, 1935, 56, 1745.

Krueger, Mosettig, *J. Org. Chem.*, 1940, 5, 313.

9-Hydroxy-10-aminophenanthrene (10-Amino-9-phenanthrol, morphigenin).

Yellowish-brown cryst. M.p. 417° after sintering at 150° .

B, HCl: needles. Decomp. above 120° .

N-Acetyl: needles. M.p. $223-4^\circ$.

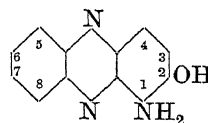
O : *N-Diacetyl*: prisms. M.p. 242° .

N-Benzoyl: needles from AcOH. M.p. $248-9^\circ$.

Pschorr, *Ber.*, 1902, 35, 2733.

McCoy, Day, *J. Am. Chem. Soc.*, 1943, 65, 1956.

2-Hydroxy-1-aminophenazine



$C_{12}H_9ON_3$

MW, 211

Brownish-red cryst. turning reddish-violet at 100° .

N-Acetyl: dark yellow needles from C_6H_6 or AcOEt. M.p. 229° .

Hegedüs, *Chem. Abstracts*, 1947, 41, 6263.

3-Hydroxy-2-aminophenazine.

Yellow cryst. from EtOH. Spar. sol. hot $PhNO_2$. Brownish-red sol. in conc. H_2SO_4 . 20% H_2SO_4 at $200^\circ \rightarrow$ 2 : 3-dihydroxyphenazine.

N-Acetyl: reddish-brown needles from EtOH. Does not melt below 340° . Spar. sol. C_6H_6 . Red sol. in H_2SO_4 .

Diacetyl deriv.: needles from toluene. M.p. 230° . Sol. EtOH.

Ullmann, Mauthner, *Ber.*, 1902, 35, 4303.

7-Hydroxy-2-aminophenazine.

Cryst. M.p. 360° . Sol. EtOH with green fluor. Insol. C_6H_6 , ligroin. Conc. $H_2SO_4 \rightarrow$ violet col.

Diacetyl deriv.: yellow plates from $PhNO_2$. M.p. 275° . Spar. sol. EtOH. Insol. H_2O , C_6H_6 .

Ullmann, Gnaedinger, *Ber.*, 1912, 45, 3442.

2-Hydroxy-1-amino-2-phenylpropionic Acid (2-Phenylserine, 1-amino-2-phenylhydracrylic acid)



$C_9H_{11}O_3N$

MW, 181

46

Cis-.

Needles. M.p. 230–32° decomp.

N-Benzoyl: cryst. from dil. EtOH. M.p. 197°.

O-Me ether: m.p. 215–16°. *N*-Benzoyl: needles from EtOH. M.p. 208°.

Amide: prisms from H₂O. M.p. 199–200°.

Trans-.

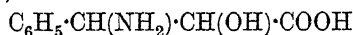
Plates + 1H₂O from EtOH.Aq. M.p. 200–2° decomp. Spar. sol. EtOH, Et₂O.

Erlenmeyer, Früstück, *Ann.*, 1895, 284, 41.

Forster, Rao, *J. Chem. Soc.*, 1926, 129, 1943.

Fourneau, Billeter, *Bull. soc. chim.*, 1940, 7, 593.

1-Hydroxy-2-amino-2-phenylpropionic Acid (2-Amino-2-phenyl-lactic acid, 2-phenyl-isoserine)


C₉H₁₁O₃N MW, 181

M.p. 275–80°.

Et ester: needles. M.p. 148°.

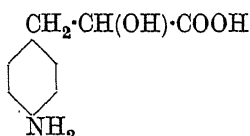
Amide: m.p. 198°.

Erlenmeyer, *Ann.*, 1892, 271, 155; *Ber.*, 1906, 39, 792.

Fourneau, Billeter, *Bull. soc. chim.*, 1940, 7, 593.

Fourneau, Maréchal, *Bull. soc. chim.*, 1945, 12, 990.

1-Hydroxy-2-*p*-aminophenylpropionic Acid (2-*p*-Aminophenyl-lactic acid)


C₉H₁₁O₃N MW, 181

Needles from 93% EtOH. M.p. 189–90° decomp. Sol. EtOH. Insol. Et₂O.

Erlenmeyer, Lipp, *Ann.*, 1883, 219, 231.

1-Hydroxy-2-aminopropionaldehyde (Isoserine aldehyde, aminolactic aldehyde)


C₃H₇O₂N MW, 89

Not known in free state. Polymerises easily. Reduces NH₃.AgNO₃ and Fehling's. Br → isoserine.

B, *HCl*: needles. M.p. 137–47° decomp.

*B*₂, *H*₂*PtCl*₆: m.p. 185° decomp.

d-.

Cryst. M.p. 42°. B.p. 107–10°/17 mm. [α]_D²⁵ +21.5° in H₂O. Hygroscopic.

l-.

Cryst. M.p. 42°. [α]_D²⁵ –20.5° in H₂O.

dl-.

Needles from AcOEt. M.p. 58°. B.p. 110–12°/12 mm. Hygroscopic.

Di-Et acetal: C₇H₁₇O₃N. MW, 163. B.p. 120–1°/14 mm. Sol. Et₂O.

Wohl, Schweitzer, *Ber.*, 1907, 40, 97.

Wohl, Momber, *Ber.*, 1914, 47, 3350.

Hydroxyaminopropionic Acid.

See Serine, Isoserine and Homoserine.

α-Hydroxy-β-aminopropylbenzene.

See Norephedrine and Nor-ψ-ephedrine.

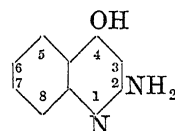
Hydroxy-aminopurine.

See Guanine and Isoguanine.

Hydroxy-amino-pyrimidine.

See Cytosine and Isocytosine.

4-Hydroxy-2-aminoquinoline (2-Amino-4-quinolinol)


C₉H₈ON₂ MW, 160

Needles + 1H₂O from H₂O. Anhyd. rhombohedra from EtOH. M.p. 303–4°. Sol. HCl, alkalis. Spar. sol. EtOH. Forms cryst. chloroplatinate and chloraurate.

Gabriel, *Ber.*, 1918, 51, 1509.

8-Hydroxy-2-aminoquinoline (2-Amino-8-quinolol).

M.p. 61–3°.

Schneiderwirth, U.S.P. 2,121,449, (*Chem. Abstracts*, 1938, 32, 6232).

4-Hydroxy-3-aminoquinoline (3-Amino-4-quinolol).

B, *HCl*: m.p. 302–5° decomp.

Benzoyl deriv.: m.p. 289°.

Musajo, *Gazz. chim. ital.*, 1937, 67, 222.

Bachmann *et al.*, *J. Am. Chem. Soc.*, 1947, 69, 365.

2-Hydroxy-4-aminoquinoline (4-Amino-2-quinolol).

M.p. 308–10°.

Et ether: *N*-acetyl, m.p. 176–8°.

Bachmann, Hamilton, *J. Am. Chem. Soc.*, 1942, 64, 1357.

Arnin, D.R.P. 681,980, (*Chem. Abstracts*, 1942, 36, 2273).

6-Hydroxy-4-aminoquinoline (4-Amino-6-quinolinol).

Cryst. from EtOH. M.p. 264° decomp. Sol. MeOH, EtOH. Spar. sol. H₂O, AcOH, C₆H₆. Insol. CHCl₃, Et₂O, pet. ether. Conc. H₂SO₄ → yellow sol. with blue fluor. HNO₃ → red sol.

Me ether: C₁₀H₁₀ON₂. MW, 174. Needles from C₆H₆. M.p. 120°. *B*, *HCl*: m.p. 249°.

John, Andraschko, *J. prakt. Chem.*, 1930, 128, 209.

2-Hydroxy-5-aminoquinoline (5-Amino-carbostyryl).

Needles from H_2O . M.p. 250°.

Claus, Setzer, *J. prakt. Chem.*, 1896, **53**, 396.

4-Hydroxy-5-aminoquinoline.

M.p. 189°.

B, HCl : m.p. 251–5°.

Kermack, Tebrich, *J. Chem. Soc.*, 1945, 375.

6-Hydroxy-5-aminoquinoline (5-Amino-6-quinolinol).

Green needles. M.p. 185°. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$. $FeCl_3 \rightarrow$ quinolinequinone.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Yellow plates from ligroin. M.p. 154–6°. *Picrate*: red needles from EtOH.Aq. M.p. 225°.

Et ether: $C_{11}H_{12}ON_2$. MW, 188. Yellow needles + $1H_2O$ from H_2O . M.p. 76°. M.p. anhyd. 115–16°. *N-Acetyl*: m.p. 163–4°. *N-Benzoyl*: m.p. 144°.

Zincke, Wiederhold, *Ann.*, 1896, **290**, 364.

Vis, *J. prakt. Chem.*, 1893, **48**, 29.

8-Hydroxy-5-aminoquinoline (5-Amino-8-quinolinol).

Needles from C_6H_6 . M.p. 143°. $CrO_3 \rightarrow$ quinolinequinone.

Me ether: yellow needles from EtOH. M.p. 156°. *N-Acetyl*: m.p. 179°. *N-Benzoyl*: m.p. 268–9°. *Picrate*: brown needles from H_2O . M.p. 126°.

Et ether: yellow plates + $1H_2O$. M.p. 70°. M.p. anhyd. 114°. Spar. sol. H_2O , EtOH. Insol. ligroin. *N-Benzoyl deriv.*: analgen. Yellow needles from EtOH. M.p. 206°. Spar. sol. H_2O . Antiseptic and antineuralgic.

N-Acetyl: prisms from EtOH. M.p. 221–2°. Insol. C_6H_6 , Me_2CO .

O:N-Diacetyl: plates from EtOH. M.p. 206–7°.

O:N-Dibenzoyl: plates from EtOH. M.p. 205°.

Gattermann, *Ber.*, 1894, **27**, 1939.

Balaban, *J. Chem. Soc.*, 1932, 2625.

Vis, *J. prakt. Chem.*, 1892, **45**, 541.

2-Hydroxy-6-aminoquinoline (6-Amino-carbostyryl).

Yellow plates from AcOH. Does not melt below 320°. Spar. sol. AcOH.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Plates from EtOH.Aq. M.p. 103°. Sol. EtOH, Et_2O . Mod. sol. H_2O .

Friedländer, Lazarus, *Ann.*, 1885, **229**, 246.

Feer, Königs, *Ber.*, 1885, **18**, 2397.

4-Hydroxy-6-aminoquinoline (6-Amino-4-quinolol).

$B, 2HCl$: m.p. 305°.

$B, 2H_2SO_4$: m.p. 275°.

Kermack, Weatherhead, *J. Chem. Soc.*, 1940, 1164.

8-Hydroxy-6-aminoquinoline (6-Amino-8-quinolinol).

Me ether: m.p. 169° (168°). *Picrate*: orange needles from H_2O . M.p. 224°.

Balaban, *J. Chem. Soc.*, 1932, 2625.

2-Hydroxy-7-aminoquinoline (7-Amino-carbostyryl).

Needles from H_2O . M.p. 292–3°. Sol. EtOH, H_2O . Forms cryst. salts with acids.

Friedländer, Fritsch, *Monatsh.*, 1902, **23**, 538.

Kermack, Webster, *J. Chem. Soc.*, 1942, 213.

8-Hydroxy-7-aminoquinoline (7-Amino-8-quinolinol).

Brown prisms from EtOH.Aq. M.p. 124°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O .

$B, 2HCl$: needles from EtOH. M.p. 256°.

N-Acetyl: needles. M.p. 177°.

Picrate: reddish-brown prisms from EtOH. M.p. 205° decomp.

Matsumura, *J. Am. Chem. Soc.*, 1927, **49**, 814.

4-Hydroxy-8-aminoquinoline.

Me ether: cryst. from EtOH. M.p. 107–7.5°.

Baker *et al.*, *J. Am. Chem. Soc.*, 1946, **68**, 1532.

5-Hydroxy-8-aminoquinoline (8-Amino-5-quinolinol).

Cryst. Does not melt below 250°. Sol. alkalis.

N-Acetyl: leaflets from EtOH.Aq. M.p. 227° decomp. Spar. sol. H_2O , AcOH. Insol. C_6H_6 , Me_2CO .

O:N-Diacetyl: needles from EtOH.Aq. M.p. 153–4°.

O:N-Dibenzoyl: prisms from AcOH. M.p. 180°.

Gattermann, *Ber.*, 1894, **27**, 1940.

Jacobs, Heidelberger, *J. Am. Chem. Soc.*, 1917, **39**, 2217.

6-Hydroxy-8-aminoquinoline (8-Amino-6-quinolinol).

Needles from EtOH.Aq. M.p. 185° C. Sol. EtOH. Spar. sol. Et_2O , C_6H_6 , $CHCl_3$. $FeCl_3 \rightarrow$ quinolinequinone.

Me ether: $C_{10}H_{10}ON_2$. MW, 174. Cryst. M.p. 41°. B.p. 137–8°/1 mm. Antipyretic. B, HCl : needles. M.p. 228°.

Et ether: $C_{11}H_{12}ON_2$. MW, 188. Cryst. M.p. 60°. B.p. 144–5°/1 mm.

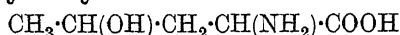
Mathëus, *Ber.*, 1888, **21**, 1645, 1887.

Schulemann, Schönhöfer, Meitzsch, U.S.P., 1,703,365, (*Chem. Abstracts*, 1929, **23**, 1995).

7-Hydroxy-8-aminoquinoline (8-Amino-7-quinolinol).

Me ether: yellow needles from EtOH.Aq. M.p. 108°. *Picrate*: red needles from EtOH.Aq. M.p. 226° decomp.

Balaban, *J. Chem. Soc.*, 1932, 2626.

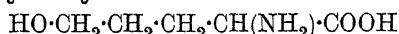
3-Hydroxy-1-aminovaleric Acid

$\text{C}_5\text{H}_{11}\text{O}_3\text{N}$ MW, 133

Leaflets from EtOH.Aq. M.p. 212° decomp. Sol. H_2O . Spar. sol. EtOH. $\text{P} + \text{HI} \rightarrow$ 1-aminovaleric acid.

Lactone: $\text{C}_5\text{H}_9\text{O}_2\text{N}$. MW, 115. Oil. B.p. 123-5°/13 mm. *B.HCl*: prisms. M.p. 198-200°.

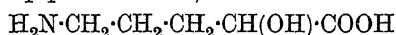
Fischer, Leuchs, *Ber.*, 1902, 35, 3797.

4-Hydroxy-1-aminovaleric Acid

$\text{C}_5\text{H}_{11}\text{O}_3\text{N}$ MW, 133

Needles from MeOH.Aq. M.p. 223-4°. Sol. H_2O . Spar. sol. EtOH, Me_2CO . Insol. Et_2O , ligroin. Fusion \rightarrow pyrrolidine-1-carboxylic acid.

Sörensen, *Chem. Zentr.*, 1905, II, 398.

1-Hydroxy-4-aminovaleric Acid (1-Hydroxyhomopiperidinic acid)

$\text{C}_5\text{H}_{11}\text{O}_3\text{N}$ MW, 133

Prisms. M.p. 188-91° decomp. Sol. H_2O . Spar. sol. EtOH. Fusion \rightarrow 3-hydroxypiperidone-2.

l.

M.p. 196.4° corr. $[\alpha]_D^{21} -17.1^\circ$.

Fischer, Zemplén, *Ber.*, 1909, 42, 4882.

Hunter, Woodward, *Biochem. J.*, 1941, 35, 1298.

Hydroxyaminoxylene.

See Aminoxyleneol.

Hydroxyamylbenzene.

See *p*-tert.-Amylphenol and 1-Phenylpentanol-3.

 β -Hydroxy- β -amylhydrocinnamic Acid.

See 2-Hydroxy-2-phenylcaprylic Acid.

Hydroxyaniline.

See Aminophenol.

Hydroxyanisaldehyde.

See Iovanillin and under Resorecylic Aldehyde.

Hydroxyanisic Acid.

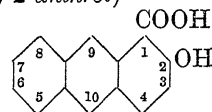
See Iovanillic Acid and under β -Resorecylic Acid.

Hydroxyanisole.

See Guaiacol, and under Hydroquinone and Resorcinol.

Hydroxyanthracene.

See Anthrol.

2-Hydroxyanthracene-1-carboxylic Acid (2-Anthrol-1-carboxylic acid, 2-hydroxy- α -anthroic acid, 1-carboxy-2-anthrol)

$\text{C}_{15}\text{H}_{10}\text{O}_3$

MW, 238

Cryst. M.p. 263-5°.

I.G., D.R.P., 564,129, (*Chem. Abstracts*, 1933, 27, 1000).

10 - Hydroxyanthracene - 1 - carboxylic Acid (9-Anthrol-4-carboxylic acid, 9-hydroxy- α -anthroic acid, 4-carboxy-ms-anthrol).

Cryst. from EtOH.Aq. M.p. 252-3°. Sol. EtOH, Et_2O . Ox. \rightarrow anthraquinone-1-carboxylic acid.

Graebe, Juillard, *Ann.*, 1887, 242, 255.

1-Hydroxyanthracene-2-carboxylic Acid (1-Anthrol-2-carboxylic acid, 1-hydroxy- β -anthroic acid, 2-carboxy-1-anthrol).

Cryst. M.p. 268°.

I.G., D.R.P., 559,333, (*Chem. Abstracts*, 1933, 27, 735); D.R.P., 564,129, (*Chem. Abstracts*, 1933, 27, 1000).

3-Hydroxyanthracene-2-carboxylic Acid (2-Anthrol-3-carboxylic acid, 3-hydroxy- β -anthroic acid, 3-carboxy-2-anthrol).

M.p. above 300° (280°).

o-Toluidide: m.p. 270°.

Ioffe, Shtokhammer, *Chem. Abstracts*, 1938, 32, 2112.

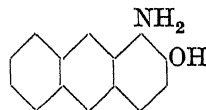
I.G., D.R.P., 564,129, (*Chem. Abstracts*, 1933, 27, 1000).

9-Hydroxyanthracene-2-carboxylic Acid (9-Anthrol-2-carboxylic acid, 9-hydroxy- β -anthroic acid, 2-carboxy-ms-anthrol).

Yellow cryst. from EtOH.Aq. M.p. 305-10°. Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 . Alk. $\text{KMnO}_4 \rightarrow$ anthraquinone-2-carboxylic acid. $\text{Zn} + \text{NH}_3 \rightarrow$ anthracene-2-carboxylic acid.

Limpricht, *Ann.*, 1899, 309, 121.

Barnett, Cook, Grainger, *Ber.*, 1924, 57, 1779.

2-Hydroxy-1-anthramine (2-Hydroxy-1-aminoanthracene, 1-amino-2-anthrol)

$\text{C}_{14}\text{H}_{11}\text{ON}$

MW, 208

Plates from EtOH. Decomp. at 150°. Sol. EtOH, Et_2O . Spar. sol. CHCl_3 . Conc. $\text{H}_2\text{SO}_4 \rightarrow$ yellow sol. with green fluor. \rightarrow bluish-red on warming. Ox. \rightarrow 1:2-anthraquinone.

N-Acetyl: plates from EtOH. Decomp. about 200-20°.

Triacetyl deriv.: plates from EtOH. M.p. 165°.

Lagodzinski, *Ann.*, 1905, 342, 73.

1-Hydroxy-2-anthramine (1-Hydroxy-2-aminoanthracene, 2-amino-1-anthrol).

B, HCl: plates. $\text{FeCl}_3 \rightarrow$ 1:2-anthraquinone.

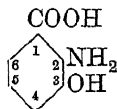
Triacetyl deriv.: plates or needles from AcOH. M.p. 161°. $\text{FeCl}_3 \rightarrow$ 1:2-anthraquinone.

Dienel, *Ber.*, 1906, 39, 930.

Hydroxyanthranil.

See Benzisoxazolone.

3-Hydroxyanthranilic Acid (3-Hydroxy-o-aminobenzoic acid)



$\text{C}_7\text{H}_7\text{O}_3\text{N}$ MW, 153

Leaflets from H_2O . M.p. 164°. Sol. hot H_2O , EtOH, Et_2O , CHCl_3 . Spar. sol. cold H_2O . *B, HCl*: cryst. from conc. HCl. M.p. 198–200°. Hyd. by H_2O .

Me ether: 3-methoxyanthranilic acid, 2-amino-m-methoxybenzoic acid. $\text{C}_8\text{H}_9\text{O}_3\text{N}$. MW, 167. Leaflets from AcOH. M.p. 170–1°. *Acetyl*: needles. M.p. 208°.

Keller, *Arch. Pharm.*, 1908, 246, 15, 21.

Froelicher, Cohen, *J. Chem. Soc.*, 1921, 119, 1431.

4-Hydroxyanthranilic Acid (4-Hydroxy-o-aminobenzoic acid).

Needles. M.p. 148° decomp. Very sol. H_2O , EtOH, Et_2O . Spar. sol. CHCl_3 , C_6H_6 , toluene. *B, HCl*: needles. Spar. sol. H_2O .

Me ether: 4-methoxyanthranilic acid, 2-amino-anisic acid. Plates from EtOH. M.p. 166° decomp. (172°). Very sol. EtOH, Me_2CO . Spar. sol. ligroin, CHCl_3 , C_6H_6 . Sols. show blue fluor. *Me ester*: $\text{C}_9\text{H}_{11}\text{O}_3\text{N}$. MW, 181. Needles. M.p. 75° (116–18°). *N-Acetyl*: needles from MeOH. M.p. 199°.

Et ether: 4-ethoxyanthranilic acid, 2-amino-p-ethoxybenzoic acid. $\text{C}_9\text{H}_{11}\text{O}_3\text{N}$. MW, 181. Plates from EtOH. M.p. 174° decomp. Very sol. EtOH. Spar. sol. Et_2O , CHCl_3 , ligroin, C_6H_6 . *Me ester*: m.p. 154–5°. *N-Acetyl*: plates. M.p. 182–3°.

Friedländer, Bruckner, Deutsch, *Ann.*, 1912, 388, 46.

Ullmann, Dootson, *Ber.*, 1918, 51, 20.

Rodionov, Fedorova, *Bull. soc. chim.*, 1939, 6, 478.

5-Hydroxyanthranilic Acid (5-Hydroxy-o-aminobenzoic acid).

Violet cryst. from H_2O . Darkens at 235°. M.p. 252° decomp. Sol. hot H_2O and most org. solvents. Spar. sol. cold H_2O . Sol. dil. acids

and alkalis with blue fluor. Reduces $\text{NH}_3\cdot\text{AgNO}_3$. $\text{FeCl}_3 \rightarrow$ reddish-brown col.

Me ester: $\text{C}_9\text{H}_9\text{O}_3\text{N}$. MW, 167. Yellow needles. M.p. 158°. *B, HCl*: cryst. from EtOH–AcOEt. M.p. 223°.

Et ester: $\text{C}_9\text{H}_{11}\text{O}_3\text{N}$. MW, 181. Cryst. from EtOH. M.p. 140°. *B, HCl*: m.p. 214°.

N-Acetyl: plates from H_2O . M.p. 227°.

Me ether: 5-methoxyanthranilic acid, 6-amino-m-methoxybenzoic acid. Needles from H_2O . M.p. 179–80°. Very sol. H_2O , Et_2O . *B, HCl*: m.p. 210°. *Acetyl*: m.p. 161–2°.

Et ether: 5-ethoxyanthranilic acid, 6-amino-m-ethoxybenzoic acid. M.p. 174°.

Puxeddu, *Gazz. chim. ital.*, 1929, 59, 10, 489.

Gattermann, *Ber.*, 1894, 27, 1932.

Friedländer, *Ber.*, 1916, 49, 963.

6-Hydroxyanthranilic Acid (6-Hydroxy-o-aminobenzoic acid, 6-aminosalicylic acid).

Free acid not known.

Me ether: 6-methoxyanthranilic acid, 6-amino-o-methoxybenzoic acid. $\text{C}_8\text{H}_9\text{O}_3\text{N}$. MW, 167. Needles from H_2O . M.p. 87°. *Amide*: $\text{C}_8\text{H}_{10}\text{O}_2\text{N}_2$. MW, 166. Needles from H_2O . M.p. 150°. *Nitrile*: $\text{C}_8\text{H}_8\text{ON}_2$. MW, 148. Needles from EtOH.Aq. M.p. 141°. *N-acetyl*, needles from EtOH. M.p. 176°.

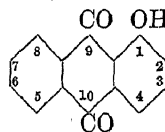
Et ether: 6-ethoxyanthranilic acid, 6-amino-o-ethoxybenzoic acid. *Amide*: $\text{C}_9\text{H}_{12}\text{O}_2\text{N}_2$. MW, 180. Needles from H_2O . M.p. 169°. *Nitrile*: $\text{C}_9\text{H}_{10}\text{ON}_2$. MW, 162. Needles from H_2O . M.p. 98–5°.

Friedländer, *Ber.*, 1916, 49, 966.

Friedländer, Bruckner, Deutsch, *Ann.*, 1912, 388, 42.

Roberts, Wiles, Kent, *J. Chem. Soc.*, 1932, 1795.

1-Hydroxyanthraquinone (α -Hydroxyanthraquinone, erythroxyanthraquinone)



$\text{C}_{14}\text{H}_8\text{O}_3$ MW, 224

Orange-red needles from EtOH. M.p. 193°. Sublimes without decomp. Sol. EtOH, Et_2O , C_6H_6 . Sol. alkalis to yellow sols. $\text{HNO}_3 \rightarrow$ phthalic acid. $\text{NaNO}_2 + \text{conc. H}_2\text{SO}_4 \rightarrow$ quinizarin. Oleum \rightarrow anthrarufin + 1:2:4:5:6:8-hexahydroxyanthraquinone. Gives insol. Ba salt.

Me ether: 1-methoxyanthraquinone. $\text{C}_{15}\text{H}_{10}\text{O}_3$. MW, 238. Yellow cryst. from EtOH. M.p. 170°. Sol. C_6H_6 , CHCl_3 . Spar. sol. EtOH. *Oxime*: m.p. 198°.

Phenyl ether: 1-phenoxyanthraquinone. $\text{C}_{20}\text{H}_{12}\text{O}_3$. MW, 300. Cryst. M.p. 145°. Sublimes. Volatile in steam. *Oxime*: m.p. 175°.

p-Tolyl ether: $C_{21}H_{14}O_3$. MW, 314. Yellow needles from pet. ether. M.p. 128.5°.

1-Naphthyl ether: $C_{24}H_{14}O_3$. MW, 350. Yellow cryst. from pet. ether. M.p. 275-6°.

2-Naphthyl ether. Yellow cryst. from C_6H_6 . M.p. 180°.

Acetyl: needles. M.p. 176-9°.

Freund, Achenbach, *Ber.*, 1910, **43**, 3259.

Laube, *Ber.*, 1906, **39**, 2245.

Graebe, Bernhard, *Ann.*, 1906, **249**, 225.

2-Hydroxyanthraquinone (β -Hydroxyanthraquinone).

Occurs in roots of *Oldenlandia umbellata*. Yellow needles or plates from EtOH. Yellow needles from AcOH. M.p. 306° (302°). $k = 2.4 \times 10^{-8}$ at 18°. Sol. EtOH, Et₂O. Insol. cold H₂O. Sol. NH₄OH, alkalis to reddish-yellow sols. Sol. conc. H₂SO₄ to reddish-brown sol. HI+P \rightarrow 2-anthrol. Gives sol. Ba salt.

Me ether: 2-methoxyanthraquinone. Yellow needles from EtOH. M.p. 195-6°. Begins to sublime at 100°. Sol. amyl alcohol, AcOH, C_6H_6 . Spar. sol. MeOH. Insol. H₂O. Sol. conc. H₂SO₄ \rightarrow 2-hydroxyanthraquinone.

Et ether: 2-ethoxyanthraquinone. $C_{18}H_{12}O_3$. MW, 252. Yellow needles. M.p. 135°. Sol. EtOH. KOH fusion \rightarrow alizarin.

Phenyl ether: 2-phenoxyanthraquinone. Cryst. from EtOH-AcOEt. M.p. 153°. Sol. most org. solvents.

Acetyl: yellow needles from EtOH. M.p. 159°.

Liebermann, Haagen, *Ber.*, 1882, **15**, 1798.

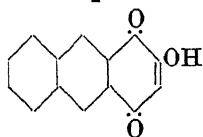
Perkin, Hummel, *J. Chem. Soc.*, 1893, **63**, 1177.

Kaufler, *Ber.*, 1904, **37**, 65.

Vorozhtsov, Aleksandrov, *J. Gen. Chem.*

U.S.S.R., 1940, **10**, 869, (*Chem. Abstracts*, 1941, **35**, 4375).

2-Hydroxyanthraquinone-1 : 4



$C_{14}H_8O_3$

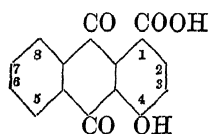
MW, 224

Dark yellow needles from EtOH. M.p. 235°. Sublimes without decomp. Sol. alkalis to yellow sols. Sol. conc. H₂SO₄ to red sol. Gives ppts. with CaCl₂, BaCl₂, AgNO₃.

Acetyl: yellow needles from EtOH. M.p. 188°.

Lagodzinski, *Ann.*, 1906, **344**, 91.

4-Hydroxyanthraquinone-1-carboxylic Acid



$C_{15}H_8O_5$

MW, 268

Yellow needles from H₂O. M.p. 236-8° decomp. Sol. hot H₂O. Decomp. at 270° \rightarrow 1-hydroxyanthraquinone + CO₂.

Birukow, *Ber.*, 1887, **20**, 2438.

1-Hydroxyanthraquinone-2-carboxylic Acid.

Yellow needles from AcOH.Aq. M.p. 224-5°. Sol. usual org. solvents. Dark red sols in alkalis. Conc. H₂SO₄ \rightarrow yellowish-red sol.

Phenyl ether: $C_{21}H_{12}O_5$. MW, 344. Yellow plates from ligroin. M.p. 272°.

2-Naphthyl ether: $C_{25}H_{14}O_5$. MW, 394. Yellow plates from AcOH. M.p. 262°.

Scholl, *Monatsh.*, 1913, **34**, 1023.

Badische, D.R.P., 251,696, (*Chem. Zentr.*, 1912, II, 1502).

3-Hydroxyanthraquinone-2-carboxylic Acid.

Cryst. from AcOH.Aq. M.p. 292°.

Ioffe, Shtokhammer, *Chem. Abstracts*, 1938, **32**, 2112.

4-Hydroxyanthraquinone-2-carboxylic Acid.

Cryst. from AcOH. M.p. 282-4°.

Acetyl: cryst. from AcOH. M.p. 272°.

Chloride: $C_{15}H_7O_4Cl$. MW, 286.5. Cryst. from C_6H_6 . M.p. 162-3°.

Mitter, Das-Gupta, Bachwat, *J. Indian Chem. Soc.*, 1934, **11**, 893.

5-Hydroxyanthraquinone-2-carboxylic Acid.

Cryst. from Py. M.p. 297°.

Me ether: $C_{16}H_{10}O_5$. MW, 282. Yellow needles from AcOH. M.p. 279°.

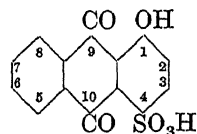
Acetyl: yellow needles from AcOH. M.p. 242°.

Chloride: m.p. 182°.

Eckert, *Monatsh.*, 1914, **35**, 294.

Mitter, Das-Gupta, Bachwat, *J. Indian Chem. Soc.*, 1934, **11**, 893.

1-Hydroxyanthraquinone-4-sulphonic Acid



$C_{14}H_8O_6S$

MW, 304

Needles from AcOH. M.p. 220°.

Na salt: reddish-brown plates. Spar. sol. H₂O.

*NH*₄ salt: reddish-brown plates. Spar. sol. H₂O.

Chloride: $C_{14}H_7O_5ClS$. MW, 322.5. Golden plates from CHCl₃. M.p. 246°. Sol. CHCl₃, AcOH, C_6H_6 . Conc. H₂SO₄ \rightarrow violet sol.

Anilide: needles from AcOH. M.p. 199°.

Fries, Schürmann, *Ber.*, 1919, **52**, 2188.

1-Hydroxyanthraquinone-5-sulphonic Acid.

Na salt: yellow needles. Sol. hot H_2O with yellow col. Spar. sol. excess $NaOH$. Conc. $H_2SO_4 \rightarrow$ orange sol. unchanged by boric acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *K salt*: yellow sol. in H_2O .

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. *K salt*: yellow needles. Spar. sol. H_2O . Insol. Py.

Höchst, D.R.P., 158,413, (*Chem. Zentr.*, 1905, I, 704).

Bayer, D.R.P., 205,881, (*Chem. Zentr.*, 1909, I, 881).

1-Hydroxyanthraquinone-6-sulphonic Acid.

Na salt: yellow cryst. Heat with lime under press. \rightarrow 1:6-dihydroxyanthraquinone.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder. Sol. $H_2O \rightarrow$ brown col. \rightarrow yellow with dil. min. acids. Conc. $H_2SO_4 \rightarrow$ deep yellow sol.

Phenyl ether: $C_{20}H_{12}O_6S$. MW, 380. NH_4 salt: plates. *Na salt*: long needles. Insol. Py. Conc. $H_2SO_4 \rightarrow$ orange sol. \rightarrow yellow on heating.

Höchst, D.R.P., 145,188, (*Chem. Zentr.*, 1903, II, 1037).

Bayer, D.R.P., 158,531, (*Chem. Zentr.*, 1905, I, 1517).

Frobenius, Hepp, *Ber.*, 1907, 40, 1048.

1-Hydroxyanthraquinone-7-sulphonic Acid.

Me ether: $C_{15}H_{10}O_6S$. MW, 318. *Na salt*: yellowish-brown powder.

Höchst, D.R.P., 145,188, (*Chem. Zentr.*, 1903, II, 1037).

1-Hydroxyanthraquinone-8-sulphonic Acid

Na salt: cryst. Sol. hot H_2O , insol. cold. Sols. in alkalis. Excess alkali ppts. neutral salt. Conc. $H_2SO_4 \rightarrow$ reddish-yellow sol.

Bayer, D.R.P., 197,607, (*Chem. Zentr.*, 1908, I, 1814).

2-Hydroxyanthraquinone-3-sulphonic Acid.

Cryst. Sol. EtOH. Spar. sol. H_2O . Insol. Et_2O .

Na salt: needles + $1H_2O$ from EtOH.Aq.

Ba salt: yellowish-red cryst.

Perger, *J. prakt. Chem.*, 1878, 18, 179.

Georgievics, *Chem. Zentr.*, 1905, I, 1515.

2-Hydroxyanthraquinone-6-sulphonic Acid.

Acid Na salt: cryst. from H_2O . Yellow sol. in hot H_2O . Spar. sol. EtOH. Insol. Et_2O , C_6H_6 .

Neutral Na salt: red cryst.

Höchst, D.R.P., 106,505, (*Chem. Zentr.*, 1900, I, 741).

2-Hydroxyanthraquinone-7-sulphonic Acid.

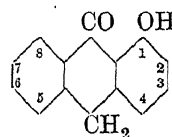
Acid Na salt: yellowish-red cryst.

Neutral Na salt: dark red cryst.

Höchst, D.R.P., 106,505, (*Chem. Zentr.*, 1900, I, 741).

Hydroxyanthroic Acid.

See Hydroxyanthracene-carboxylic Acid.

1-Hydroxyanthrone

$C_{14}H_{10}O_2$

MW, 210

Yellow needles or plates from C_6H_6 . M.p. $140-1^\circ$. Sol. C_6H_6 , CS_2 , EtOH, AcOH, Py.

Me ether: $C_{15}H_{12}O_2$. MW, 224. Yellow cryst. M.p. 105° .

Liebermann, Mamlock, *Ber.*, 1905, 38, 1794.

Graebe, Bernhard, *Ann.*, 1906, 349, 224.

Höchst, D.R.P. 242,053, (*Chem. Zentr.*, 1912, I, 305).

Bayer, D.R.P. 301,452, (*Chem. Zentr.*, 1917, II, 715).

Zahn, *Ber.*, 1938, 71, 172.

2-Hydroxyanthrone.

Yellow needles from EtOH. M.p. 221° . Sol. EtOH, C_6H_6 , hot AcOH. Spar. sol. $CHCl_3$.

Bistrzycki, Schepper, *Ber.*, 1898, 31, 2793.

3-Hydroxyanthrone.

Needles from EtOH.Aq. M.p. $202-6^\circ$. Sol. EtOH, Et_2O .

Liebermann, Simon, *Ann.*, 1882, 212, 28.

4-Hydroxyanthrone.

Needles from chlorobenzene. M.p. $239-40^\circ$ decomp. Spar. sol. C_6H_6 .

Me ether: pale yellow needles. M.p. $142-3^\circ$ ($132-3^\circ$).

Zahn, *Ber.*, 1934, 67, 2063.

10-Hydroxyanthrone.

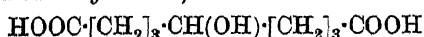
See Oxanthranol.

1-Hydroxyarachidic Acid.

See 1-Hydroxyeicosanic Acid.

 β -Hydroxyatropic Acid.

See Phenylformylacetic Acid.

4-Hydroxyazelaic Acid (4-Hydroxyheptane-1:7-dicarboxylic acid)

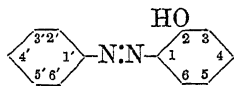
$C_9H_{16}O_5$

MW, 204

Leaflets from CHCl_3 . M.p. 104–5°. Sol. H_2O , EtOH, hot CHCl_3 . Spar. sol. Et_2O , hot C_6H_6 . $\text{HI} \rightarrow$ azelaic acid.

v. Pechmann, Sidgwick, *Ber.*, 1904, 37, 3820.

2-Hydroxyazobenzene (o-Benzeneazophenol)



$\text{C}_{12}\text{H}_{10}\text{ON}_2$

MW, 198

Orange red needles from Et_2O . M.p. 83°. Sol. most org. solvents. Spar. sol. H_2O . Sol. alkalis to orange-red sols. Volatile in steam. $\text{Zn} + \text{NH}_3 \rightarrow$ o-aminophenol + aniline.

Me ether: 2-methoxyazobenzene, o-benzene-azoanisole. $\text{C}_{13}\text{H}_{12}\text{ON}_2$. MW, 212. Orange-red needles from EtOH.Aq. M.p. 41°. B.p. 196–7°/14 mm. Volatile in steam.

Et ether: 2-ethoxyazobenzene, o-benzeneazophenetole. $\text{C}_{14}\text{H}_{14}\text{ON}_2$. MW, 226. Purple prisms from pet. ether. M.p. 44°. Very sol. org. solvents.

Acetyl: orange-red liq. M.p. –20°.

Benzoyl: orange-red needles from pet. ether. M.p. 93°.

Cu deriv.: needles from EtOH. M.p. 225–6°.

Bamberger, *Ber.*, 1900, 33, 3192; 1902, 35, 1610.

Tietze, *Chem. Zentr.*, 1899, II, 583.

McPherson, Lucas, *J. Am. Chem. Soc.*, 1909, 31, 283.

Martynoff, *Compt. rend.*, 1946, 223, 747.

3-Hydroxyazobenzene (m-Benzeneazo-phenol).

Yellow prisms from C_6H_6 . M.p. 114–17°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O , ligroin. Sol. dil. alkalis, conc. H_2SO_4 to orange-red sols. $\text{Zn} + \text{NH}_3 \rightarrow$ m-aminophenol + aniline.

Me ether: 3-methoxyazobenzene, m-benzene-azoanisole. Red plates from MeOH. M.p. 32–3°. B.p. 193°/15 mm. Sol. org. solvents.

Et ether: 3-ethoxyazobenzene, m-benzeneazophenetole. Plates. M.p. 64°. B.p. 200°/22 mm.

Acetyl: orange plates from pet. ether. M.p. 67.5°.

Benzoyl: orange-red plates from pet. ether. M.p. 92°.

Jacobson, Hönlgsberger, *Ber.*, 1903, 36, 4102.

Martynoff, *Compt. rend.*, 1946, 223, 747.

4-Hydroxyazobenzene (p-Benzeneazo-phenol).

Orange prisms from EtOH. M.p. 152°. B.p. 220–30°/20 mm. Sol. EtOH, Et_2O . Spar. sol. hot H_2O . Sol. dil. alkalis, conc. H_2SO_4 to yellow sols. $k = 4.9 \times 10^{-9}$. Heat of comb. C_p 1508.5 Cal., C_p 1509.1 Cal. Reacts acid to litmus. Forms addn. comps. with amino-acids. $\text{Zn} +$

$\text{NH}_3 \rightarrow$ p-aminophenol + aniline. $\text{HNO}_3 \rightarrow$ 2:4-dinitrophenol.

B.HCl: red needles. M.p. 169° decomp. Hyd. by H_2O .

B,2HNO₃: red leaflets. M.p. 75° decomp.

Me ether: 4-methoxyazobenzene, p-benzene-azoanisole. Brownish-yellow cryst. from pet. ether. M.p. 54–6°. B.p. 340°. Sol. most org. solvents.

Et ether: 4-ethoxyazobenzene, p-benzeneazophenetole. M.p. 85°. B.p. 339–40°. Sol. most org. solvents.

Propyl ether: $\text{C}_{15}\text{H}_{18}\text{ON}_2$. MW, 240. Dark orange needles. M.p. 61°.

Phenyl ether: 4-phenoxyazobenzene. $\text{C}_{18}\text{H}_{14}\text{ON}_2$. MW, 274. Golden leaflets. M.p. 116°.

Benzyl ether: $\text{C}_{19}\text{H}_{16}\text{ON}_2$. MW, 288. Golden needles. M.p. 116°.

Acetyl: yellow leaflets from EtOH. M.p. 89° (84–5°).

Propionyl: red needles. M.p. 75°.

Benzoyl: yellow leaflets from EtOH. M.p. 136.8°.

Chlorosulphonyl: m.p. 116.5–117.5°.

Oddo, Puxeddu, *Ber.*, 1905, 38, 2755.

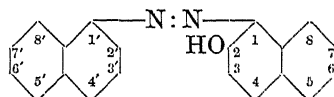
Auwers, Eisenlohr, *Ann.*, 1909, 369, 242.

Gorke, Köppe, Staiger, *Ber.*, 1908, 41, 1157.

Ponzio, Gazz. chim. ital., 1913, 43, 560.

Lukashevich, Sokolova, *Compt. rend. acad. sci. U.R.S.S.*, 1946, 54, 693, (*Chem. Abstracts*, 1947, 41, 5472).

2-Hydroxy-1 : 1'-azonaphthalene



$\text{C}_{20}\text{H}_{14}\text{ON}_2$

MW, 298

Red needles. M.p. 229–30°. Spar. sol. EtOH. Insol. H_2O , alkalis, dil. acids. Violet sol. in conc. H_2SO_4 .

Chloroacetyl: cryst. from toluene. M.p. 140–140.5°.

Kunz, *Ber.*, 1898, 31, 1531.

Meldola, Hanes, *J. Chem. Soc.*, 1894, 65, 837.

Hodgson, Marsden, *J. Chem. Soc.*, 1943, 285.

2-Hydroxy-1 : 2'-azonaphthalene.

Reddish-brown needles from EtOH-aniline. M.p. 178–9°. Sublimes. Reddish-violet sol. in conc. H_2SO_4 .

Acetyl: plates. M.p. 117°.

Nietzki, Goll, *Ber.*, 1886, 19, 1282.

Meldola, Hanes, *J. Chem. Soc.*, 1894, 65, 836.

Hodgson, Marsden, *J. Chem. Soc.*, 1943, 379.

1-Hydroxy-4 : 1'-azonaphthalene.

Dark red plates from AcOH.

Hodgson, Marsden, *J. Chem. Soc.*, 1943, 379.**5-Hydroxybarbituric Acid.**

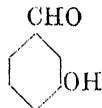
See Dialuric Acid.

1-Hydroxybehenic Acid.

See Phellonic Acid.

o-Hydroxybenzaldehyde.

See Salicylaldehyde.

m-Hydroxybenzaldehyde (*m-Aldehyde-phenol*) $C_7H_6O_2$

MW, 122

Occurs naturally combined in glucoside salinigrin. Needles from hot H_2O . M.p. 108° ($103-4^\circ$). B.p. 240° , $191^\circ/50$ mm., $161^\circ/20$ mm. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . Insol. ligroin. Solid salts are colourless, but in sol. are yellow. $k = 1.0 \times 10^{-8}$ at 25° . Non-volatile in steam. $FeCl_3 \rightarrow$ weak violet col. Pptes. lead acetate. $Zn + HCl \rightarrow m$ -cresol. KOH fusion $\rightarrow m$ -hydroxybenzoic acid.

Me ether : see *m*-Methoxybenzaldehyde.

Et ether : *m*-ethoxybenzaldehyde. $C_9H_{10}O_2$. MW, 150. B.p. 245° , $151^\circ/50$ mm., $133^\circ/16$ mm. D_4^{20} 1.0768. n_D^{20} 1.5408. Volatile in steam.

Acetyl : b.p. 203° .

Benzoyl : needles from EtOH. M.p. $48-5-49^\circ$ ($37-8^\circ$).

Oxime : cryst. from hot C_6H_6 . M.p. $87-8^\circ$. After melting the oxime on recryst. has m.p. 138° . Sol. H_2O , EtOH, Et_2O . Spar. sol. $CHCl_3$. Insol. ligroin. *B, HCl* : m.p. 140° . *Acetyl* : m.p. 122° .

Hydrazone : m.p. $104-5^\circ$.*Phenylhydrazone* : m.p. 130° .

2 : 4-Dinitrophenylhydrazone : prisms from xylene. M.p. 259° .

Azine : m.p. 162° .*Phenylurethane* : m.p. $158-60^\circ$.Tiemann, Ludwig, *Ber.*, 1882, 15, 2045.Subak, *Monatsh.*, 1903, 24, 167.Werner, *Ber.*, 1895, 28, 2001.Dollfus, *Ber.*, 1892, 25, 1912.Clemm, *Ber.*, 1891, 24, 826.Pauly, Schübel, Lockemann, *Ann.*, 1911, 383, 308.Franzen, Eichler, *J. prakt. Chem.*, 1910, 82, 246.Woodward, Doering, *J. Am. Chem. Soc.*, 1945, 67, 860.Woodward, *Organic Syntheses*, 1945, XXV, 55.**p-Hydroxybenzaldehyde** (*p-Aldehyde-phenol*).

Occurs naturally combined in many glycosides. Needles from H_2O . M.p. $115-16^\circ$. Sub-

limes. Sol. hot H_2O , EtOH, Et_2O . Spar. sol. cold H_2O . n_D^{20} 1.5705. Heat of comb. C_p 793.07 Cal., C_p 793.3 Cal. $k = 2.2 \times 10^{-8}$ at 25° . Non-volatile in steam. $FeCl_3 \rightarrow$ weak violet col. KOH fusion $\rightarrow p$ -hydroxybenzoic acid. $Na_2O_2 \rightarrow$ hydroquinone. $NaHg \rightarrow$ 4 : 4'-dihydroxybenzoin. $Zn + HCl \rightarrow p$ -cresol. Does not give Cannizzaro reaction. $HBr \rightarrow$ a comp., m.p. 185° ; $CCl_3-COOH \rightarrow$ a comp., m.p. 68° .

Me ether : see Anisaldehyde.

Et ether : *p*-ethoxybenzaldehyde. M.p. $13-14^\circ$. B.p. 249° , $140^\circ/20$ mm. D_4^{21} 1.08. Anti-oxime : m.p. 118° . Syn-oxime : m.p. 157° .

Phenyl ether : 4-aldehydodiphenyl ether, *p*-phenoxybenzaldehyde. $C_{13}H_{10}O_2$. MW, 198. B.p. $191-3^\circ/22$ mm. *Oxime* : m.p. 86° .

Benzyl ether : *p*-aldehydophenyl benzyl ether. $C_{14}H_{12}O_2$. MW, 212. Needles from EtOH. Aq. M.p. 72° . Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O . *Oxime* : m.p. $110-12^\circ$.

Acetyl : liq. at -21° . B.p. 265° . Anti-oxime : m.p. $114-15^\circ$. Syn-oxime : m.p. 132° .

Oxime : m.p. $72-3^\circ$, 112° anhyd. *B, HCl* : m.p. $160-5^\circ$. *Acetyl* : m.p. $114-15^\circ$.

Semicarbazone : needles from EtOH. M.p. $223-5^\circ$.

Hydrazone : needles from C_6H_6 . M.p. 222° . 2 : 4-Dinitrophenylhydrazone : cryst. from $PhNO_2$. M.p. 280° decomp. (260°).

Azine : m.p. $239-40^\circ$.*Di-Me acetal* : m.p. $60-4^\circ$.

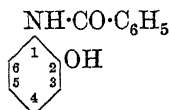
Cyanhydrin : see under 4-Hydroxymandelic Acid.

Herzfeld, Tiemann, *Ber.*, 1877, 10, 64.Gattermann, Berchemann, *Ber.*, 1898, 31, 1766.Gattermann, *Ann.*, 1907, 357, 347.Tiemann, *Ber.*, 1886, 19, 357.v. Kostanecki, Schneider, *Ber.*, 1896, 29, 1892.Hantzsch, *Z. physik. Chem.*, 1894, 13, 518.Brady, Dunn, *J. Chem. Soc.*, 1914, 105, 821.Dollfus, *Ber.*, 1892, 25, 1912.Pauly, Schübel, Lockemann, *Ann.*, 1911, 383, 308.Franzen, Eichler, *J. prakt. Chem.*, 1910, 82, 246.Rupe, Brentano, *Helv. Chim. Acta*, 1936, 19, 588.Riedel, de Haën, D.R.P. 621,567, (*Chem. Abstracts*, 1936, 30, 2200).**Hydroxybenzaldehyde-carboxylic Acid.**

See Hydroxyaldehydobenzoic Acid and Aldehydosalicic Acid.

Hydroxybenzamide.

See under Hydroxybenzoic Acid and Salicylic Acid.

o-Hydroxybenzanilide (N-Benzoyl-o-amino-phenol) $C_{13}H_{11}O_2N$

MW, 213

Leaflets. M.p. 167° decomp. Sol. EtOH, AcOH, C_6H_6 , Me_2CO , alkalis. Mod. sol. hot H_2O . Insol. ligroin.

Me ether: benzoyl-o-anisidine, benz-o-anisidine. $C_{14}H_{13}O_2N$. MW, 227. M.p. 60°. Sol. EtOH, Et_2O .

O-Acetyl: needles from EtOH. M.p. 134–40°.

O-Benzoyl: needles from EtOH. M.p. 185°. Sol. Me_2CO , $CHCl_3$, C_6H_6 . Spar. sol. EtOH, ligroin.

O-m-Nitrobenzoyl: m.p. 152°.

O-p-Toluenesulphonyl: needles from EtOH. M.p. 109–10°.

Ciamician, Silber, *Ber.*, 1905, **38**, 1181.

Hübner, *Ann.*, 1881, **210**, 387.

Mülhäuser, *Ann.*, 1881, **207**, 244.

Raiford, *J. Am. Chem. Soc.*, 1919, **41**, 2080.

Raiford, Shelton, *J. Org. Chem.*, 1939, **4**, 207.

Crounse, Raiford, *J. Org. Chem.*, 1945, **10**, 419.

m-Hydroxybenzanilide (N-Benzoyl-m-aminophenol).

Needles from toluene. M.p. 174°. Sol. EtOH, Et_2O . Spar. sol. C_6H_6 .

Et ether: benzoyl-m-phenetidine, benz-m-phenetidine. $C_{15}H_{15}O_2N$. MW, 241. Needles from EtOH. M.p. 103°. Sol. Me_2CO , C_6H_6 . Spar. sol. H_2O , EtOH, Et_2O , ligroin.

O-Benzoyl: prisms from C_6H_6 . M.p. 153°. Spar. sol. Et_2O . Insol. ligroin.

Meyer, Sundmacher, *Ber.*, 1899, **32**, 2124.

Ikuta, *Am. Chem. J.*, 1893, **15**, 43.

Reverdin, Lokietek, *Bull. soc. chim.*, 1915, **17**, 408.

Grimmel, Guenther, Morgan, *J. Am. Chem. Soc.*, 1946, **68**, 539.

p-Hydroxybenzanilide (N-Benzoyl-p-amino-phenol).

Fine needles. M.p. 216–17° (205°, 227°). Sol. hot AcOH. Spar. sol. H_2O , $CHCl_3$, C_6H_6 , ligroin.

Me ether: benzoyl-p-anisidine, benz-p-anisidine. Leaflets from EtOH. M.p. 153–4°.

Et ether: benzoyl-p-phenetidine, benz-p-phenetidine. Leaflets from EtOH.Aq. M.p. 173°.

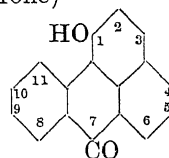
O-Acetyl: leaflets from C_6H_6 . M.p. 171°.

O-Benzoyl: needles from MeOH. M.p. 235°.

Ciamician, Silber, *Ber.*, 1905, **38**, 1181.

Reverdin, *Ber.*, 1909, **42**, 1524.

Reverdin, Dresel, *Ber.*, 1904, **37**, 4452.

1-Hydroxybenzanthrone (see formulæ under Benzanthrone) $C_{17}H_{10}O_2$

MW, 246

Orange-yellow powder. M.p. 290–2°. Sublimes.

Me ether: 1-methoxybenzanthrone. $C_{18}H_{12}O_2$. MW, 260. Yellow powder. M.p. 147–8°. Sublimes.

Heilbron, Hey, Wilkinson, *J. Chem. Soc.*, 1938, 699.

3-Hydroxybenzanthrone.

M.p. 317°.

I.G., D.R.P., 550,706, (*Chem. Abstracts*, 1932, **26**, 4830); 552,269, (*Chem. Abstracts*, 1933, **27**, 513).

4-Hydroxybenzanthrone.

Yellow needles from MeOH.Aq. M.p. 179–5°. Sol. conc. H_2SO_4 with green fluor. Spar. sol. cold dil. NaOH, more sol. hot to yellow sol.

Acetyl: cryst. from EtOH–AcOH. M.p. 200–1°.

Me ether: yellow needles from C_6H_6 . M.p. 198–9°. Sol. conc. H_2SO_4 , conc. HNO_3 .

Perkin, *J. Chem. Soc.*, 1920, **117**, 696.

Perkin, Spencer, *J. Chem. Soc.*, 1922, **121**, 479.

Bradley, Jadhav, *J. Chem. Soc.*, 1937, 1791.

5-Hydroxybenzanthrone.

Yellow cryst. from EtOH or xylene. M.p. 291°. Sol. H_2SO_4 with fluor. Sol. dil. NaOH.

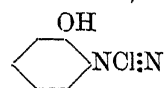
Badische, D.R.P., 187,495, (*Chem. Zentr.*, 1907, **II**, 1367).

6-Hydroxybenzanthrone.

Cryst. from AcOH. M.p. 176–7°.

Boroacetyl: cryst. from Ac_2O . M.p. 268° decomp.

Bradley, Jadhav, *J. Chem. Soc.*, 1937, 1791.

o-Hydroxybenzenediazonium chloride (o-Phenoldiazonium chloride) $C_6H_5ON_2Cl$

MW, 156.5

Colourless cryst. from MeOH or EtOH– Et_2O . Quickly darkens in air. Decomp. at 152°. Very sol. H_2O . Insol. pet. ether, $CHCl_3$, C_6H_6 .

Hantzsch, Davidson, *Ber.*, 1896, **29**, 1528.

Oddo, *Gazz. chim. ital.*, 1895, **25**, 336.

Crossley, Kieule, Benbrook, *J. Am. Chem. Soc.*, 1940, **62**, 1400.

***p*-Hydroxybenzenediazonium chloride**
(*p*-Phenoldiazonium chloride).

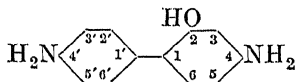
White needles. Explodes on heating. Decomp. quickly in air. Forms double salts with chlorides of most heavy metals.

$C_6H_5ON_2Cl \cdot HgCl_2 \cdot H_2O$: white needles, decomp. at 156°.

Oddo, *Gazz. chim. ital.*, 1895, 25, 336.

Crossley, Kicule, Benbrook, *J. Am. Chem. Soc.*, 1940, 62, 1400.

2-Hydroxybenzidine (2-Hydroxy-4 : 4'-diaminodiphenyl)



$C_{12}H_{12}ON_2$ MW, 200

Plates from H_2O . M.p. 226–7°. Sol. hot $EtOH$, hot H_2O . Spar. sol. Et_2O , C_6H_6 .

Me ether: $C_{13}H_{14}ON_2$. MW, 214. Plates from C_6H_6 –pet. ether. M.p. 103–103.3°. Sol. H_2O , Et_2O . *Picrate*: m.p. 220° decomp.

Hydrochloride: plates. Spar. sol. H_2O .

Picrate: yellow needles. M.p. 220° decomp.

Jacobson, Franz, Hönigsberger, *Ber.*, 1903, 36, 4072, 4113.

3-Hydroxybenzidine (3-Hydroxy-4 : 4'-diaminodiphenyl).

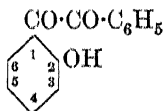
Plates from H_2O . M.p. 185°. Spar. sol. H_2O , cold $EtOH$, Et_2O , C_6H_6 . $FeCl_3 \rightarrow$ deep red col.

Et ether: $C_{14}H_{16}ON_2$. MW, 228. Needles from H_2O . M.p. 134–5° (139°).

Jacobson, Franz, Hönigsberger, *Ber.*, 1903, 36, 4072, 4113.

Weinberg, *Ber.*, 1887, 20, 3173.

2-Hydroxybenzil (Phenyl 2-hydroxyphenyl diketone)



$C_{14}H_{10}O_3$ MW, 226

Yellow plates from ligroin. M.p. 74°. Sol. $EtOH$, Et_2O , C_6H_6 . Sol. alkalis with yellow col. Alc. $FeCl_3 \rightarrow$ reddish-violet col.

Me ether: $C_{15}H_{12}O_3$. MW, 240. Yellow prisms. M.p. 71.5°. 2 : 4-Dinitrophenylhydrazones: yellow needles from $AcOH$. M.p. 176–7°.

Asahina, Terasaka, *Chem. Zentr.*, 1923, III, 434.

Asahina, Asano, *Ber.*, 1929, 62, 173.

Brass, Willig, Hanssen, *Ber.*, 1930, 63, 2615.

4-Hydroxybenzil (Phenyl 4-hydroxyphenyl diketone).

Orange needles from $EtOH$. Aq. M.p. 175°. Sol. org. solvents. Insol. H_2O . Yellow alc. sol. \rightarrow red on addn of alkali.

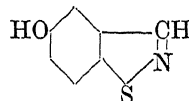
Me ether: cryst. M.p. 62–3°.

Dioxime: hydrochloride, needles, m.p. 155°.

Weisl, *Monatsh.*, 1905, 26, 992.

McKenzie, Luis, Tiffeneau, Weill, *Bull. soc. chim.*, 1929, 45, 418.

5-Hydroxybenzisothiazole



C_7H_5ONS MW, 151

Needles from H_2O , $EtOH$, or C_6H_6 . M.p. 156°. Very sol. $AcOH$. Spar. sol. pet. ether.

B, HBr: colourless needles. M.p. 240° decomp. Hyd. by H_2O .

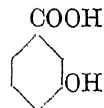
Benzoyl: hard plates from $EtOH$. M.p. 125°.

Fries, *Ann.*, 1927, 454, 281.

***o*-Hydroxybenzoic Acid.**

See Salicylic Acid.

***m*-Hydroxybenzoic Acid**



$C_7H_6O_3$ MW, 138

Needles from H_2O . M.p. 200.8°. Very sol. hot H_2O , $EtOH$, Me_2CO . Sol. Et_2O . Spar. sol. cold H_2O , C_6H_6 . $k = 8.7 \times 10^{-5}$ at 25°.

Me ester: $C_8H_8O_3$. MW, 152. Needles from C_6H_6 –pet. ether. M.p. 69° (71.5°). B.p. 280–280.5°/709 mm.

Et ester: $C_9H_{10}O_3$. MW, 166. Plates from C_6H_6 . M.p. 72–3° (72–4°). B.p. 295°, 211°/65 mm. Very sol. $EtOH$, Et_2O . Spar. sol. H_2O .

Benzyl ester: m.p. 70°.

Amide: *m*-hydroxybenzamide. $C_7H_7O_2N$. MW, 137. Plates from H_2O . M.p. 170.5°. Very sol. hot H_2O , $EtOH$, Et_2O . Spar. sol. cold H_2O .

Nitrile: *m*-cyanophenol, *m*-hydroxybenzonitrile. C_7H_5ON . MW, 119. Plates from H_2O . M.p. 82°. Very sol. $EtOH$, Et_2O , hot H_2O .

Anilide: needles from $EtOH$. Aq. M.p. 154–5°. Very sol. $EtOH$. Spar. sol. Et_2O , CS_2 , C_6H_6 . Insol. $CHCl_3$.

Me ether: see *m*-Methoxybenzoic Acid.

Et ether: see *m*-Ethoxybenzoic Acid.

O-Acetyl: *m*-acetoxybenzoic acid. $C_9H_8O_4$. MW, 180. Cryst. from xylene. M.p. 131.5°. $k = 1.3 \times 10^{-4}$. Very sol. $EtOH$, Et_2O . Sol. hot H_2O .

Offermann, *Ann.*, 1894, 280, 6.

Ansano, Huziwaru, *Chem. Abstracts*, 1939, 33, 5838.

Ungnade, Hemick, *J. Am. Chem. Soc.*, 1942, 64, 1737.

Woodruff, *J. Am. Chem. Soc.*, 1944, 66, 1799.

King, McWhirter, Barton, *J. Am. Chem. Soc.*, 1945, 67, 2089.

p-Hydroxybenzoic Acid.

Prisms from xylene-EtOH. M.p. 213-14°. Cryst. +1H₂O from EtOH.Aq. or Me₂CO-EtOH. Very sol. EtOH. Sol. Me₂CO, Et₂O. Spar. sol. H₂O, C₆H₆. Insol. CS₂. $k = 2.86 \times 10^{-5}$. Many of the esters possess antiseptic and fungicidal properties.

Me ester: needles from EtOH.Aq. M.p. 131° (127-9°). B.p. 270-80° decomp.

Et ester: cryst. M.p. 116° (112°). B.p. 297-8°. Very sol. EtOH, Et₂O. Spar. sol. H₂O, CHCl₃, pet. ether, CS₂.

Propyl ester: cryst. from Et₂O. M.p. 95.6-95.8°.

Benzyl ester: m.p. 111°.

Amide: p-hydroxybenzamide. Needles +1H₂O from H₂O. M.p. 162°. Very sol. EtOH, hot H₂O. Sol. Et₂O. Spar. sol. CHCl₃, CS₂.

Nitrile: p-cyanophenol, p-hydroxybenzonitrile. Cryst. M.p. 113°. Very sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O. $k = 3.0 \times 10^{-8}$ at 25°.

Anilide: plates from H₂O. M.p. 196-7°. Very sol. EtOH. Spar. sol. Et₂O. Insol. CHCl₃.

Me ether: see Anisic Acid.

Et ether: see p-Ethoxybenzoic Acid.

O-Acetyl: p-acetoxybenzoic acid. Plates from C₆H₆. M.p. 187-187.5°.

O-Benzoyl: needles from EtOH. M.p. 221-3°.

Hartmann, *J. prakt. Chem.*, 1877, 16, 39.

Pearl, *J. Org. Chem.*, 1947, 12, 85.

Gilman, Arntzen, *J. Am. Chem. Soc.*, 1947, 69, 1537.

Sah, Yuin, *J. Chinese Chem. Soc.*, 1946, 13, 77, (*Chem. Abstracts*, 1947, 41, 5869).

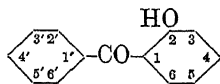
King, McWhirter, Barton, *J. Am. Chem. Soc.*, 1945, 67, 2089.

Zbarskii, *Chem. Abstracts*, 1939, 33, 9312.

Hydroxybenzoic Acid sulphonic Acid.

See Hydroxysulphobenzoic Acid.

2-Hydroxybenzophenone (*Phenyl 2-hydroxyphenyl ketone*, *2-hydroxydiphenyl ketone*, *o-benzoylphenol*)



C₁₃H₁₀O₂

MW, 198

Plates from EtOH.Aq. M.p. 39°. B.p. 250°/560 mm. Very sol. EtOH, Et₂O, AcOH, C₆H₆. Spar. sol. pet. ether. Insol. H₂O. Yellow sols. in alkalis. KOH fusion → salicylic acid. PbO₂ → xanthone.

Me ether: 2-methoxybenzophenone, o-benzoylanisole. C₁₄H₁₂O₂. MW, 212. M.p. 39°. B.p. 210°/27 mm. *Oxime*: exists in two forms. (i) M.p. 130°, (ii) m.p. 150°.

Et ether: 2-ethoxybenzophenone, o-benzoylphenetole. C₁₅H₁₄O₂. MW, 226. M.p. 40°.

B.p. 199°/20 mm. *Oxime*: m.p. 159°. *Semicarbazone*: m.p. 159-60°.

syn-Oxime: needles from C₆H₆. M.p. 141°. PCl₅ → salicylanilide. Formic acid → *anti*-form.

anti-Oxime: plates from C₆H₆. M.p. 143°. PCl₅ → 2-phenylbenzoxazole.

Azine: yellow cryst. M.p. 273°.

Phenylhydrazone: prisms from EtOH. M.p. 155°.

Ullmann, Goldberg, *Ber.*, 1902, 35, 2811. Bonnard, Meyer-Oulif, *Bull. soc. chim.*, 1931, 49, 1303.

Kohler, Bruce, *J. Am. Chem. Soc.*, 1931, 53, 1569.

Cullinane, Morgan, Plummer, *Rec. trav. chim.*, 1937, 56, 627.

Pfeiffer, Loewe, *J. prakt. Chem.*, 1937, 147, 293.

3-Hydroxybenzophenone (*Phenyl 3-hydroxyphenyl ketone*, *3-hydroxydiphenyl ketone*, *m-benzoylphenol*).

Plates from EtOH. M.p. 116°. Very sol. EtOH, Et₂O.

Me ether: 3-methoxybenzophenone, m-benzoylanisole. M.p. 37°. B.p. 342-3°/730 mm. Very sol. EtOH, C₆H₆. Insol. H₂O.

syn-Oxime: needles. M.p. 76°. KOH → *anti*-form.

anti-Oxime: needles from C₆H₆. M.p. 126°. HCl or heat at m.p. → *syn*-form.

Ullmann, Goldberg, *Ber.*, 1902, 35, 2811.

Smith, *Ber.*, 1891, 24, 4045.

Pfeiffer, Loewe, *J. prakt. Chem.*, 1937, 147, 293.

4-Hydroxybenzophenone (*Phenyl 4-hydroxyphenyl ketone*, *4-hydroxydiphenyl ketone*, *p-benzoylphenol*).

Plates from EtOH.Aq. M.p. 135° (130-2°). Very sol. EtOH, Et₂O, AcOH. Spar. sol. H₂O.

Me ether: 4-methoxybenzophenone, p-benzoylanisole. Prisms from Et₂O. M.p. 61-2°. B.p. 354-5°/729 mm. Very sol. EtOH, Et₂O.

Phenylhydrazone: exists in two forms. (i) Prisms from EtOH. M.p. 132°. (ii) Cryst. from Et₂O. M.p. 90°. *syn-Oxime*: cryst. from EtOH. M.p. 115-16°. *anti-Oxime*: plates from EtOH. M.p. 137-8°.

Et ether: 4-ethoxybenzophenone. Plates from AcOH. M.p. 38-9° (47°). B.p. 242°/40 mm.

Acetyl: needles from EtOH. M.p. 81°. Very sol. Et₂O, AcOH, C₆H₆.

Benzoyl: prisms from EtOH. M.p. 94-5° (113-14°). Very sol. hot EtOH. Sol. Me₂CO, AcOEt, C₆H₆.

Phenylhydrazone: m.p. 144°.

Semicarbazone: m.p. 194°.

syn-Oxime: needles. M.p. 81°. HCl or heat at m.p. → *anti*-form.

anti-Oxime: prisms from AcOH.Aq. M.p. 152°. Boiling NaOH \rightarrow *syn*-form.

Blicke, Weinkauff, *J. Am. Chem. Soc.*, 1932, 54, 1448.

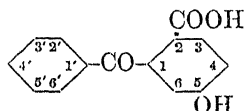
Smith, *Ber.*, 1891, 24, 4040.

Schäfer, *Ann.*, 1891, 264, 159.

Pfeiffer, Loewe, *J. prakt. Chem.*, 1937, 147, 293.

Priestley, Moness, *J. Org. Chem.*, 1940, 5, 355.

5-Hydroxybenzophenone-2-carboxylic Acid (4-Hydroxy-*o*-benzoylbenzoic acid)



$C_{14}H_{10}O_4$ MW, 242

Leaflets. Decomp. at 220–22°. Sol. EtOH, Et₂O. Prac. insol. CHCl₃, C₆H₆. NaOH fusion \rightarrow benzoic and 4-hydroxybenzoic acids.

Kliegl, *Ber.*, 1905, 38, 296.

2'-Hydroxybenzophenone-2-carboxylic Acid (2-*o*-Hydroxybenzoylbenzoic acid, *o*-salicylbenzoic acid).

Cryst. from AcOH. M.p. 171–2°. Sol. EtOH, Et₂O, AcOH, hot Me₂CO, hot PhNO₂. Spar. sol. C₆H₆, hot H₂O. Yellow sols. in alkalis. Red sol. in conc. H₂SO₄.

Et ester: $C_{16}H_{14}O_4$. MW, 270. M.p. 62°.

Me ether: 2-*o*-methoxybenzoylbenzoic acid. $C_{15}H_{12}O_4$. MW, 256. Cryst. from toluene. M.p. 144–5°.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2106.

Bayer, D.R.P., 269,336, (*Chem. Zentr.*, 1914, I, 508).

Sieglitz, *Ber.*, 1924, 57, 317.

3'-Hydroxybenzophenone-2-carboxylic Acid (2-*m*-Hydroxybenzoylbenzoic acid).

M.p. 181–2°. H₂SO₄ at 100° \rightarrow 1- and 2-hydroxyanthraquinones.

Et ester: prisms from C₆H₆. M.p. 91–3°.

Basler Chem. Fabr., D.R.P., 148,110, (*Chem. Zentr.*, 1904, I, 328).

Bayer, D.R.P., 279,201, (*Chem. Zentr.*, 1914, II, 1175).

4'-Hydroxybenzophenone-2-carboxylic Acid (2-*p*-Hydroxybenzoylbenzoic acid).

Leaflets from H₂O. M.p. 213° (210°). Sol. EtOH, Et₂O, AcOH, PhNO₂, hot H₂O. Yellow sols. in alkalis.

Me ester: $C_{15}H_{12}O_4$. MW, 256. Cryst. from MeOH. M.p. 134°. Sol. H₂SO₄ with lemon-yellow col.

Me ether: *o*-anisoylbenzoic acid, 2-*p*-methoxybenzoylbenzoic acid. $C_{15}H_{12}O_4$. MW, 256. Leaflets from H₂O. M.p. 148° (142–3°). Sol. EtOH, Et₂O, AcOH, CHCl₃, toluene. Spar. sol.

H₂O. *Me ester*: $C_{16}H_{14}O_4$. MW, 270. Plates from MeOH. M.p. 63°.

Et ether: 2-*p*-ethoxybenzoylbenzoic acid. $C_{16}H_{14}O_4$. MW, 270. Cryst. from toluene. M.p. 135–6°. Sol. Et₂O, C₆H₆, hot EtOH. Spar. sol. hot H₂O.

Phenyl ether: 2-*p*-phenoxybenzoylbenzoic acid. $C_{20}H_{14}O_4$. MW, 318. Needles from EtOH.Aq. M.p. 163–5°. Sol. EtOH, Et₂O, AcOH, C₆H₆. Insol. ligroin. Sol. conc. H₂SO₄ with red col.

Friedländer, *Ber.*, 1893, 26, 176.

Meyer, Turnau, *Monatsh.*, 1909, 30, 486.

Grande, *Gazz. chim. ital.*, 1890, 20, 124.

Kipper, *Ber.*, 1905, 38, 2492.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2106.

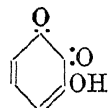
Buu-Hoi, Cagniant, *Bull. soc. chim.*, 1944, 11, 410.

Hubacher, *J. Am. Chem. Soc.*, 1946, 68, 718.

4-Hydroxybenzophenone-3-carboxylic Acid.

See 5-Benzoylsalicylic Acid.

3-Hydroxy-*o*-benzoquinone (3-Hydroxy-*o*-quinone)



$C_6H_4O_3$ MW, 124

Me ether: 3-methoxy-*o*-benzoquinone. $C_7H_6O_3$. MW, 138. Red prisms or needles. M.p. 115–20°. Sol. CHCl₃. Spar. sol. C₆H₆. Sols. in H₂O, EtOH, Et₂O and dil H₂SO₄ are red.

Et ether: $C_8H_8O_3$. MW, 152. *Oxime*: m.p. 102°.

Willstätter, Müller, *Ber.*, 1911, 44, 2179.

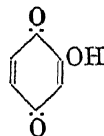
Hillemann, *Ber.*, 1938, 71, 34.

4-Hydroxy-*o*-benzoquinone.

Me ether: scarlet needles. Decomp. at 88–90°.

Kvalnes, *J. Am. Chem. Soc.*, 1934, 56, 2487.

Hydroxy-*p*-benzoquinone (Hydroxyquinone)



$C_6H_4O_3$ MW, 124

Yellow plates from C₆H₆. Darkens on exposure to light. Blackens at 124°. Sol. Me₂CO, EtOH. Sols. are stable. Aq. sol. reacts acid.

Me ether: methoxy-*p*-benzoquinone, methoxyquinone. $C_7H_6O_3$. MW, 138. Yellow needles from H₂O. M.p. 145° (140°). Sublimes at 80–90° in long needles. Sol. EtOH. Spar. sol. H₂O, ligroin. Conc. H₂SO₄ \rightarrow blue sol. \rightarrow green on dilution.

Et ether: ethoxy-*p*-benzoquinone, ethoxyquinone. $C_8H_8O_3$. MW, 152. Yellow needles. M.p. 119–20° (117°). Sol. EtOH, Et₂O. Mod. sol. H₂O. Volatile in steam. Sublimes.

Willstätter, Müller, *Ber.*, 1911, **44**, 2180.
 Bechhold, *Ber.*, 1889, **22**, 2381.
 Will, Pukall, *Ber.*, 1887, **20**, 1132.
 Jacobson, Huber, *Ann.*, 1909, **369**, 14.
 Gomberg, Stone, *J. Am. Chem. Soc.*, 1916, **38**, 1594.

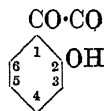
Hydroxybenzoylbenzoic Acid.

See Hydroxybenzophenone-carboxylic Acid and Benzoylsalicylic Acid.

Hydroxybenzoylethyl Alcohol.

See 4-β-Dihydroxypropiofenone.

2-Hydroxybenzoylformic Acid (2-Hydroxy-phenylglyoxylic acid, salicyloylformic acid)



$C_8H_6O_4$ MW, 166
 Yellow plates from C_6H_6 -ligroin. M.p. 56–7° (41–2°).

Et ester: $C_{10}H_{10}O_4$. MW, 194. M.p. 15°. Decomp. on dist. in vacuo.

Acetyl: needles from H₂O. M.p. 101–6° (+ 1H₂O), 134.5–135.5° (anhyd.). *Me ester*: plates from MeOH. M.p. 109–10°. *Amide*: prisms from EtOH. M.p. 170° decomp. *Nitrile*: plates from AcOH. M.p. 110–11°. B.p. 149–51°/14 mm.

Oxime: needles from EtOH.Aq. M.p. 149° decomp.

Phenylhydrazone: yellow needles from EtOH.Aq. M.p. 148°.

Stoermer, *Ber.*, 1909, **42**, 201.

Anschütz, *Ann.*, 1909, **368**, 85.

Fries, Pfaffendorf, *Ber.*, 1912, **45**, 157.

3-Hydroxybenzoylformic Acid (3-Hydroxy-phenylglyoxylic acid).

Me ether-nitrile: 3-methoxybenzoyl cyanide. $C_9H_7O_2N$. MW, 161. Cryst. from C_6H_6 -pet. ether. M.p. 111–12°. Very sol. EtOH, Et₂O, C_6H_6 . Spar. sol. ligroin.

Mauthner, *Ber.*, 1909, **42**, 192.

4-Hydroxybenzoylformic Acid (4-Hydroxy-phenylglyoxylic acid).

Needles from Et₂O- C_6H_6 -ligroin. M.p. 177–8° (172–3°). Sol. H₂O, EtOH, Et₂O. Spar. sol. CHCl₃, C_6H_6 . Insol. ligroin.

Me ether: anisoylformic acid. $C_9H_8O_4$. MW, 180. Needles from C_6H_6 . M.p. 89° (93°). Very sol. EtOH, Et₂O. Sol. C_6H_6 . Spar. sol. pet. ether. *Oxime*: cryst. M.p. 145–6°. *Semicarbazone*: m.p. 201° decomp. *Amide*: $C_9H_9O_3N$. MW, 179. Needles from C_6H_6 . M.p. 151–2°. *Nitrile*: 4-methoxybenzoyl cyanide,

anisoyl cyanide. $C_9H_7O_2N$. MW, 161. Needles from C_6H_6 -ligroin. M.p. 63–4°.

Et ether: $C_{10}H_{10}O_4$. MW, 194. Prisms + H₂O from H₂O. M.p. 52°. Cryst. from C_6H_6 . M.p. 125° decomp. *Phenylhydrazone*: m.p. 153°. *Nitrile*: $C_{10}H_9O_2N$. MW, 175. Cryst. from pet. ether. M.p. 43°.

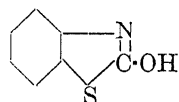
Fromhertz, *Z. physiol. Chem.*, 1910, **70**, 355.

Bouveault, *Bull. soc. chim.*, 1898, **19**, 75.

Mauthner, *Ber.*, 1909, **42**, 191.

Vorländer, *Ber.*, 1911, **44**, 2464.

2-Hydroxybenzthiazole



C_7H_5ONS MW, 151
 M.p. 136°. Sol. EtOH, Et₂O. Insol. H₂O.

Me ether: C_8H_7ONS . MW, 165. Cryst. from MeOH. M.p. 34–5°. B.p. 119°/30 mm. *Picrate*: m.p. 102–3°.

Et ether: C_9H_9ONS . MW, 179. M.p. 25°. B.p. above 360°.

Acetyl: prisms from EtOH. M.p. 60°.

Hofmann, *Ber.*, 1879, **12**, 1128.

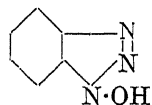
Jacobson, *Ber.*, 1886, **19**, 1811.

Duzee, U.S.P. 2,179,987, (*Chem. Abstracts*, 1940, **34**, 1690).

Davies, Sexton, *J. Chem. Soc.*, 1942, 304.

Colonna, *Chem. Abstracts*, 1947, **41**, 754.

1-Hydroxybenztriazole (Benzazimidol)



$C_6H_5ON_3$ MW, 135

Cryst. from EtOH.Aq. M.p. 159–60°. Sol. alkalis. $FeCl_3 \rightarrow$ red col.

Nietzki, Braunschweig, *Ber.*, 1894, **27**, 3381.

Ghosh, *J. Indian Chem. Soc.*, 1945, **22**, 27.

Hydroxybenzylacetophenone.

See Hydroxyphenylpropiofenone.

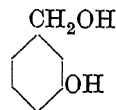
α-Hydroxybenzylacetylene.

See Ethynylphenylcarbinol.

o-Hydroxybenzyl Alcohol.

See Saligenin.

***m*-Hydroxybenzyl Alcohol** (ω-Hydroxy-*m*-cresol)



$C_7H_8O_2$ MW, 124

Cryst. from C_6H_6 . M.p. 73° (67°). Very sol. EtOH, Et₂O, hot H₂O. Spar. sol. CHCl₃.

Acetyl: *m*-hydroxybenzyl acetate. Cryst.

M.p. 55°. Very sol. EtOH, Et₂O. Spar. sol. H₂O.

Diacyl: b.p. about 290°. Very sol. EtOH, Et₂O.

3-Me ether: *m*-methoxybenzyl alcohol. C₈H₁₀O₂. MW, 138. B.p. 252°, 129.5°/9 mm.

Mettler, *Ber.*, 1905, 38, 1752.

Tiemann, Ludwig, *Ber.*, 1882, 15, 2047.

v. den Velden, *J. prakt. Chem.*, 1877, 15, 165.

p-Hydroxybenzyl Alcohol (*ω*-Hydroxy-*p*-cresol).

Prisms or needles from H₂O. M.p. 124.5–125.5°. Very sol. EtOH, Et₂O, H₂O. Spar. sol. C₆H₆. Insol. CHCl₃, pet. ether.

Acetyl: *p*-hydroxybenzyl acetate. Needles from H₂O. M.p. 84°.

Diacyl: needles. M.p. 75°. B.p. 155–7°/11 mm.

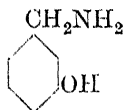
Me ether: see Anisyl Alcohol.

Auwers, Daecke, *Ber.*, 1899, 32, 3374.

o-Hydroxybenzylamine.

See Salicylamine.

m-Hydroxybenzylamine (*ω*-Amino-*m*-cresol)



C₇H₉ON

MW, 123

B.HCl: m.p. 160°.

Me ether: *m*-methoxybenzylamine. C₈H₁₁ON. MW, 137. B.p. 103–4°/6 mm. *Picrate*: prisms from MeOH. M.p. 181°. *Benzoyl*: needles from CHCl₃-ligroin. M.p. 95°. *p-Nitrobenzoyl*: needles from MeOH. M.p. 124°.

Shoppee, *J. Chem. Soc.*, 1932, 702.

p-Hydroxybenzylamine (*ω*-Amino-*p*-cresol).

Plates +1H₂O from H₂O. M.p. 95° decomp. *B.HCl*: plates from EtOH. M.p. 195°.

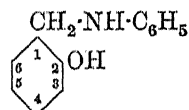
B.HI: m.p. 198–200°.

Me ether: see Anisamine.

Salkowski, *Ber.*, 1889, 22, 2142.

Tiffeneau, *Bull. soc. chim.*, 1911, 9, 823.

o-Hydroxybenzylamine



C₁₃H₁₃ON

MW, 199

Leaflets from EtOH or ligroin. M.p. 113°. Sol. EtOH, Et₂O, acids, alkalis. Spar. sol. H₂O, ligroin.

B.HCl: m.p. 131°.

B₂H₂PtCl₆: m.p. 184° decomp.

Acetyl deriv.: m.p. 93°.

Paal, Senninger, *Ber.*, 1894, 27, 1802.

Emmerich, *Ann.*, 1887, 241, 344.

m-Hydroxybenzylamine.

Prisms from EtOH.Aq. M.p. 103–4°. Sol. Me₂CO, EtOH, CHCl₃, C₆H₆. Spar. sol. H₂O, cold ligroin.

N-Nitroso: m.p. 87.5–88°.

Bamberger, Müller, *Ann.*, 1900, 313, 113.

p-Hydroxybenzylamine.

Needles from EtOH, m.p. 208°. Prisms from C₆H₆, m.p. 156°.

Me ether: C₁₄H₁₅ON. MW, 213. Prisms from MeOH. M.p. 64.5°. Sol. Et₂O, CHCl₃, C₆H₆, ligroin. *B.HCl*: m.p. 163°. *N-Acetyl*: m.p. 54°.

Et ether: C₁₅H₁₇ON. MW, 227. Plates from MeOH. M.p. 65°.

Emmerich, *Ann.*, 1887, 241, 355.

Bischoff, Fröhlich, *Ber.*, 1906, 39, 3966.

Steinhart, *Ann.*, 1887, 241, 337.

Fritsch, *Ann.*, 1901, 315, 141.

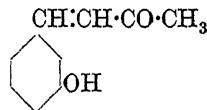
Hydroxybenzyl cyanide.

See under Hydroxyphenylacetic Acid.

o-Hydroxybenzylideneacetone.

See Salicylideneacetone.

m-Hydroxybenzylideneacetone (*Methyl 3-hydroxystyryl ketone*)



C₁₀H₁₀O₂

MW, 162

Me ether: *m*-methoxybenzylideneacetone. B.p. 173°/8 mm. *Phenylhydrazones*: m.p. 116–17°. *Semicarbazones*: needles from EtOH. M.p. 197–8°. Sol. hot EtOH, C₆H₆, AcOH. Insol. ligroin.

Bauer, Vogel, *J. prakt. Chem.*, 1913, 88, 332.

p-Hydroxybenzylideneacetone (*Methyl 4-hydroxystyryl ketone*).

Needles from H₂O. M.p. 102–3°. Sol. EtOH, AcOH. Spar. sol. H₂O. Orange-yellow sols. in alkalis.

Acetyl: needles from EtOH.Aq. M.p. 80–1°. Sol. EtOH, AcOH.

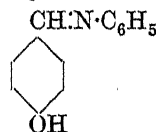
Me ether: see Anisylideneacetone.

Zincke, Mühlhausen, *Ber.*, 1903, 36, 134.

o-Hydroxybenzylideneaniline.

See Salicylideneaniline.

p-Hydroxybenzylideneaniline



C₁₃H₁₁ON

MW, 197

Yellow plates from EtOH. M.p. 194–5° (190–1°). Sol. EtOH, Et₂O. Spar. sol. CHCl₃, C₆H₆. Insol. H₂O.

Me ether: see under Anisaldehyde.

Herzfeld, *Ber.*, 1877, 10, 1271.

Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2464.

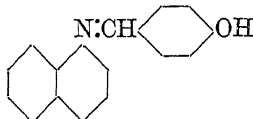
Hydroxy-benzylideneaniline.

See Benzylideneaminophenol.

o-Hydroxybenzylidene-1-naphthylamine.

See Salicylidene-1-naphthylamine.

p-Hydroxybenzylidene-1-naphthylamine



C₁₇H₁₃ON

MW, 247

Plates from xylene. M.p. 191–191.5°.

Me ether: anisylidene-1-naphthylamine.

C₁₈H₁₅ON. MW, 261. Plates from EtOH. M.p. 100–1°. *B, HCl*: m.p. 211° decomp.

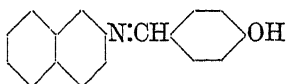
Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2470.

Pope, Fleming, *J. Chem. Soc.*, 1908, 93, 1916.

o-Hydroxybenzylidene-2-naphthylamine.

See Salicylidene-2-naphthylamine.

p-Hydroxybenzylidene-2-naphthylamine



C₁₇H₁₃ON

MW, 247

Yellow plates from EtOH. M.p. 231.5° (220°).

Me ether: anisylidene-2-naphthylamine.

C₁₈H₁₅ON. MW, 261. Plates from EtOH. M.p. 98°.

Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2471.

Emmerich, *Ann.*, 1887, 241, 356.

Steinhart, *ibid.*, 341.

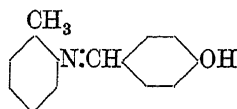
Hydroxybenzylidenepropionic Acid.

See *p*-Hydroxystyrylacetic Acid and Styrylglycollic Acid.

o-Hydroxybenzylidene-toluidine.

See Salicylidene-toluidine.

p-Hydroxybenzylidene-*o*-toluidine



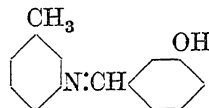
C₁₄H₁₃ON

MW, 211

Prisms from EtOH. M.p. 171–2°. Exhibits phototropy.

Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2464.

m-Hydroxybenzylidene-*m*-toluidine



C₁₄H₁₃ON

MW, 211

Prisms from C₆H₆-pet. ether. M.p. 106–7°. Sol. most org. solvents.

Senier, Shephard, *J. Chem. Soc.*, 1909, 95, 1951.

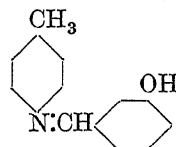
p-Hydroxybenzylidene-*m*-toluidine.

Yellow plates from EtOH, colourless cryst. from C₆H₆. M.p. 181°. Sol. Et₂O, C₆H₆ to colourless sols. Sol. EtOH, AcOH, AcOEt, CHCl₃ to yellow sols. Exhibits phototropy.

Me ether: C₁₅H₁₅ON. MW, 225. Plates from EtOH. M.p. 59°. *Hydrochloride*: m.p. 174°.

Senier, Shephard, *J. Chem. Soc.*, 1909, 95, 1951.

m-Hydroxybenzylidene-*p*-toluidine



C₁₄H₁₃ON

MW, 211

Leaflets from CHCl₃-ligroin. M.p. 129°.

Bayer, D.R.P., 105,006, (*Chem. Zentr.*, 1899, II, 1078).

p-Hydroxybenzylidene-*p*-toluidine.

Orange leaflets from EtOH. M.p. 218°. Sol. hot EtOH, Et₂O. Spar. sol. H₂O, CHCl₃, C₆H₆. Exhibits phototropy.

Herzfeld, *Ber.*, 1877, 10, 2196.

Senier, Forster, *J. Chem. Soc.*, 1914, 105, 2465.

p-Hydroxybenzylpenicillin.

See Penicillin-X.

p-Hydroxybenzylpenillamine.

See Penillamine-X.

p-Hydroxybenzylpenillic Acid.

See Penillic-X Acid.

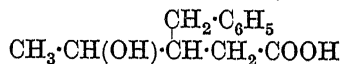
p-Hydroxybenzylpenilloaldehyde.

See Penilloaldehyde-X.

p-Hydroxybenzylpenilloic Acid.

See Penilloic-X Acid.

3-Hydroxy-2-benzyl-*n*-valeric Acid (2- α -Hydroxyethyl-3-phenylbutyric acid)



C₁₂H₁₆O₃

MW, 208

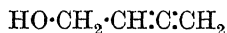
Prisms + 1H₂O from H₂O. M.p. 55–6°, anhyd. 75–6°. Sol. hot H₂O.

Lactone: benzylvalerolactone. C₁₂H₁₄O₂.

MW, 190. Cryst. from CS₂. M.p. 86°. Sol. toluene. Spar. sol. hot H₂O.

Erdmann, *Ann.*, 1889, 254, 202, 215.

4-Hydroxy-1 : 2-butadiene (*Hydroxymethylallene, vinylidene-ethyl alcohol, 3-methyleneallyl alcohol*)



C₄H₆O

MW, 70

Lachrymatory liq. with pungent odour. B.p. 126-8°/756 mm., 68-70°/53 mm. D₄²⁰ 0.9164. n_D²⁰ 1.4759. Misc. with H₂O and most org. solvents.

Acetyl : b.p. 140-140.5°/780 mm., 85-6°/125 mm. D₄²⁰ 0.9641. n_D²⁰ 1.4504.

Carothers, Berchet, *J. Am. Chem. Soc.*, 1933, 55, 2812.

Hydroxybutane.

See Butyl Alcohol.

Hydroxybutane-dicarboxylic Acid.

See Ethylmalic Acid.

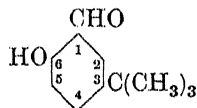
γ-Hydroxy-α-butenylacetylene.

See 3-Hexen-1-yn-5-ol.

Hydroxybutenylbenzene.

See Methylstyrylcarbinol and 3-Phenylallylcarbinol.

6-Hydroxy-3-tert.-butylbenzaldehyde (5-tert.-Butylsalicylaldehyde)



C₁₁H₁₄O₂

MW, 178

Liq. at -18°. B.p. 251-2°. D₂₀ 1.039. FeCl₃ → violet col.

Me ether : C₁₂H₁₆O₂. MW, 192. B.p. 274-6°.

Benzyl ether : C₁₈H₂₀O₂. MW, 268. Prisms from MeOH. M.p. 70-71°.

Oxime : needles from pet. ether. M.p. 112°. Sol. H₂O, Et₂O, CHCl₃, C₆H₆.

Phenylhydrazone : plates. M.p. 178°.

Dains, Rothrock, *Am. Chem. J.*, 1894, 16, 635.

Hydroxybutylbenzene

See Butylphenol and Phenylbutyl Alcohol.

3-Hydroxy-1-butylene.

See Methylvinylcarbinol.

1-Hydroxy-2-butylene.

See Crotyl Alcohol.

3-ω-Hydroxybutylindole.

See 4-[3-Indolyl]-n-butyl Alcohol.

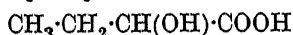
4-Hydroxybutyl phenyl Ketone.

See ω-Hydroxyvalerophenone.

2-Hydroxybutyraldehyde.

See Aldol.

1-Hydroxybutyric Acid



C₄H₈O₃

MW, 104

Dict. of Org. Comp.—II.

d.

Isobutyl ester : C₈H₁₆O₃. MW, 160. B.p. 196°. D₁₅ 0.944. n_D 1.4182. [α]_D + 7.7°.

l.

Et ester : C₆H₁₂O₃. MW, 132. B.p. 165-70°. D₁₅ 0.978. n_D 1.4101. [α]_D - 1.9°.

dl.

Cryst. M.p. 43-4°. B.p. 225-60° decomp. and anhydride formation, 140°/14 mm. Sublimes at 60-70°. *k* = 7.5 × 10⁻⁵.

Et ester : b.p. 167°. D₁₀ 0.9952. *Acetyl* : b.p. 198°.

Nitrile : propionaldehyde cyanhydrin. C₄H₇ON. MW, 85. B.p. 102-3°/23 mm. D₁₅ 0.9690. n_D¹⁵ 1.4175. *Acetyl* : b.p. 102-3°/23 mm. D₀ 1.019.

Acetyl : cryst. from CS₂. M.p. 43°.

Me ether : 1-methoxybutyric acid. C₅H₁₀O₃. MW, 118. Liq. Sol. H₂O, EtOH, Et₂O. *Me ester* : C₆H₁₂O₃. MW, 132. B.p. 150-5°. *Et ester* : C₇H₁₄O₃. MW, 146. B.p. 159-61°(148°). D₂₄ 0.9223. *p-Phenylphenacyl ester* : m.p. 82°.

p-Bromophenacyl ester : m.p. 69-70°. *Et ether* : 1-ethoxybutyric acid. C₆H₁₂O₃. MW, 132. Liq. Sol. H₂O, EtOH, Et₂O. *Me ester* : C₇H₁₄O₃. MW, 146. B.p. 156-8°. *Et ester* : C₈H₁₆O₃. MW, 160. B.p. 166-70°(168.5°). D₂₂ 0.8804.

Anilide : m.p. 89-90°.

Carbamate : m.p. 126-7° decomp.

Bischoff, Walden, *Ann.*, 1894, 279, 102.

Anschütz, Motschmann, *Ann.*, 1912, 392, 103.

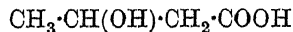
Guye, Jordan, *Bull. soc. chim.*, 1896, 15, 475.

Duvillier, *Ann. chim. phys.*, 1879, 17, 532.

Levene, Kuna, *J. Biol. Chem.*, 1941, 141, 391.

Gilman, Abbott, *J. Org. Chem.*, 1943, 8, 224.

2-Hydroxybutyric Acid



C₄H₈O₃

MW, 104

d.

Na salt : cryst. from EtOH.

Quinine salt : C₂₀H₂₄O₂N₂·C₄H₈O₃·H₂O. Needles + 1H₂O from H₂O. M.p. 108-14°, anhyd. 126.5-127.5°. [α]_D¹⁷ - 126.2° in EtOH.

Nitrile : 1-cyanoisopropyl alcohol. C₄H₇ON. MW, 85. B.p. 99-100°/15 mm. [α]_D¹⁸ + 8.78°.

l.

Cryst. Very hygroscopic. M.p. 49-50°. Very sol. H₂O, EtOH, Et₂O. Insol. C₆H₆. [α]_D¹⁸ - 24.9°.

Quinine salt : needles + 4½H₂O. M.p. 60-70°, anhyd. 124-6°. [α]_D¹⁸ - 129.9° in EtOH.

Me ester : C₅H₁₀O₃. MW, 118. B.p. 67-68.5°/13 mm. D₂₀²⁰ 1.058. [α]_D²⁰ - 21.09°.

Nitrile: b.p. 99–100°/15 mm. $[\alpha]_D^{25} - 10.03^\circ$ in H_2O .

Amide: $C_4H_9O_2N$. MW, 103. Cryst. from AcOEt. M.p. 99–100°. $[\alpha]_D^{20} - 22.49^\circ$ in MeOH.

dl.

Hygroscopic syrup. B.p. 130°/12–14 mm. Volatile in steam. $k = 5.1 \times 10^{-5}$ (3.4×10^{-5}).

Me ester: b.p. 67–8°/12–13 mm.

Et ester: $C_6H_{12}O_3$. MW, 132. B.p. 178–80°, 76–7°/15 mm. $D_4^{17} 1.012$. $n_D^{17} 1.422$. *Acetyl*: b.p. 92–4°/8 mm.

Amide: prisms from H_2O . M.p. 84–7°.

Nitrile: b.p. 220–1°/757 mm., 123–5°/22 mm. $D_9^{18} 1.0134$. *Acetyl*: b.p. 210°/765 mm.

Acetyl: b.p. 93–4°/0.5 mm. $D^{18} 1.1346$. $n_D 1.4282$.

Me ether: *p*-bromophenacyl ester, m.p. 59–60°.

McKenzie, *J. Chem. Soc.*, 1902, 81, 1402.

Fischer, Scheibler, *Ber.*, 1909, 42, 1221.

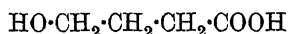
Anschütz, Motschmann, *Ann.*, 1912, 392, 106.

Vavon, *Ann. chim.*, 1914, 1, 180.

Mozingo, Spencer, Folkers, *J. Am. Chem. Soc.*, 1944, 66, 1859.

Tuerck, Lichtenstein, U.S.P. 2,411,700, (*Chem. Abstracts*, 1947, 41, 6278).

3-Hydroxybutyric Acid



$C_4H_8O_3$

MW, 104

Liq. at -17° . Readily reverts to lactone. $k = 1.93 \times 10^{-5}$ at 25° .

Nitrile: 3-cyanopropyl alcohol. C_4H_7ON . MW, 85. B.p. 238–40°/765 mm., 150–1°/68 mm., 140°/30 mm. $D_8^{18} 1.0290$. *Acetyl*: b.p. 237°.

Lactone: see Butyrolactone.

Me ether: 3-methoxybutyric acid. $C_5H_{10}O_3$. MW, 118. B.p. 105–105.5°/7 mm. $D_4^{20} 1.0596$. $n_D^{20} 1.42509$.

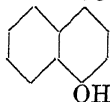
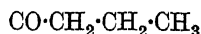
Et ether: 3-ethoxybutyric acid. $C_6H_{12}O_3$. MW, 132. B.p. 116.5–117°/8 mm. $D_4^{20} 1.0194$. $n_D^{20} 1.42531$.

Hydrazide: m.p. 89–90°.

Henry, *Chem. Zentr.*, 1898, I, 984.

Palomaa, Kenetti, *Ber.*, 1931, 64, 800.

4-Hydroxy-1-butyronaphthone (4-Butyryl-1-naphthol, propyl 4-hydroxy-1-naphthyl ketone)



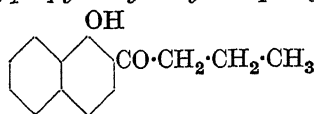
$C_{14}H_{14}O_2$

MW, 214

Me ether: 4-methoxybutyronaphthone. $C_{15}H_{16}O_2$. MW, 228. Leaflets from EtOH. M.p. 49–50°. *Picrate*: red needles. M.p. 90°.

Rousset, *Bull. soc. chim.*, 1896, 15, 634.

1-Hydroxy-2-butyronaphthone (2-Butyryl-1-naphthol, propyl 1-hydroxy-2-naphthyl ketone)



$C_{14}H_{14}O_2$

MW, 214

Rhombic cryst. from ligroin, needles from Et_2O . M.p. 85–6° (78°). B.p. 145–52°/1 mm.

Me ether: $C_{15}H_{16}O_2$. MW, 228. Cryst. from ligroin. M.p. 80–1°. B.p. 155–7°/1 mm.

Et ether: $C_{16}H_{18}O_2$. MW, 242. Cryst. from ligroin. M.p. 79–80°. B.p. 158–9°/1 mm.

Oxime: needles from C_6H_6 -ligroin. M.p. 119°.

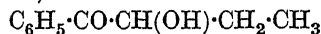
Semicarbazone: m.p. 201–2°.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, 43, 97.

Chi, *J. Am. Chem. Soc.*, 1939, 61, 2487.

Stroughton, *J. Am. Chem. Soc.*, 1935, 57, 202.

β -Hydroxybutyrophenone (Ethylbenzoylcarbinol, 1-benzoylpropyl alcohol, 1-hydroxypropyl phenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

B.p. 131.5–132.5°/12 mm. $D_4^{19} 1.077$. $n_D^{19} 1.529$. Alkalis $\rightarrow C_6H_5C(OH) \cdot CO \cdot CH_2 \cdot CH_3$.

Acetyl: yellow oil. B.p. 154–6°/16 mm. $D_4^{18} 1.091$. $n_D^{18} 1.5081$. Sol. EtOH, Et_2O . Insol. H_2O .

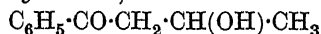
Phenylurethane: m.p. 162–3°.

Temnikova, Afanas'wa, *J. Gen. Chem. U.S.S.R.*, 1941, 11, 70, (*Chem. Abstracts*, 1941, 35, 6580).

Urion, Baum, *Chem. Abstracts*, 1939, 33, 7286.

Collett, *Compt. rend.*, 1897, 125, 354.

γ -Hydroxybutyrophenone (Methylphenacylcarbinol, 1-benzoylisopropyl alcohol, 2-hydroxypropyl phenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

Oil. B.p. 150–2°/12 mm.

Me ether: γ -methoxybutyrophenone. $C_{11}H_{14}O_2$. MW, 178. Oil. B.p. 119–21°/8 mm. $D_4^{20} 1.0349$. $n_D^{20} 1.5168$.

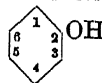
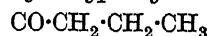
Semicarbazone: m.p. 153–4°.

Staudinger, Kon, *Ann.*, 1911, 384, 124.

Dufraisse, Demontvignier, *Bull. soc. chim.*, 1927, 41, 847.

Schöpf, Thierfelder, *Ann.*, 1935, 518, 127.

o-Hydroxybutyrophenone (o-Butyryl-phenol, propyl o-hydroxyphenyl ketone)



$C_{10}H_{12}O_2$

MW, 164

Cryst. M.p. 10° (8°). B.p. 124–6°/14 mm., 119°/9 mm. D_{20}^{25} 1.0683. n_D^{25} 1.5375.

Semicarbazone: cryst. from EtOH. M.p. 192–3°.

Phenylhydrazone: yellow cryst. M.p. 91–2°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, 47, 1308.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, 119, 1885.

m-Hydroxybutyrophenone (m-Butyryl-phenol, propyl m-hydroxyphenyl ketone).

Plates from C_6H_6 -pet. ether. M.p. 63°.

p-Nitrophenylhydrazone: orange-yellow needles from C_6H_6 . M.p. 160°.

Morgan, Hickinbottom, *J. Chem. Soc.*, 1921, 119, 1884.

p-Hydroxybutyrophenone (p-Butyryl-phenol, propyl p-hydroxyphenyl ketone).

Plates from ligroin. M.p. 91°. B.p. 187–8°/9 mm. Sol. EtOH. Spar. sol. hot H_2O .

Me ether: p-methoxybutyrophenone, propyl p-methoxyphenyl ketone, p-butyrylanisole. $C_{11}H_{14}O_2$. MW, 178. M.p. 21–2°. B.p. 275°, 158–9°/19 mm. D_{20}^{20} 1.0494. n_D^{20} 1.5388. Semicarbazone: cryst. M.p. 183°.

Et ether: p-ethoxybutyrophenone, propyl p-ethoxyphenyl ketone, p-butyrylphenetole. $C_{12}H_{16}O_2$. MW, 192. Cryst. B.p. 173–4°/23 mm. n_D^{15} 1.5390. Oxime: m.p. 103–4°. Semicarbazone: m.p. 181°.

Benzoyl: cryst. from EtOH. M.p. 107–107.5°. Oxime: m.p. 83–4°.

Semicarbazone: m.p. 167–9°.

Baranger, *Bull. soc. chim.*, 1931, 49, 1216.

Sandulesco, Girard, *Bull. soc. chim.*, 1930, 47, 1308.

Klages, *Ber.*, 1902, 35, 2266.

Perkin, *J. Chem. Soc.*, 1889, 55, 548.

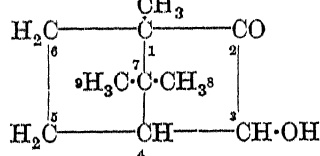
β -Hydroxy- γ -butyrottrimethylbetaine.

See Carnitine.

2-Hydroxycamphane.

See Borneol.

3-Hydroxycamphor



$C_{10}H_{16}O_2$ MW, 168

Exists in three forms.

(i)

M.p. 211–12° (198°, 193–5°). Sol. pet. ether. $[\alpha]_D^{19} + 18.9^\circ$. $CrO_3 \rightarrow$ camphorquinone.

Acetyl: m.p. 63–4°.

Me ether: $C_{11}H_{18}O_2$. MW, 182. B.p. 81°/4 mm.

Semicarbazone: m.p. 223–4° (203–4°).

2:4-Dinitrophenylhydrazone: yellow or red cryst. from EtOH. M.p. 225°. $[\alpha]_D + 252^\circ$ in EtOH.

(ii)

Needles from C_6H_6 . M.p. 210–11°. $[\alpha]_D^{20} + 115.6^\circ$.

Semicarbazone: m.p. 199–201°.

(iii)

Cryst. from ligroin. M.p. 210–13°. $[\alpha]_D^{20} + 9.8^\circ$.

Semicarbazone: m.p. 196–8°.

Shimamoto, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 25, 56.

Ishidate, *Chem. Abstracts*, 1928, 22, 3406.

Bredt, Ahrens, *J. prakt. Chem.*, 1926, 112, 273.

Rupe, Müller, *Helv. Chim. Acta*, 1941, 24, 265E.

4-Hydroxycamphor.

Cryst. from pet. ether. M.p. 250°. Very sol. most org. solvents. Spar. sol. H_2O , pet. ether. $[\alpha]_D^{17} - 16^\circ$ in EtOH.

Acetyl: oil. B.p. 132°/11 mm.

Oxime: cryst. from toluene. M.p. 212°.

Semicarbazone: cryst. from EtOH.Aq. M.p. 236–8°.

Houben, Pfankuck, *Ann.*, 1931, 489, 217.

5-Hydroxycamphor (p-Hydroxycamphor).

Needles from ligroin. M.p. 222.5–223.5° (210°). Easily sol. EtOH, Et_2O , C_6H_6 , AcOH. Spar. sol. pet. ether. Sol. to 3.4% in H_2O at 15°. $[\alpha]_D^{19.5} + 41.0^\circ$ in EtOH. $[\alpha]_D^{16} + 47.4^\circ$.

Acetyl: oil. B.p. 165–7°/22 mm. (149–50°/25 mm.). $[\alpha]_D^{24} + 22.5^\circ$ in EtOH. Semicarbazone: needles from EtOH. M.p. 223–4° (237–8°).

p-Nitrobenzoyl: m.p. 158–9°.

Semicarbazone: needles from EtOH. M.p. 232.5–233.5° (222°).

Asahina, Ishidate, *Ber.*, 1934, 67, 73.

Takeuchi, *Sci. Papers Inst. Phys. Chem. Research, Tokyo*, 1934, 25, 70.

6-Hydroxycamphor (Ketoisoborneol).

M.p. 130°.

Acetyl: b.p. 153–5°/22 mm.

3:5-Dinitrobenzoyl: m.p. 146°.

Semicarbazone: m.p. 200°.

Asahina, Tukamoto, *Ber.*, 1937, 70, 584.

8-Hydroxycamphor (π -Hydroxycamphor).

Exists in cis and trans forms.

Cis:

Cryst. from pet. ether. M.p. 233–4°. Sol. to 8% in H_2O at 15°. $[\alpha]_D^{16} + 40.68^\circ$.

Acetyl: b.p. 160°/22 mm. Semicarbazone: needles from AcOEt. M.p. 210–11°.

Semicarbazone: prisms from AcOEt. M.p. 216–17°.

Trans:

Prisms from ligroin. M.p. 233°. Very sol. EtOH, Et₂O, C₆H₆. Spar. sol. pet. ether. Sol. to 12.5% in H₂O at 18°. $[\alpha]_D^{25} + 62.20^\circ$.

Acetyl: oil. B.p. 176°/47 mm. *Semicarbazone*: cryst. from EtOH.Aq. M.p. 234–5° decomp.

Semicarbazone: needles from AcOEt. M.p. 224–5°.

Asahina, Ishidate, *Ber.*, 1934, 67, 76.

Shimamoto, *Sci. Papers Inst. Phys. Chem. Research Tokyo*, 1934, 25, 53.

Guha, Bhattacharyya, *J. Indian Chem. Soc.*, 1944, 21, 271.

10-Hydroxycamphor (*β*-Hydroxycamphor).

Cryst. from pet. ether. M.p. 216° (220°). $[\alpha]_D^{25} + 51.9^\circ$ in EtOH.

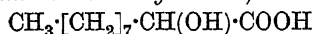
Acetyl: b.p. 148°/16 mm., 128–30°/3–4 mm. *Semicarbazone*: needles from EtOH.Aq. M.p. 163°.

Semicarbazone: prisms from EtOH.Aq. M.p. 213° (200°).

Iki, *Sci. Papers Inst. Phys. Chem. Research Tokyo*, 1934, 25, 81.

Asahina, Ishidate, *Ber.*, 1934, 67, 1202.

Kenkyujo, B.P. 453,789, (*Chem. Abstracts*, 1937, 31, 1041).

1-Hydroxycaproic Acid (*α*-Hydroxycaproic acid, 1-nonanol-1-carboxylic acid)

C₁₀H₂₀O₃ MW, 188

Cryst. from CHCl₃ or pet. ether. M.p. 70–5°. Dist. at ord. press. → nonyl aldehyde.

Me ester: C₁₁H₂₂O₃. MW, 202. Cryst. from pet. ether. M.p. 30°.

Et ester: C₁₂H₂₄O₃. MW, 216. M.p. 30–5°.

Phenacyl ester: m.p. 60–60.5°.

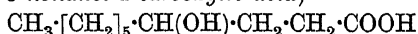
p-Bromophenacyl ester: m.p. 93–93.5°.

Acetyl: cryst. from pet. ether. M.p. 40°.

p-Nitrobenzoyl: m.p. 54.5–55°.

Anilide: m.p. 79°.

Bagard, *Bull. soc. chim.*, 1907, 1, 350.

3-Hydroxycaproic Acid (*γ*-Hydroxycaproic acid, 3-nonanol-1-carboxylic acid)

C₁₀H₂₀O₃ MW, 188

Cryst. Readily dehydrates to lactone.

Lactone: C₁₀H₁₈O₂. MW, 170. B.p. 281°. Volatile in steam. Spar. sol. H₂O. Ba(OH)₂ → Ba salt of 3-hydroxycaproic acid.

Fittig, Schneegans, *Ann.*, 1885, 227, 93.

4-Hydroxycaproic Acid (4-Nonanol-1-carboxylic acid)

C₁₀H₂₀O₃ MW, 188

Lactone: b.p. 117–20°/0.02 mm. D₄^{27.5} 0.9540. n_D²⁵ 1.4537. $[\alpha]_D + 39.68^\circ$.

Meyer, *Rec. trav. chim.*, 1940, 59, 191.

9-Hydroxycaproic Acid (9-Nonanol-1-carboxylic acid)

C₁₀H₂₀O₃ MW, 188

Cryst. from Et₂O–pet. ether. M.p. 75° (75–76.5°). Sol. Et₂O. Spar. sol. pet. ether.

Me ester: C₁₁H₂₂O₃. MW, 202. M.p. 34–5°. B.p. 154°/7 mm., 145–7°/3 mm. D₂₀ 0.9618. n_D 1.4471. *Acetyl*: m.p. 15°. B.p. 175°/17 mm., 163°/10 mm. *Phenylurethane*: cryst. from Et₂O–pet. ether. M.p. 54–5°.

Amyl ester: C₁₅H₃₀O₃. MW, 258. B.p. 179–80°/8 mm. *Acetyl*: b.p. 210°/15 mm.

Acetyl: m.p. 36–7°. B.p. 213°/15 mm., 172–4°/2 mm. Very sol. pet. ether.

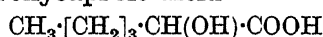
Lactone: m.p. 6°. B.p. 113–15°/15 mm. D₄³⁵ 0.9926. n_D³⁵ 1.4655.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 474.

Lycan, Adams, *J. Am. Chem. Soc.*, 1929, 51, 628.

Chuit, Boelsing, Hausser, Malet, *Helv. Chim. Acta*, 1926, 9, 1074.

Grün, Wirth, *Ber.*, 1922, 55, 2211.

1-Hydroxycaproic Acid

C₆H₁₂O₃ MW, 132

l.

Prisms from Et₂O. M.p. 60°. $[\alpha]_D^{20} - 4.68^\circ$ in EtOH. Very sol. H₂O, EtOH, Et₂O, CHCl₃.

dl.

Prisms from Et₂O. M.p. 60° (60–2°). Very sol. H₂O, EtOH, Et₂O, CHCl₃.

Amide: C₆H₁₃O₂N. MW, 131. M.p. 140–2°. Very sol. EtOH, boiling H₂O. Spar. sol. cold H₂O.

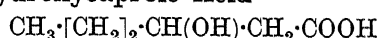
Et ether: 1-ethoxycaproic acid. C₈H₁₆O₃. MW, 160. B.p. 124–5°/10 mm. *Et ester*: C₁₀H₂₀O₃. MW, 188. B.p. 93°/16 mm., 87–9°/13 mm. *Chloride*: C₈H₁₅O₂Cl. MW, 178.5. B.p. 69°/9 mm. *Amide*: C₈H₁₇O₂N. MW, 159. Plates from pet. ether. M.p. 78°.

Acetyl: b.p. 90–5°/6 mm.

Aberhalden, Weil, *Z. physiol. Chem.*, 1913, 84, 50.

Blaise, Picard, *Ann. chim.*, 1912, 26, 282.

Marvel, MacCorquodale, Kendall, Lazier, *J. Am. Chem. Soc.*, 1924, 46, 2840.

2-Hydroxycaproic Acid

C₆H₁₂O₃ MW, 132

M.p. 13°. Very sol. H₂O. Boil with NaOH → 2-propylacrylic acid. Ba and Ag salts sol. H₂O.

Et ester: C₈H₁₆O₃. MW, 160. B.p. 95–8°/12 mm.

Fittig, Baker, *Ann.*, 1894, 283, 124.

3-Hydroxycaproic Acid



$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Free acid not isolated : reverts to lactone.

NH_4 salt : cryst. M.p. 90° decomp.

Ag salt : colourless needles.

Ca salt : glassy solid.

Me ester : $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. $115.5\text{--}116^\circ/16$ mm. D_4^{20} 1.0160. $n_D^{24.4}$ 1.4326.

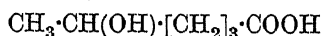
Amide : $\text{C}_6\text{H}_{13}\text{O}_2\text{N}$. MW, 131. Prisms from CHCl_3 . M.p. 74° .

Lactone : see 3-Caprolactone.

Fittig, Dubois, *Ann.*, 1890, 256, 152.

Fittig, Hjelt, *Ann.*, 1881, 208, 68.

4-Hydroxycaproic Acid



$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Free acid passes immediately into the lactone.

Ag salt : cryst. from H_2O .

Ba salt : amorph. Very sol. H_2O . Sol. boiling EtOH.

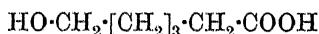
S-Benzylthiuronium salt : m.p. $128\text{--}9^\circ$.

Et ester : $\text{C}_8\text{H}_{16}\text{O}_3$. MW, 160. B.p. $94\text{--}5^\circ/2$ mm. D_{25}^{25} 0.9832. n_D^{25} 1.4315.

Lactone : see 4-Caprolactone.

Lease, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 807.

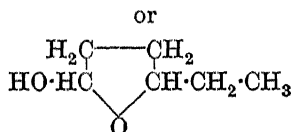
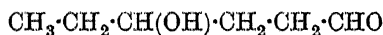
5-Hydroxycaproic Acid



$\text{C}_6\text{H}_{12}\text{O}_3$ MW, 132

Et ester : b.p. $134^\circ/15$ mm. Phenylurethane : m.p. $50\text{--}1^\circ$.

Robinson, Smith, *J. Chem. Soc.*, 1937, 371.

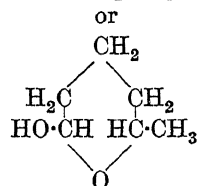
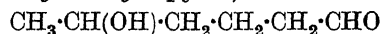
3-Hydroxy-*n*-caproic Aldehyde (5-Hydroxy-2-ethyltetrahydrofuran)

$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

Exists in both cyclic and acyclic forms. B.p. $77\text{--}80^\circ/11$ mm. D_4^{18} 1.004. n_D^{18} 1.4368. Misc. with most org. solvents. Spar. sol. H_2O . Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Sol. conc. H_2SO_4 to red sol.

Me ether : 5-methoxy-2-ethyltetrahydrofuran, semi-acetal of 3-hydroxy-*n*-caproic aldehyde. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. $139\text{--}45^\circ$. D_4^{18} 0.9225. n_D^{18} 1.4164.

Helferich, *Ber.*, 1919, 52, 1811.

4-Hydroxy-*n*-caproic Aldehyde (6-Hydroxy-2-methyltetrahydropyran)

$\text{C}_6\text{H}_{12}\text{O}_2$ MW, 116

Exists in both cyclic and acyclic forms. B.p. $71\text{--}8^\circ/11$ mm. D_4^{18} 1.0065. n_D^{18} 1.4452. Misc. with most org. solvents. Spar. sol. H_2O . Reduces Fehling's and $\text{NH}_3 \cdot \text{AgNO}_3$. Ox. \rightarrow 4-hydroxy-*n*-caproic acid.

Me ether : 6-methoxy-2-methyltetrahydropyran, semi-acetal of 4-hydroxy-*n*-caproic aldehyde. $\text{C}_7\text{H}_{14}\text{O}_2$. MW, 130. B.p. $71\text{--}6^\circ/110$ mm. D_4^{18} 0.9232. n_D^{18} 1.4211.

p-Bromophenylhydrazone : m.p. 85° .

Helferich, Malkomes, *Ber.*, 1922, 55, 706.

1-Hydroxycaprylic Acid



$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Plates. M.p. 69.5° . Very sol. EtOH, Et₂O. Spar. sol. H_2O . $k = 1.55 \times 10^{-4}$.

Et ester : $\text{C}_{10}\text{H}_{20}\text{O}_3$. MW, 188. B.p. $229\text{--}30^\circ/715$ mm., $130^\circ/20$ mm.

Phenacyl ester : m.p. 56° .

p-Bromophenacyl ester : m.p. $95\text{--}6^\circ$.

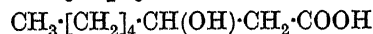
Amide : $\text{C}_8\text{H}_{17}\text{O}_2\text{N}$. MW, 159. Plates. M.p. 150° .

Nitrile : heptaldehyde cyanhydrin. $\text{C}_8\text{H}_{15}\text{ON}$. MW, 141. M.p. -10° . B.p. $143.5\text{--}144^\circ/19$ mm. D^{17} 0.9048.

Erlenmeyer, Sigel, *Ann.*, 1875, 177, 103.

Bösesken, *Rec. trav. chim.*, 1918, 37, 165.

2-Hydroxycaprylic Acid



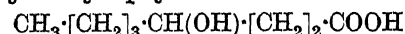
$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

M.p. $38\text{--}38.5^\circ$.

Et ester : b.p. $101\text{--}4^\circ/5$ mm.

Adickes, Andresen, *Ann.*, 1943, 555, 41.

3-Hydroxycaprylic Acid



$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Free acid passes immediately to the lactone.

Lactone : 3-caprylrolactone. $\text{C}_8\text{H}_{14}\text{O}_2$. MW, 142. B.p. $132\text{--}3^\circ/20$ mm. D_4^{19} 0.9796. n_D^{19} 1.4451.

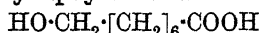
Blaise, Koehler, *Bull. soc. chim.*, 1910, 7, 414.

5-Hydroxycaprylic Acid



$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

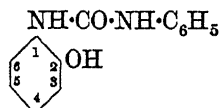
Viscous liq. Slow dist. in vacuo \rightarrow lactone.
 Lactone: 5-caprylactone. $C_8H_{14}O_2$. MW, 142. Colourless liq. B.p. 114–15°/10 mm.
 Blaise, Koehler, *Bull. soc. chim.*, 1910, 7, 413.

7-Hydroxycaprylic Acid

$C_8H_{16}O_3$ MW, 160
 Needles from H_2O . M.p. 58°. Very sol. C_6H_6 , EtOH. Sol. H_2O . Spar. sol. pet. ether.
Me ester: $C_9H_{18}O_3$. MW, 174. B.p. 137–8°/8 mm. D_{20}^{20} 0.992.
Acetyl: $C_{10}H_{18}O_4$. MW, 202. M.p. 9–10°. B.p. 155–8°/1.5 mm. D_{20}^{20} 1.042.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 466.

o-Hydroxycarbanilide (o-Hydroxy-sym.-di-phenylurea)



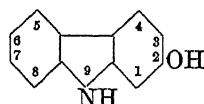
$C_{13}H_{12}O_2N_2$ MW, 228
 Cryst. M.p. 165–6°. Sol. H_2O , EtOH, Et₂O.
Et ether: $C_{15}H_{16}O_2N_2$. MW, 256. Needles from EtOH. M.p. 169–70°.

Leuckart, *J. prakt. Chem.*, 1890, 41, 327.

p-Hydroxycarbanilide (p-Hydroxy-sym.-di-phenylurea).

Needles from AcOH. M.p. 221°. Sol. hot EtOH. Spar. sol. hot H_2O , Et₂O, C_6H_6 .

Fischer, *Ber.*, 1900, 33, 1701 (Note).

2-Hydroxycarbazole

$C_{12}H_9ON$ MW, 183
 Leaflets. M.p. 276°. Sol. usual org. solvents.
Et ether: $C_{14}H_{13}ON$. MW, 211. M.p. 217°.
Acetyl deriv.: m.p. 188°.

Ballauf, Muth, Schmelzer, U.S.P., 1,807,682, (*Chem. Abstracts*, 1931, 25, 4412).

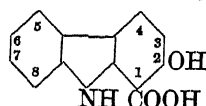
Ballauf, Schmelzer, U.S.P., 1,834,015, (*Chem. Abstracts*, 1932, 26, 1000).

3-Hydroxycarbazole.

Needles from xylene. M.p. 260–1°. Sol. EtOH, Et₂O, $CHCl_3$, C_6H_6 . Spar. sol. H_2O , ligroin.

Diacetyl: m.p. 113–14°.

Ruff, Stein, *Ber.*, 1901, 34, 1683.

2-Hydroxycarbazole-1-carboxylic Acid

$C_{13}H_9O_3N$ MW, 227

Cryst. M.p. 271–2°.

I.G., D.R.P., 512,234, (*Chem. Abstracts*, 1931, 25, 966).

1-Hydroxycarbazole-2-carboxylic Acid.

Cryst. M.p. 233–4°.

I.G., D.R.P., 512,234, (*Chem. Abstracts*, 1931, 25, 966).

2-Hydroxycarbazole-3-carboxylic Acid.

Cryst. M.p. 273–4°.

I.G., D.R.P., 512,234, (*Chem. Abstracts*, 1931, 25, 966).

Hydroxycarbostryl.

See Dihydroxyquinoline.

4-Hydroxy-3-carboxyazobenzene.

See 5-Benzeneazosalicylic Acid.

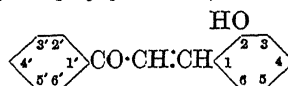
1-Hydroxy-2-carboxymethylhydrindene.

See 1-Hydroxyhydrindenyl-2-acetic Acid.

β-Hydroxy-β-carboxypropionoxysuccinic Acid.

See Malomalic Acid.

2-Hydroxychalkone (ω-Salicylideneacetophenone, ω-o-hydroxybenzylideneacetophenone, phenyl 2-hydroxystyryl ketone)



$C_{15}H_{12}O_2$ MW, 224
 Yellow plates from EtOH. M.p. 153–4°. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2 . $NaHg \rightarrow$ 3-[o-hydroxyphenyl]-1-phenylpropyl alcohol. $NaOH \rightarrow$ flavanone.

Me ether: phenyl o-methoxystyryl ketone. $C_{16}H_{14}O_2$. MW, 238. Yellow needles from pet. ether. M.p. 64–5°. Sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$. Spar. sol. ligroin. *Oxime*: m.p. 135–45°.
Acetyl: m.p. 68–9°.

Phenylhydrazone: m.p. 136°.

Harries, Busse, *Ber.*, 1896, 29, 378.

Löwenbein, *Ber.*, 1924, 57, 1515.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Bablich, Kostanecki, *Ber.*, 1896, 29, 235.

3-Hydroxychalkone (ω-m-Hydroxybenzylideneacetophenone, phenyl 3-hydroxystyryl ketone).

Plates from dil. EtOH. M.p. 159–60°. Sol. EtOH, C_6H_6 , $CHCl_3$. Spar. sol. CS_2 . $NaOH \rightarrow$ dark yellow col. Conc. $H_2SO_4 \rightarrow$ yellow col.

Me ether: phenyl m-methoxystyryl ketone. Yellow plates from MeOH. M.p. 65°. B.p. 247°/12 mm. Sol. org. solvents. Insol. H_2O . *Oxime*: m.p. 75–95°.

Et ether: phenyl m-ethoxystyryl ketone. $C_{17}H_{16}O_2$. MW, 252. Prisms from EtOH. M.p. 75°.

Acetyl: m.p. 102–3°.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Bablich, Kostanecki, *Ber.*, 1896, 29, 235.

Bauer, Vogel, *J. prakt. Chem.*, 1913, 88, 334.

4-Hydroxychalkone (ω -*p*-Hydroxybenzylideneacetophenone, phenyl 4-hydroxystyryl ketone).

Yellow cryst. from C_6H_6 . M.p. 182–3°. Dil. NaOH \rightarrow yellow col. Conc. $H_2SO_4 \rightarrow$ orange col. KOH \rightarrow acetophenone + 4-hydroxybenzaldehyde.

Me ether: see Anisylideneacetophenone.

Et ether: phenyl *p*-ethoxystyryl ketone. Dark yellow plates. M.p. 63°.

Acetyl: m.p. 129–31°.

Skriner, Kurosawa, *J. Am. Chem. Soc.*, 1930, 52, 2538.

Kostanecki, Schneider, *Ber.*, 1896, 29, 1892.

2'-Hydroxychalkone (2-Hydroxy- ω -benzylideneacetophenone, *o*-hydroxyphenyl styryl ketone, β -salicyloylstyrene).

Yellow needles from EtOH. M.p. 88–9°. EtOH + dil. HCl \rightarrow 4-ketoflavan.

Me ether: *o*-methoxyphenyl styryl ketone. $C_{16}H_{14}O_2$. MW, 238. Yellow oil. B.p. 226°/11.5 mm. *Oxime*: m.p. 135–40°.

Acetyl: m.p. 51–2°.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Feuerstein, Kostanecki, *Ber.*, 1898, 31, 715.

3'-Hydroxychalkone (3-Hydroxy- ω -benzylideneacetophenone, *m*-hydroxyphenyl styryl ketone, β -*m*-hydroxybenzoylstyrene).

Plates from dil. EtOH. M.p. 126°. NaOH \rightarrow yellow col. Conc. $H_2SO_4 \rightarrow$ yellowish-red col.

Me ether: *m*-methoxyphenyl styryl ketone. M.p. 41–2°. B.p. 236–8°/12 mm. *Oxime*: m.p. 132–7°.

Acetyl: m.p. 101°.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Kostanecki, Tambor, *Ber.*, 1899, 32, 1924.

4'-Hydroxychalkone (4-Hydroxy- ω -benzylideneacetophenone, *p*-hydroxyphenyl styryl ketone, β -*p*-hydroxybenzoylstyrene).

Yellow needles from dil. EtOH. M.p. 172–3°. Dil. NaOH \rightarrow yellow col. Conc. $H_2SO_4 \rightarrow$ yellowish-red col. KOH \rightarrow benzoic acid + 4-hydroxyacetophenone.

Me ether: *p*-methoxyphenyl styryl ketone, β -anisoylstyrene. Needles. M.p. 107°. *Perchlorate*: m.p. 63–78°. *Oxime*: m.p. 140–2°.

Et ether: $C_{17}H_{16}O_2$. MW, 252. Needles from EtOH. M.p. 74–5°.

Phenyl ether: 4-cinnamoyldiphenyl ether. $C_{21}H_{16}O_2$. MW, 300. Plates. M.p. 85°. Sol. EtOH, Me_2CO , Et₂O. Spar. sol. ligroin.

Acetyl: m.p. 90°.

Glucoside: m.p. 195°.

Dilthey, *Ber.*, 1919, 52, 1203.

Skriner, Kurosawa, *J. Am. Chem. Soc.*, 1930, 52, 2539.

Auwers, Brink, *Ann.*, 1932, 493, 223.

Kostanecki, Tambor, *Ber.*, 1899, 32, 1924.

γ -Hydroxychalkone.

See Dibenzoylmethane.

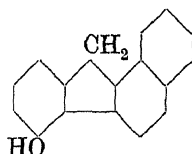
4-Hydroxy-3-chloromethylbenzoic Acid.

See α -Chloro-6-hydroxy-*m*-toluic Acid.

3-Hydroxycholanin Acid.

See Lithocholic Acid.

7-Hydroxychrysofluorene



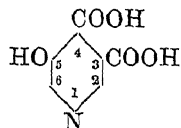
$C_{17}H_{12}O$

MW, 232

Needles from cyclohexane. M.p. 152–3°. Sublimes at 160°/0.5 mm. Spar. sol. NaOH. No cestrogenic action.

Richtzenhain, Miedrich, *Ber.*, 1948, 81, 92.

5-Hydroxycinchomeronic Acid



$C_7H_5O_5N$

MW, 183

Cryst. M.p. 243–4°. Hygroscopic.

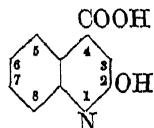
Reed, Shrive, *J. Am. Chem. Soc.*, 1946, 69, 2740.

6-Hydroxycinchomeronic Acid (2-Hydroxy-*pyridine*-4 : 5-dicarboxylic acid).

Rhomboheda from dil. HCl. M.p. 287–9°. Insol. H_2O , EtOH, Et₂O. No col. with $FeCl_3$. Ac_2O at 200° \rightarrow 2-hydroxynicotinic acid.

Weidel, Strache, *Monatsh.*, 1886, 7, 280.

2-Hydroxycinchoninic Acid (2-Hydroxyquinoline-4-carboxylic acid, carbostyryl-4-carboxylic acid)



$C_{10}H_7O_3N$

MW, 189

Needles from H_2O . M.p. 343° (anhyd.), 310° (monohydrate). Sol. boiling H_2O , EtOH, AcOH. Spar. sol. cold H_2O . $KMnO_4 \rightarrow$ oxalic acid + NH_3 .

Me ester: $C_{11}H_9O_3N$. MW, 203. Needles from H_2O . M.p. 242–3°.

Et ester: $C_{12}H_{11}O_3N$. MW, 217. Needles from EtOH.Aq. M.p. 206–7°.

Et ether: 2-ethoxyquinoline-4-carboxylic acid. $C_{12}H_{11}O_3N$. MW, 217. Needles from H_2O . M.p. 145–6°. Heat \rightarrow Et ester of parent acid.

Et ester: $C_{14}H_{15}O_3N$. MW, 245. Needles. M.p. 86°.

N-Me : m.p. 244°.

Borsche, Jacobs, *Ber.*, 1914, **47**, 359.
Königs, Koerner, *Ber.*, 1883, **16**, 2152.
Wojahn, *Arch. Pharm.*, 1931, **269**, 422.
Sugasawa, *J. Pharm. Soc. Japan*, 1937, **57**, 296.

6-Hydroxycinchoninic Acid (6-Hydroxyquinoline-4-carboxylic acid, xanthoquininic acid).

Plates from H₂O. M.p. 320° decomp. Very sol. AcOH, dil. HCl. Spar. sol. most org. solvents. FeCl₃ → blood red col.

Et ester : m.p. 185.5°.

Amide : C₁₀H₈O₂N₂. MW, 188. Needles from MeOH. M.p. 264°. N-Di-Et : cryst. from MeOH. M.p. 119°.

Chloride : C₁₀H₆O₂NCl. MW, 207.5. Orange cryst. M.p. 158° decomp.

Me ether : see Quininic Acid.

Et ether : 6-ethoxyquinoline-4-carboxylic acid. Yellow needles from propyl alcohol. M.p. 278°.

Methochloride : yellow plates. M.p. 295°.

Methiodide : orange-yellow needles from EtOH. M.p. 302°.

Claus, Brandt, *Ann.*, 1894, **282**, 93.

John, *J. prakt. chem.*, 1930, **128**, 194.

7-Hydroxycinchoninic Acid (7-Hydroxyquinoline-4-carboxylic acid).

Me ether : 7-methoxyquinoline-4-carboxylic acid. C₁₁H₉O₃N. MW, 203. M.p. 273°. Sublimes readily in high vacuum at 160°. *Nitrile* : 7-hydroxy-4-cyanoquinoline. C₁₁H₈ON₂. MW, 184. Cryst. from EtOH.Aq. M.p. 153-4°.

Späth, Brunner, *Ber.*, 1924, **57**, 1250.

8-Hydroxycinchoninic Acid (8-Hydroxyquinoline-4-carboxylic acid).

Bright yellow powder. M.p. 254-6°. Sol. hot EtOH, AcOH. Spar. sol. boiling H₂O, C₆H₆. 8-Acetyl : m.p. 220°.

Weidel, Cobenzl, *Monatsh.*, 1880, **1**, 867.

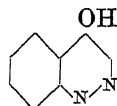
Hydroxycinnamaldehyde.

See Coumaraldehyde.

Hydroxycinnamic Acid.

See Coumaric Acid.

4-Hydroxycinnoline



C₈H₆O₂N MW, 148

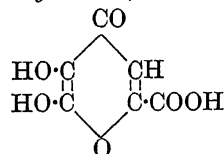
Leaflets or needles from AcOH or AcOH.Aq. M.p. 233.5-234°.

Acetyl : needles from EtOH.Aq. M.p. 127-8°.

Me ether : needles from Et₂O-pet. ether. M.p. 127-8°.

Schofield, Simpson, *J. Chem. Soc.*, 1945, **512**; 1948, 1170.

6-Hydroxycoumalic Acid (5:6-Dihydroxy-γ-pyrone-2-carboxylic acid)



C₆H₄O₆ MW, 172

Needles + 3H₂O from H₂O. M.p. 275°. Sol. H₂O, EtOH. Spar. sol. Et₂O. Insol. CHCl₃. FeCl₃ → intense violet col. NH₄OH at 150° → 4:5:6-trihydroxypicolinic acid.

Di-Me ether : 5:6-dimethoxy-γ-pyrone-2-carboxylic acid. C₈H₈O₆. MW, 200. Plates from H₂O. M.p. 242°. *Me ester* : C₉H₁₀O₆. MW, 214. Needles from MeOH. M.p. 97°.

Me ester : C₇H₆O₆. MW, 186. Needles from MeOH. M.p. 222°.

Et ester : C₈H₈O₆. MW, 200. Prisms from EtOH. M.p. 204°. *Diacetyl* : needles from EtOH. M.p. 75°.

Peratoner, Castellana, *Gazz. chim. ital.*, 1906, **36**, 4, 21.

Ost, *J. prakt. Chem.*, 1881, **23**, 441.

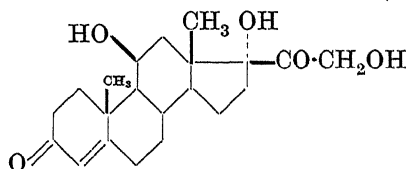
Tickle, Collie, *J. Chem. Soc.*, 1902, **81**, 1006.

Azzarello, *Atti accad. Lincei*, 1905, **14**, 163.

Hydroxyconiine.

See Conhydrine and ψ-Conhydrine.

17-Hydroxycorticosterone (Kendall's Compound F, Reichstein's Substance M)



C₂₁H₃₀O₅ MW, 362

Adrenal cortical hormone. Cryst. from isopropyl alcohol. M.p. 220°. [α]_D + 167°.

Reichstein, *Helv. Chim. Acta*, 1937, **20**, 953.

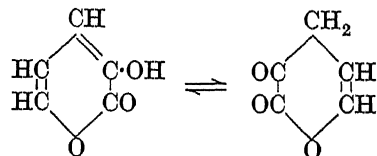
Mason, Hoehn, Kendall, *J. Biol. Chem.*, 1938, **124**, 459.

Steiger, Reichstein, *Helv. Chim. Acta*, 1937, **20**, 817.

von Euw, Reichstein, *Helv. Chim. Acta*, 1942, **25**, 988.

Wendler, Huang-Minlon, Tishler, *J. Am. Chem. Soc.*, 1951, **73**, 3818.

Hydroxycoumalin (3-Hydroxy-α-pyrone, isopyromucic acid)



C₅H₄O₃

MW, 112

M.p. (+ 2H₂O) 80–5°, anhyd. 95° (91°). B.p. 112°/20 mm. Sol. to 4.5% in H₂O at 0°. Sol. EtOH, Et₂O, CHCl₃, hot C₆H₆. Spar. sol. CS₂. Decomp. by dil. alkalis. Reduces Fehling's and NH₃.AgNO₃.

Me ether: 3-methoxy- α -pyrone. C₆H₈O₃. MW, 126. Colourless needles. M.p. 60°. B.p. 130–5°/20 mm. Sol. H₂O, EtOH. Mod. sol. Et₂O.

Et ether: 3-ethoxy- α -pyrone. C₇H₈O₃. MW, 140. M.p. 52°. Sol. H₂O, EtOH.

Benzyl ether: prisms. M.p. 71°. Insol. H₂O.

Anhydride: C₁₀H₆O₅. MW, 206. White needles from EtOH. M.p. 73°. B.p. 235° slight decomp.

Phenylhydrazone: needles. M.p. 77°.

Acetyl: cryst. M.p. 28°. B.p. 152°/20 mm. Sol. most org. solvents. Spar. sol. H₂O.

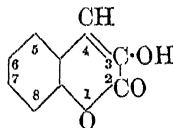
Benzoyl: prisms from EtOH. M.p. 85°. Sol. org. solvents. Spar. sol. H₂O.

Chavanne, *Bull. soc. chim.*, 1903, 29, 402; *Ann. chim.*, 1904, 3, 536.

α -Hydroxy-*p*-coumaric Acid.

See 4-Hydroxyphenylpyruvic Acid.

3-Hydroxycoumarin (α -Hydroxy-o-coumaric lactone)



C₉H₆O₃ MW, 162

Needles from EtOH or C₆H₆. M.p. 153°. Sol. H₂O and most org. solvents.

Me ether: 3-methoxycoumarin. C₁₀H₈O₃. MW, 176. Needles from EtOH. M.p. 162°.

Phenylhydrazone: yellow leaflets from EtOH. M.p. 173–4°.

Erlenmeyer, Stadlin, *Ann.*, 1904, 337, 292.

Plöchl, Wolfrum, *Ber.*, 1885, 18, 1185.

Heilbron, Hill, Walls, *J. Chem. Soc.*, 1931, 1702.

4-Hydroxycoumarin (Benzotetronic acid, β -hydroxy-o-coumaric lactone).

Needles from H₂O. M.p. 206° (232–3°). Very sol. EtOH, Et₂O, hot H₂O. FeCl₃ \rightarrow brown col.

Me ether: 4-methoxycoumarin. Colourless flakes from H₂O. M.p. 124°.

Et ether: C₁₁H₁₀O₃. MW, 190. Yellow plates from Et₂O. M.p. 136°. B.p. 174°/14 mm.

Acetyl: needles from C₆H₆. M.p. 103°.

Glucoside: C₁₅H₁₆O₈. MW, 224. M.p. 201–2°. [α]_D²⁵ –106° in MeOH. *Tetra-acetyl deriv.*: m.p. 178–9°. [α]_D²⁵ –63.2° in CHCl₃.

Anschütz, *Ann.*, 1909, 367, 196.

Heilbron, Hill, *J. Chem. Soc.*, 1927, 1707.

5-Hydroxycoumarin.

Cryst. M.p. 229° (221–3°). NaOH \rightarrow deep yellow col. FeCl₃ \rightarrow blue-violet col.

Me ether: m.p. 85–7°.

Acetyl: m.p. 88–9° (84°).

Shah, Shah, *J. Chem. Soc.*, 1938, 1832.

Böhme, *Ber.*, 1939, 72, 2130.

7-Hydroxycoumarin.

See Umbelliferone.

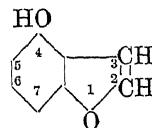
8-Hydroxycoumarin.

M.p. 160°. FeCl₃ \rightarrow blue-green col.

Acetyl: m.p. 131°.

Böhme, *Ber.*, 1939, 72, 2130.

4-Hydroxycoumarone (Karanjol)



C₈H₆O₂

MW, 134

M.p. 55–6° (58°).

Me ether: C₉H₈O₂. MW, 148. B.p. 220–2°.

Limaye, *Chem. Abstracts*, 1937, 31, 2206.

5-Hydroxycoumarone.

Me ether: C₉H₈O₂. MW, 148. B.p. 230–40°.

Stoermer, *Ann.*, 1900, 312, 335.

Dumont, Kostanecki, *Ber.*, 1909, 42, 913.

6-Hydroxycoumarone.

Me ether: b.p. 232–3°. D₄¹⁶ 1.1567. n_D¹⁸ 1.5664. Sol. EtOH, Et₂O. Insol. H₂O. Volatile in steam. Resinifies in conc. H₂SO₄. *Picrate*: m.p. 64–5°.

Et ether: C₁₀H₁₀O₂. MW, 162. Leaflets. M.p. 10°. B.p. 230°/10 mm. Sol. conc. H₂SO₄: addn. of FeCl₃ \rightarrow intense violet col.

Stoermer, *Ann.*, 1900, 312, 335.

Dumont, Kostanecki, *Ber.*, 1909, 42, 913.

ω -Hydroxycresol.

See Hydroxybenzyl Alcohol and Saligenin.

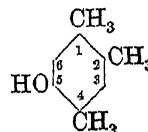
2-Hydroxycrotonic Acid.

See Acetoacetic Acid.

Hydroxycumene.

See Isopropylphenol.

5-Hydroxy- ψ -cumene (5-Hydroxy-1:2:4-trimethylbenzene, ψ -cumenol, 2:4:5-trimethylphenol)



C₉H₁₂O

MW, 136

Needles from H₂O. M.p. 70.5–71.5°. Sol. EtOH, Et₂O. Insol. cold H₂O. $k = 0.28 \times 10^{-10}$ at 25°.

Me ether: 2:4:5-trimethylanisole. C₁₀H₁₄O.

MW, 150. B.p. 213–14°.

Et ether: 2:4:5-trimethylphenetole. C₁₁H₁₆O. MW, 164. B.p. 223–4°.

Isoamyl ether: $C_{14}H_{22}O$. MW, 206. B.p. 265-6°.

Benzyl ether: $C_{16}H_{18}O$. MW, 226. Prisms from EtOH. M.p. 45°.

Acetyl: needles from pet. ether. M.p. 34-34.5°. B.p. 245-6°.

Hofmann, *Ber.*, 1884, 17, 1917.

Bamberger, Blangey, *Ann.*, 1911, 384, 307.

Auwers, Bundesmann, Wieners, *Ann.*, 1926, 447, 183.

6-Hydroxy- ψ -cumene (6-Hydroxy-1:2:4-trimethylbenzene, *iso- ψ -cumenol*, 2:3:5-trimethylphenol).

Needles from H_2O or pet. ether. M.p. 95-6°. B.p. 233°/760 mm.

Me ether: 2:3:5-trimethylanisole. B.p. 214-16°/755 mm.

Acetyl: b.p. 241°.

Benzoyl: prisms from pet. ether. M.p. 50°.

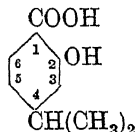
Phenylurethane: needles from pet. ether. M.p. 174°.

Auwers, Saurwein, *Ber.*, 1922, 55, 2388.

Auwers, Bundesmann, Wieners, *Ann.*, 1926, 447, 192.

Kruber, Schmitt, *Ber.*, 1931, 64, 2274.

2-Hydroxycuminic Acid (4-Isopropylsalicylic acid, *isohydroxycuminic acid*, *o-hydroxy-p-isopropylbenzoic acid*)



$C_{10}H_{12}O_3$ MW, 180

Needles from H_2O . M.p. 96-7°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . Volatile in steam. $FeCl_3 \rightarrow$ intense reddish-violet col. Dry dist. \rightarrow *m*-isopropylphenol.

Heymann, Koenigs, *Ber.*, 1886, 19, 3314.

Jacobsen, *Ber.*, 1878, 11, 1061.

3-Hydroxycuminic Acid (*m*-Hydroxy-*p*-isopropylbenzoic acid, *thymohydroxycuminic acid*).

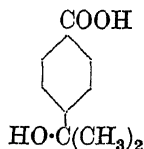
Prisms from H_2O . M.p. 141-3°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. H_2O . $KOH \rightarrow$ hydroxyterephthalic + *m*-hydroxybenzoic acids.

Et ester: $C_{12}H_{16}O_3$. MW, 208. Prisms from H_2O . M.p. 73-5°.

Barth, *Ber.*, 1878, 11, 1571.

Heymann, Koenigs, *Ber.*, 1886, 19, 3307.

α -Hydroxycuminic Acid (*p*- α -Hydroxyisopropylbenzoic acid)



$C_{10}H_{12}O_3$

MW, 180

Prisms from H_2O . M.p. 156-7°. Sol. EtOH, Et_2O . Spar. sol. H_2O . Ox. \rightarrow acetophenone + terephthalic acid. $Ac_2O \rightarrow$ *p*-isopropenylbenzoic acid.

Amide: $C_{10}H_{13}O_2N$. MW, 179. Needles from H_2O . M.p. 144-5°.

Nitrile: $C_{10}H_{11}ON$. MW, 161. Needles from pet. ether. M.p. 51-2°.

Meyer, *Ann.*, 1883, 219, 249.

Fileti, Abbona, *Gazz. chim. ital.*, 1891, 21, 400.

Hydroxycyclobutane.

See Cyclobutanol.

Hydroxycycloheptane.

See Cycloheptanol.

Hydroxycyclohexanone.

See Cyclohexanolone.

4-Hydroxycyclohexyl- α -alanine.

See Hexahydrotyrosine.

4-Hydroxycyclohexylethylamine.

See Hexahydrotyramine.

Hydroxycyclopentadecane.

See Cyclopentadecanol.

Hydroxycyclopentane.

See Cyclopentanol.

Hydroxycymene.

See Dimethyl-tolylcarbinol, Isopropylcresol, Carvacrol and Thymol.

Hydroxydecahydronaphthalene.

See Decahydronaphthol.

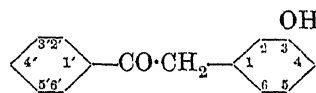
3-Hydroxydecane.

See Ethyl-*n*-heptylcarbinol.

17-Hydroxy-11-dehydrocorticosterone.

See Cortisone.

3-Hydroxydeoxybenzoin (*m*-Phenacylphenol, phenyl 3-hydroxybenzyl ketone, ω -benzoyl-*m*-cresol)



$C_{14}H_{12}O_2$

MW, 212

Cryst. M.p. 97-8°.

Linnel, Sharma, *Chem. Abstracts*, 1942, 36, 2546.

4-Hydroxydeoxybenzoin (*p*-Phenacylphenol, phenyl 4-hydroxybenzyl ketone, ω -benzoyl-*p*-cresol).

Cryst. from H_2O . M.p. 129° (137°).

Me ether: $C_{15}H_{14}O_2$. MW, 226. M.p. 98°.

Acetyl: plates. M.p. 87°.

Oxime: m.p. 121-2°.

Ney, *Ber.*, 1888, 21, 2449.

2'-Hydroxydeoxybenzoin (*o*-Hydroxyphenyl benzyl ketone, ω -salicyloyltoluene).

Plates from ligroin. M.p. 60°.

2 : 4-Dinitrophenylhydrazone : orange plates from AcOH. M.p. 219°.

Chadha, Mahal, Venkataraman, *J. Chem. Soc.*, 1933, 1461.

4'-Hydroxydeoxybenzoin (p-Hydroxyphenyl benzyl ketone).

Needles from EtOH.Aq., yellow cryst. from H₂O. M.p. 151° (142°). Sol. EtOH, Et₂O, AcOH, C₆H₆. Sol. 150 parts boiling H₂O.

Me ether : p-methoxyphenyl benzyl ketone, ω-anisoyltoluene. C₁₅H₁₄O₂. MW, 226. Needles from MeOH. M.p. 77-8°. B.p. 360°. *Oxime* : m.p. 111°.

Acetyl : cryst. M.p. 82°. Sol. Et₂O. Spar. sol. EtOH.

Oxime : cryst. M.p. 85°. Sol. Et₂O, AcOH. Spar. sol. EtOH.

2 : 4-Dinitrophenylhydrazone : orange plates from AcOH. M.p. 224°.

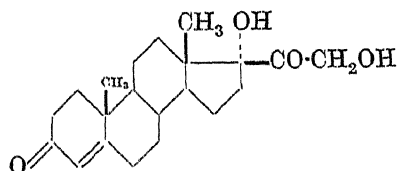
Chadha, Mahal, Venkataraman, *J. Chem. Soc.*, 1933, 1461.

Weisl, *Monatsh.*, 1905, 26, 984.

Meisenheimer, Jochelson, *Ann.*, 1907, 355, 291.

Ney, *Ber.*, 1888, 21, 2450.

17-Hydroxydeoxycorticosterone (*Reichstein's Substance S*)



C₂₁H₃₀O₄ MW, 346

Adrenal cortical hormone. Plates from Et₂O. M.p. 207-8°.

Acetyl : needles from Me₂CO. M.p. 235-8°. [α]_D + 114° (116°) in Me₂CO.

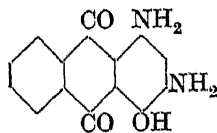
Reichstein, von Euw, *Helv. Chim. Acta*, 1938, 21, 1197.

Reichstein, Gätzi, *ibid.*, 1190.

Reichstein, von Euw, *Helv. Chim. Acta*, 1940, 23, 1114, 1258; 1941, 24, 1140.

Julian et al., *J. Am. Chem. Soc.*, 1950, 72, 5145.

4-Hydroxy-1 : 3-diaminoanthraquinone



C₁₄H₁₀O₃N₂ MW, 254

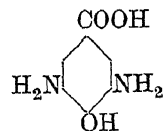
Dark red cryst. from AcOH. M.p. 266°.

Höchst, D.R.P., 183,332, (*Chem. Zentr.*, 1907, II, 765).

2-Hydroxy-3 : 5-diaminobenzoic Acid.

See 3 : 5-Diaminosalicylic Acid.

4-Hydroxy-3 : 5-diaminobenzoic Acid



C₇H₅O₃N₂ MW, 168

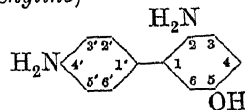
Brown plates. M.p. 205°. Oxidises rapidly in air.

B.HCl : needles. M.p. about 260° decomp. Very sol. H₂O.

Sulphate : prismatic needles. Sol. H₂O.

Reverdin, *Bull. soc. chim.*, 1908, 3, 593.

5-Hydroxy-2 : 4'-diaminodiphenyl (5-Hydroxydiphenylamine)



C₁₅H₁₂ON₂ MW, 200

Needles from C₆H₆. M.p. 148°. Sol. EtOH, Me₂CO, hot H₂O. Spar. sol. C₆H₆. Insol. Et₂O, ligroin.

Et ether : C₁₄H₁₀ON₂. MW, 228. Leaflets. M.p. 97°. Sol. EtOH, C₆H₆. 2 : 4'-N-Diacetyl : m.p. 191°.

2 : 4'-N-Diacetyl : m.p. 269°.

2 : 4'-N-Dibenzoyl : m.p. 221°.

Tribenzoyl deriv. : needles from EtOH. M.p. 177-8°.

Jacobson, Tigges, *Ann.*, 1898, 303, 344.

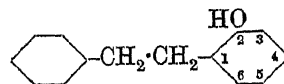
Hydroxy-4 : 4'-diaminodiphenyl.

See Hydroxybenzidine.

α-Hydroxy-4 : 4'-diaminotriphenylmethane.

See 4 : 4'-Diaminotriphenylcarbinol.

2-Hydroxydibenzyl (1-Phenyl-2-o-hydroxyphenylethane, ω-benzyl-o-cresol)



C₁₄H₁₄O MW, 198

White plates from EtOH.Aq. M.p. 81° (83-5°).

Me ether : C₁₅H₁₆O. MW, 212. Oil. B.p. 295°.

Kostanecki, Rost, Szabrawski, *Ber.*, 1905, 38, 943.

4-Hydroxydibenzyl (1-Phenyl-2-p-hydroxyphenylethane, ω-benzyl-p-cresol).

Plates from EtOH.Aq. M.p. 100-1°. Very sol. EtOH, C₆H₆. Spar. sol. ligroin, pet. ether.

Me ether : plates from EtOH. M.p. 61°.

Phenylurethane : plates from EtOH or ligroin. M.p. 150°.

Stoermer, Kippe, *Ber.*, 1903, 36, 4009.

Freund, Remse, *Ber.*, 1890, 23, 2865.

α -Hydroxydibenzyl.

See Phenylbenzylcarbinol.

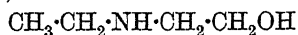
Hydroxy-dibenzylacetic Acid.

See Dibenzylglycollic Acid.

Hydroxydiethoxypropane.

See under Glycerol and Hydroxyacetone.

2-Hydroxydiethylamine (N-Ethylethanolamine, 2-ethylaminoethyl alcohol, ethyl-hydroxyethyl-amine)



$\text{C}_4\text{H}_{11}\text{ON}$ MW, 89

Oil. B.p. 169–70°. D_4^{20} 0.914. n_D^{20} 1.444. Sol. H_2O , EtOH, Et₂O. Spar. volatile in steam. Fumes in air.

B.HCl: needles. Hygroscopic.

$\text{B}_2\text{H}_2\text{PtCl}_6$: orange-yellow cryst. from EtOH. M.p. about 146°. Very hygroscopic.

B_2HAuCl_4 : yellow needles from H_2O . M.p. 127°.

Picrate: prisms. M.p. 125–6°.

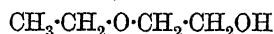
Schotte, Priewe, Roescheisen, *Z. physiol. Chem.*, 1928, 174, 144.

Knorr, Schmidt, *Ber.*, 1898, 31, 1073.

Hydroxydiethylaniline.

See Diethylaminophenol.

2-Hydroxydiethyl Ether (Ethyl 2-hydroxyethyl ether, ethylene glycol ethyl ether, 2-ethoxyethyl alcohol, ethyl cellosolve)



$\text{C}_4\text{H}_{10}\text{O}_2$ MW, 90

B.p. 134.8°/743 mm. D_{15}^{15} 0.93535. n_D^{20} 1.40797. Solvent for lacquers, etc.

Chlorocarbonyl: b.p. 67.2°/14 mm. D_4^{25} 1.1341. n_D^{25} 1.4163.

Carbamate: m.p. 62°.

Benzoyl: b.p. 260–1°/738.5 mm. D_{25}^{25} 1.0585. n_D^{25} 1.4969.

p-Nitrobenzoyl: b.p. 163.5–164.5°/4 mm. D_{25}^{25} 1.2086. n_D^{25} 1.5220.

p-Hydroxybenzoyl: b.p. 203°/3 mm.

Salicyloyl: b.p. 152°/10 mm. n_D^{25} 1.5157.

p-Toluenesulphonyl: m.p. 18.5°. B.p. 186–7°/3 mm., 122°/0.1 mm. n_D^{25} 1.5026.

3-Nitrophthaloyl: m.p. 118–19° (anhyd.), 94° (+1H₂O).

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.

Conn, Collett, Lazzell, *J. Am. Chem. Soc.*, 1932, 54, 4370.

I.G., D.R.P., 558,646, (*Chem. Abstracts*, 1933, 27, 512).

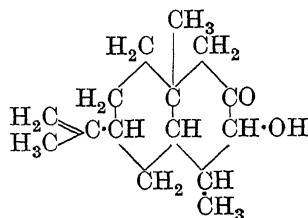
Carbide and Carbon Chemicals Corp., U.S.P., 1,732,356, (*Chem. Abstracts*, 1930, 24, 127).

Hydroxydifurylacetic Acid.

See Furilic Acid.

Hydroxydigitoxin.

See Gitoxinin.

2-Hydroxy-1 : 2-dihydroeremophilone

$\text{C}_{15}\text{H}_{24}\text{O}_2$

MW, 236

Constituent of oil of *Eremophila Mitchellii*. Prisms from MeOH. M.p. 102–3°. $[\alpha]_{5461}^{20} + 94^\circ$ in MeOH. Readily sol. most org. solvents except MeOH, EtOH. Insol. H_2O . Reduces Fehling's.

Diacetyl deriv.: prisms from MeOH. M.p. 69–70°.

3 : 5-Dinitrobenzoyl: needles from MeOH. M.p. 145–6° after sintering at 139–40°.

2 : 4-Dinitrophenylhydrazones: golden-yellow needles from EtOH. M.p. 239–41° decomp.

Bradfield, Penfold, Simonsen, *J. Chem. Soc.*, 1932, 2757.

4 - Hydroxy - 3 : 5 - dimethoxybenzaldehyde.

See Syringa-aldehyde.

4-Hydroxy-3 : 5-dimethoxybenzoic Acid.

See Syringic Acid.

3-Hydroxy-4 : 5-dimethoxybenzoic Acid.

See under Gallic Acid.

Hydroxydimethoxybenzyl Alcohol.

See Syringyl Alcohol.

Hydroxy-dimethoxy-coumarin.

See Fraxidin, Isofraxidin and Fraxinol.

Hydroxy-dimethoxy-phenylacetic Acid.

See Iridic Acid and Homosyringic Acid.

4-Hydroxy - 2 - [3 : 4 - dimethoxyphenyl - ethyl] - quinoline.

See Galipoline.

Hydroxydimethoxypropane.

See under Glycerol.

Hydroxydimethoxyquinolinealdehyde.See γ -Fagaric Aldehyde.**Hydroxydimethoxyquinolinecarboxylic Acid.**See γ -Fagaric Acid.**6-Hydroxy-7 : 8-dimethoxy-1 : 2 : 3 : 4-tetrahydroisoquinoline.**

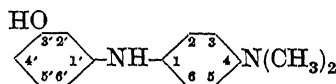
See Anhalamine.

3-Hydroxy-4 : 5-dimethoxytoluene.

See Iridol.

Hydroxydimethylacetylene.

See 2-Butyne-1-ol.

3'-Hydroxy-4-dimethylaminodiphenyl-amine

$\text{C}_{14}\text{H}_{16}\text{ON}_2$

MW, 228

4'-Hydroxy-4-dimethylaminodiphenyl-amine 749

Leaflets from H_2O . M.p. 99° . Very sol. EtOH, Et_2O , Me_2CO . Sol. CHCl_3 , C_6H_6 . Insol. cold H_2O , ligroin.

B.HCl: needles. M.p. 207° .

$\text{B}_2\text{H}_2\text{SO}_4$: prisms. M.p. 193° .

O : N-Diacetyl: needles. M.p. 101° . Very sol. EtOH, Et_2O , AcOEt, Me_2CO , C_6H_6 . Insol. ligroin.

O : N-Dibenzoyl: m.p. 112° . Very sol. EtOH, AcOEt, Me_2CO , C_6H_6 , toluene. Insol. Et_2O , ligroin.

Methiodide: needles. M.p. $199.5\text{--}200^\circ$. Very sol. EtOH, hot H_2O , Py. Insol. Et_2O , C_6H_6 .

Ethiodide: m.p. 180° . Very sol. EtOH, hot H_2O , CHCl_3 . Spar. sol. Et_2O , C_6H_6 .

N-Nitroso: needles. M.p. 125.5° .

Gnehm, Weber, *Ber.*, 1902, 35, 3087; *J. prakt. Chem.*, 1904, 69, 232.

4'-Hydroxy-4-dimethylaminodiphenyl-amine.

Prisms from C_6H_6 . M.p. $161\text{--}2^\circ$. Very sol. EtOH, Et_2O , AcOH, hot C_6H_6 . Spar. sol. H_2O .

O : N-Diacetyl: needles from EtOH.Aq. M.p. 131° . Very sol. EtOH, AcOEt, toluene. Spar. sol. Et_2O . Insol. H_2O .

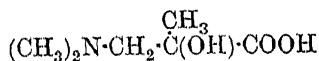
O : N-Dibenzoyl: plates from toluene. M.p. 210° . Sol. EtOH, C_6H_6 . Insol. Et_2O , H_2O , pet. ether.

Methiodide: needles from H_2O . M.p. 218° .

Ethiodide: needles. M.p. 206° .

Gnehm, Bots, *Ber.*, 1902, 35, 3086; *J. prakt. Chem.*, 1904, 69, 164.

1-Hydroxy-2-dimethylaminoisobutyric Acid



$\text{C}_6\text{H}_{13}\text{O}_3\text{N}$ MW, 147

Hygroscopic plates from EtOH- Me_2CO . M.p. 174° . Very sol. H_2O , EtOH. Spar. sol. Me_2CO . Insol. Et_2O . Neutral to litmus. Sweet taste.

Me ester: $\text{C}_7\text{H}_{15}\text{O}_3\text{N}$. MW, 161. B.p. $107\text{--}8^\circ/35\text{ mm.}$, $84^\circ/20\text{ mm.}$

Et ester: $\text{C}_8\text{H}_{17}\text{O}_3\text{N}$. MW, 175. B.p. $108^\circ/32\text{ mm.}$, $85^\circ/15\text{ mm.}$ Sol. H_2O and org. solvents.

Amide: $\text{C}_6\text{H}_{14}\text{O}_2\text{N}_2$. MW, 146. Needles. M.p. 102° . Very sol. H_2O , EtOH, hot Me_2CO . Spar. sol. C_6H_6 .

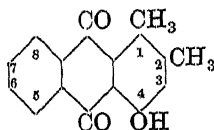
Benzoyl: cryst. from EtOH. M.p. 182° .

Fourneau, *Bull. soc. chim.*, 1909, 5, 237.

α -Hydroxy- β -dimethylaminopropyl-benzene.

See N-Methylephedrine.

4-Hydroxy-1:2-dimethylantraquinone



$\text{C}_{16}\text{H}_{12}\text{O}_3$

MW, 252

4-Hydroxy-2:5-dimethylazobenzene

Golden needles from Me_2CO . M.p. 169° .

Acetyl: yellow needles from EtOH. M.p. 154° .

Fairbourn, Gauntlett, *J. Chem. Soc.*, 1923, 123, 1139.

Fairbourn, Foster, *J. Chem. Soc.*, 1930, 1276.

4-Hydroxy-1:3-dimethylantraquinone.

Prismatic needles from AcOH. M.p. $173\text{--}5^\circ$.

Me ether: $\text{C}_{17}\text{H}_{14}\text{O}_3$. MW, 266. Cryst. from AcOH. M.p. $176\text{--}7^\circ$. Sol. AcOH. Spar. sol. EtOH, C_6H_6 .

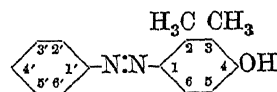
Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, 71, 1635.

5-Hydroxy-2:3-dimethylantraquinone.

Yellow cryst. M.p. 179° .

Fieser, Dunn, *J. Am. Chem. Soc.*, 1937, 59, 1016.

4-Hydroxy-2:3-dimethylazobenzene (6-Benzeneazo-o-3-xyleneol)



$\text{C}_{14}\text{H}_{14}\text{ON}_2$

MW, 226

Prisms from ligroin. M.p. $129\text{--}30^\circ$. Sol. most org. solvents.

Benzoyl: red needles from EtOH. M.p. $151\text{--}2^\circ$.

Auwers, Michaelis, *Ber.*, 1914, 47, 1293.

5-Hydroxy-2:4-dimethylazobenzene (6-Benzeneazo-m-4-xyleneol).

Orange-yellow needles from ligroin-pet. ether. M.p. 114° . Sol. MeOH, EtOH, Me_2CO , AcOH, C_6H_6 , hot ligroin.

Benzoyl: orange needles from EtOH. M.p. 115° . Sol. AcOH. Spar. sol. EtOH.

Bamberger, Reber, *Ber.*, 1907, 40, 2264.

4'-Hydroxy-2:4-dimethylazobenzene (p-4-m-Xyleneazophenol).

Brown prisms from C_6H_6 . M.p. 134° . Sol. EtOH, Et_2O .

Et ether: p-4-m-xyleneazophenetole. $\text{C}_{16}\text{H}_{18}\text{ON}_2$. MW, 254. Red needles from EtOH. M.p. 97° . Spar. sol. EtOH.

Jacobson, *Ann.*, 1895, 287, 211.

4-Hydroxy-2:5-dimethylazobenzene (5-Benzeneazo-p-2-xyleneol).

Orange-yellow prisms from ligroin. M.p. 92° . Sol. EtOH, AcOH, C_6H_6 . Spar. sol. ligroin, pet. ether.

Benzoyl: orange-yellow needles from ligroin. M.p. $136\text{--}7^\circ$.

Auwers, Michaelis, *Ber.*, 1914, 47, 1289.

4-Hydroxy-2 : 6-dimethylazobenzene (2-Benzeneazo-m-5-xyleneol).

Orange-yellow needles from ligroin. M.p. 104–5°. Sol. most org. solvents. Spar. sol. ligroin.

Benzoyl: red needles from MeOH. M.p. 94–5°. Spar. sol. cold MeOH.

Auwers, Michaelis, *Ber.*, 1914, 47, 1291.

2-Hydroxy-3 : 5-dimethylazobenzene (5-Benzeneazo-m-4-xyleneol).

Red needles from EtOH. M.p. 90° (175°). Sol. EtOH, Et₂O, AcOH, C₆H₆, ligroin.

Acetyl: yellow needles from ligroin. M.p. 68°.

Auwers, *Ann.*, 1909, 365, 291, 295.

4-Hydroxy-3 : 5-dimethylazobenzene (5-Benzeneazo-m-2-xyleneol).

Yellow needles from ligroin. M.p. 95–6°. Sol. most org. solvents.

Auwers, Markovits, *Ber.*, 1908, 41, 2340.

4-Hydroxy-2 : 2'-dimethylazobenzene (6-o-Tolueneazo-m-cresol).

Red cryst. + H₂O from H₂O. M.p. 83°: anhyd. cryst. from C₆H₆, m.p. 112°. Sol. EtOH, Et₂O, C₆H₆.

Et ether: C₁₆H₁₈ON₂. MW, 254. Deep red needles from EtOH. M.p. 64°. Sol. EtOH, Et₂O, C₆H₆, ligroin.

B, HCl: m.p. 157°.

Farmer, Hantzsch, *Ber.*, 1899, 32, 3099.

Jacobson *et al.*, *Ann.*, 1895, 287, 187.

4-Hydroxy-3 : 2'-dimethylazobenzene (5-o-Tolueneazo-o-cresol).

Red prisms from EtOH. M.p. 132°. Sol. EtOH, Et₂O, C₆H₆. Insol. H₂O.

Et ether: C₁₆H₁₈ON₂. MW, 254. Red cryst. from ligroin. M.p. 35–7°. Sol. EtOH. Spar. sol. Et₂O.

Noelting, Werner, *Ber.*, 1890, 23, 3259.

4-Hydroxy-2 : 3'-dimethylazobenzene (6-m-Tolueneazo-m-cresol).

Orange plates from C₆H₆. M.p. 106–7°. Sol. Et₂O, C₆H₆, ligroin. Spar. sol. EtOH.

Et ether: C₁₆H₁₈ON₂. MW, 254. Red prisms from EtOH. M.p. 73°. Sol. most org. solvents.

Jacobson *et al.*, *Ann.*, 1895, 287, 187.

4-Hydroxy-2 : 4'-dimethylazobenzene (6-p-Tolueneazo-m-cresol).

Prisms from C₆H₆. M.p. 135°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin.

Et ether: C₁₆H₁₈ON₂. MW, 254. Orange-red plates from EtOH. M.p. 64°. Sol. EtOH, Et₂O, C₆H₆, ligroin.

Jacobson *et al.*, *Ann.*, 1895, 287, 189.

4-Hydroxy-3 : 3'-dimethylazobenzene (5-m-Tolueneazo-o-cresol).

Golden needles from C₆H₆. M.p. 115°. Sol. EtOH, Et₂O, C₆H₆.

Et ether: C₁₆H₁₈ON₂. MW, 254. Reddish-yellow plates from EtOH. M.p. 46–7°. Sol. EtOH, Et₂O, C₆H₆.

Jacobson *et al.*, *Ann.*, 1895, 287, 185.

4-Hydroxy-3 : 4'-dimethylazobenzene (5-p-Tolueneazo-o-cresol).

Orange cryst. M.p. 163°. Sol. most org. solvents.

Et ether: C₁₆H₁₈ON₂. MW, 254. Orange-yellow needles. M.p. 73–4°. B.p. 251°/42 mm.

Noelting, Werner, *Ber.*, 1890, 23, 3261.

6-Hydroxy-3 : 4'-dimethylazobenzene (3-p-Tolueneazo-p-cresol).

Red cryst. from toluene. M.p. 112–13°. Sol. hot EtOH, Et₂O, CHCl₃. Spar. sol. cold EtOH.

Et ether: red needles from EtOH. M.p. 43°. B.p. 253–5°/63 mm.

Acetyl: yellow needles from AcOH. M.p. 91°.

Propionyl: dark red leaflets from ligroin. M.p. 62°. Sol. EtOH, C₆H₆. Spar. sol. EtOH, AcOH, ligroin.

Benzoyl: yellow needles from EtOH. M.p. 95°.

Noelting, Kohn, *Ber.*, 1884, 17, 354.

Jacobson, Piepenbrink, *Ber.*, 1894, 27, 2706.

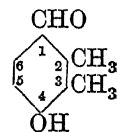
2-Hydroxy-4 : 4'-dimethylazobenzene (4-p-Tolueneazo-m-cresol).

Orange-red cryst. from ligroin. M.p. 148°. Sol. hot ligroin. Spar. sol. alkalis.

Et ether: m.p. 76°.

Benzoyl: orange needles from ligroin. M.p. 93°. Sol. cold EtOH, hot C₆H₆.

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, 33, 1531.

4-Hydroxy-2 : 3-dimethylbenzaldehyde (2 : 3-Dimethyl-p-hydroxybenzaldehyde, 3-hydroxy-6-aldehydo-o-xylene, 6-aldehydo-o-3-xyleneol)

C₉H₁₀O₂

MW, 150

Plates from toluene. M.p. 172°.

Azine: yellow needles from EtOH. M.p. 254°.

Phenylhydrazone: plates from EtOH.Aq. M.p. 165°.

Gattermann, *Ann.*, 1907, 357, 326.

6-Hydroxy-2 : 3-dimethylbenzaldehyde (5 : 6-Dimethyl-o-hydroxybenzaldehyde, 5 : 6-dimethylsalicylaldehyde, 4-hydroxy-3-aldehydo-o-xylene, 3-aldehydo-o-4-xyleneol).

Needles from pet. ether. M.p. 72°.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

6-Hydroxy-2 : 4-dimethylbenzaldehyde
(4 : 6-Dimethylsalicylaldehyde, 5-hydroxy-6-alde-
hydo-*m*-xylene, 4-aldehydo-*m*-5-xyleneol).

Needles from MeOH.Aq. M.p. 48-9°. Very
sol. most org. solvents. Sol. alkalis with yellow
col. Volatile in steam.

Me ether: $C_{10}H_{12}O_2$. MW, 164. Needles
from MeOH. M.p. 48-9°.

Oxime: needles from EtOH.Aq. M.p. 130°.

Semicarbazone: cryst. powder from AcOH.
M.p. 240°.

Phenylhydrazone: needles from pet. ether.
M.p. 126.5-127°.

Anil: yellow needles from MeOH. M.p.
88.5-89°.

Auwers, Saurwein, *Ber.*, 1922, 55, 2379.

Lindemann, Pickert, *Ann.*, 1927, 456, 280.

4-Hydroxy-2 : 5-dimethylbenzaldehyde
(2 : 5-Dimethyl-*p*-hydroxybenzaldehyde, 2-hydroxy-
5-aldehydo-*p*-xylene, 5-aldehydo-*p*-2-xyleneol).

Needles from H_2O . M.p. 132-3° (129-30°).

Benzyl ether: m.p. 74°.

Oxime: needles from H_2O . M.p. 155°.

Phenylhydrazone: plates from AcOH.Aq.
M.p. 164°.

Azine: yellow needles from EtOH. M.p. 280°
decomp.

Gattermann, *Ann.*, 1907, 357, 323.

Auwers, Winternitz, *Ber.*, 1902, 35, 470.

6-Hydroxy-2 : 5-dimethylbenzaldehyde
(3 : 6-Dimethylsalicylaldehyde, 2-hydroxy-3-alde-
hydo-*p*-xylene, 3-aldehydo-*p*-2-xyleneol).

Yellow needles. M.p. 62-3°.

Anselmino, *Ber.*, 1902, 35, 4108.

4-Hydroxy-2 : 6-dimethylbenzaldehyde
(2 : 6-Dimethyl-*p*-hydroxybenzaldehyde, 5-hydroxy-
2-aldehydo-*m*-xylene, 2-aldehydo-*m*-5-xyleneol).

Needles from EtOH. M.p. 189-90°.

Me ether: 2 : 6-dimethylanisaldehyde.
 $C_{10}H_{12}O_2$. MW, 164. Needles. M.p. 45-7°
(49.5-51.5°). B.p. 271-2°. *Oxime*: plates. M.p.
121.5°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. Oil. B.p.
279-80°. *Oxime*: needles from H_2O . M.p.
100°.

Oxime: plates from EtOH.Aq. M.p. 196°.

Azine: yellow needles from EtOH. M.p.
240°.

Gattermann, *Ann.*, 1907, 357, 328.

Auwers, Borsche, *Ber.*, 1915, 48, 1714.

6-Hydroxy-3 : 4-dimethylbenzaldehyde
(4 : 5-Dimethylsalicylaldehyde, 5-hydroxy-4-alde-
hydo-*o*-xylene, 5-aldehydo-*o*-4-xyleneol).

Cryst. from EtOH. M.p. 71°. Sol. alkalis
and most org. solvents.

Azine: yellow cryst. powder. M.p. 317°
decomp.

Phenylhydrazone: needles from EtOH.Aq.
M.p. 195°.

Auwers, *Ber.*, 1899, 32, 3598.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

Gattermann, *Ann.*, 1907, 357, 328.

2-Hydroxy-3 : 5-dimethylbenzaldehyde
(3 : 5-Dimethyl-*o*-hydroxybenzaldehyde, 3 : 5-di-
methylsalicylaldehyde, 4-hydroxy-5-aldehydo-*m*-
xylene, 5-aldehydo-*m*-4-xyleneol).

M.p. about 15°. B.p. 222°.

Oxime: needles. M.p. 138.5-139.5°.

Bamberger, Weiler, *J. prakt. Chem.*, 1898,
58, 351.

4-Hydroxy-3 : 5-dimethylbenzaldehyde
(3 : 5-Dimethyl-*p*-hydroxybenzaldehyde, 2-hydroxy-
5-aldehydo-*m*-xylene, 5-aldehydo-*m*-2-xyleneol, *p*-
hydroxymesitylenic aldehyde).

Leaflets. M.p. 115-16° (113.5-114°). Sol. hot
 H_2O , AcOH.

Benzoyl: m.p. 105°. *Phenylhydrazone*: m.p.
184°.

Me ether: 3 : 5-dimethylanisaldehyde.
 $C_{10}H_{12}O_2$. MW, 164. B.p. 257°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. B.p. 265.5°.

Oxime: needles. M.p. 169.5°. *Hydrochloride*:
m.p. 157°.

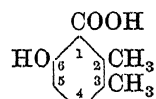
Phenylhydrazone: cryst. from MeOH.Aq.
M.p. 143°.

Azine: yellow needles. M.p. 262°.

Gattermann, *Ann.*, 1907, 357, 363.

Thiele, Eichwede, *Ann.*, 1900, 311, 367.

6-Hydroxy-2 : 3-dimethylbenzoic Acid
(5 : 6-Dimethylsalicylic acid, *o*-4-xyleneol-3-carb-
oxylic acid)



$C_9H_{10}O_3$ MW, 166

Needles from EtOH.Aq. M.p. 142-3°.

Clayton, *J. Chem. Soc.*, 1910, 97, 1405.

5-Hydroxy-2 : 4-dimethylbenzoic Acid
(*m*-4-Xyleneol-6-carboxylic acid).

Needles from toluene. M.p. 170-1°. Sol.
EtOH, AcOH, Me_2CO , hot toluene, hot C_6H_6 .
Insol. $CHCl_3$, pet. ether.

Acetyl: needles from Me_2CO -pet. ether. M.p.
134°.

Meldrum, Kapadia, *J. Indian Chem. Soc.*,
1932, 9, 490.

6-Hydroxy-2 : 4-dimethylbenzoic Acid
(4 : 6-Dimethylsalicylic acid, *m*-5-xyleneol-4-carb-
oxylic acid).

M.p. 166°.

Nitrile: 5-hydroxy-4-cyano-*m*-xylene.
 C_9H_8ON . MW, 147. Needles from H_2O . M.p.
177-8°. Very sol. MeOH, EtOH, AcOH. Spar-
sol. C_6H_6 . *Acetyl*: white cryst. M.p. 49-50°.

Me ether: $C_{10}H_{12}O_3$. MW, 180. Plates. M.p. 167.5–168°. Very sol. hot H_2O , EtOH. Spar. sol. C_6H_6 . Insol. ligroin. *Me ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 261–3°.

Bayer, D.R.P., 254,122, (*Chem. Zentr.*, 1913, I, 133).

Auwers, Saurwein, *Ber.*, 1922, 55, 2380.

4-Hydroxy-2 : 5-dimethylbenzoic Acid
(4-Hydroxyisoxyllic acid, p-2-xylenol-5-carboxylic acid).

Cryst. from H_2O . M.p. 182–4°.

Nitrile: 2-hydroxy-5-cyano-p-xylene. C_9H_9ON . MW, 147. Cryst. from $CHCl_3$. M.p. 163–5°.

Me ether: 2 : 5-dimethylanisic acid. $C_{10}H_{12}O_3$. MW, 180. Plates from 50% AcOH. M.p. 163–5°.

Houben, Fischer, *Ber.*, 1930, 63, 2461, 2469.

Clemon, Haworth, Walton, *J. Chem. Soc.*, 1929, 2377.

6-Hydroxy-2 : 5-dimethylbenzoic Acid
(6-Hydroxyisoxyllic acid, p-2-xylenol-3-carboxylic acid).

Silky needles from H_2O . M.p. 195°. Volatile in steam. Very sol. EtOH, Et_2O . $FeCl_3$ → bluish-violet col.

Stollé, Knebel, *Ber.*, 1921, 54, 1220.

4-Hydroxy-2 : 6-dimethylbenzoic Acid
(4-Hydroxy-m-xyllic acid, m-5-xylenol-2-carboxylic acid).

Plates from H_2O . M.p. 185° decomp. Very sol. EtOH. Spar. sol. C_6H_6 , $CHCl_3$. $FeCl_3$ → brown col.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Plates from EtOH. M.p. 98°.

Me ether nitrile: 2 : 6-dimethylanisonitrile. $C_{10}H_{11}ON$. MW, 161. M.p. 85–7°.

Rabe, Spence, *Ann.*, 1905, 342, 351.

Houben, Fischer, *Ber.*, 1930, 63, 2470.

5-Hydroxy-3 : 4-dimethylbenzoic Acid
(5-Hydroxy-o-xyllic acid, o-3-xylenol-5-carboxylic acid).

Plates from AcOH. M.p. 203–4°. Sublimes partially undecomp. Readily sol. EtOH, Et_2O . Mod. sol. AcOH, H_2O . Spar. sol. $CHCl_3$, pet. ether, CS_2 , C_6H_6 .

Me ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. from C_6H_6 . M.p. 148–9°.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Needles from pet. ether. M.p. 134–5°.

Acetyl: needles from C_6H_6 . M.p. 141–2°.

Me ether: cryst. from 50% EtOH. M.p. 170–1°.

Et ether: prismatic needles from MeOH. M.p. 173–4°. *Et ester*: prisms from MeOH.Aq. M.p. 50–1°.

Perkin, *J. Chem. Soc.*, 1899, 75, 187.

6-Hydroxy-3 : 4-dimethylbenzoic Acid
(4 : 5-Dimethylsalicylic acid, 6-hydroxy-o-xyllic acid, o-4-xylenol-5-carboxylic acid).

Prisms from EtOH.Aq. M.p. 199°. Very sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . Slightly volatile in steam. $FeCl_3$ → intense bluish-violet col.

Me ether: needles from MeOH. M.p. 142.5–143.5°. Very sol. EtOH, C_6H_6 . Sol. Et_2O , pet. ether. Spar. sol. ligroin.

Me ester: m.p. 33°. *Acetyl*: m.p. 74–5°.

Phenyl ester: m.p. 85°.

Acetyl: m.p. 122°.

Auwers, Risse, *Ber.*, 1931, 64, 2221.

Clayton, *J. Chem. Soc.*, 1910, 97, 1404.

Birkofer, *Z. physiol. Chem.*, 1939, 261, 87

2-Hydroxy-3 : 5-dimethylbenzoic Acid
(3 : 5-Dimethylsalicylic acid, 2-hydroxy-sym.-m-xyllic acid, m-4-xylenol-5-carboxylic acid).

Needles from EtOH.Aq. M.p. 179°. Very sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . Slightly volatile in steam. Sublimes in needles. $FeCl_3$ → blue col.

Jacobsen, *Ann.*, 1879, 195, 274 : *Ber.*, 1881, 14, 44.

4-Hydroxy-3 : 5-dimethylbenzoic Acid
(4-Hydroxymesitylenic acid, 4-hydroxy-sym.-m-xyllic acid, m-2-xylenol-5-carboxylic acid).

Needles from H_2O . M.p. 218° (223°). Sublimes. Very sol. EtOH, Et_2O . Insol. H_2O , $CHCl_3$.

Me ester: $C_{10}H_{12}O_3$. MW, 180. Needles from H_2O . M.p. 130°.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Prisms from EtOH. M.p. 113°.

Nitrile: 2-hydroxy-5-cyano-m-xylene. C_9H_9ON . MW, 147. Needles from ligroin. M.p. 126°. *Acetyl*: needles from ligroin. M.p. 98°.

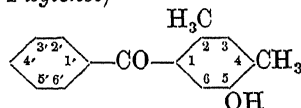
Thiele, Eichwede, *Ann.*, 1900, 311, 372.

Jacobsen, *Ber.*, 1879, 12, 606.

α-Hydroxydimethylbenzoic Acid.

See Hydroxymethyl-toluic Acid.

5-Hydroxy-2 : 4-dimethylbenzophenone
(Phenyl 5-hydroxy-2 : 4-dimethylphenyl ketone, 6-benzoyl-m-4-xylenol)



$C_{15}H_{14}O_2$

MW, 226

Colourless needles from C_6H_6 -ligroin. M.p. 140–1°. Very sol. Et_2O , EtOH, C_6H_6 . Spar. sol. ligroin.

Oxime: needles from C_6H_6 . M.p. 182–3°. Very sol. Et_2O , EtOH. Spar. sol. C_6H_6 , ligroin.

Me ether: $C_{16}H_{16}O_2$. MW, 240. Oil. B.p. 199–200°/12–13 mm. *Oximes*: (α) M.p. 138–9°, b.p. 218°/10 mm. (β) M.p. 119–20°.

4-Hydroxy-2 : 5-dimethylbenzophenone 753

Et ether : $C_{17}H_{18}O_2$. MW, 254. Oil. B.p. 190–1°/10 mm. *Oximes* : (α) M.p. 148–9°. (β) M.p. 133–4°.

Meisenheimer, Hanssen, Wächterowitz, J. *prakt. Chem.*, 1928, 119, 325.

4-Hydroxy-2 : 5-dimethylbenzophenone
(*Phenyl 4-hydroxy-2 : 5-dimethylphenyl ketone*, 5-benzoyl-p-2-xyleneol).

Needles from C_6H_6 -ligroin. M.p. 166–7°. Very sol. Et_2O , $EtOH$, C_6H_6 . Spar. sol. ligroin. *Acetyl* : m.p. 62–62.5°.

Me ether : $C_{16}H_{16}O_2$. MW, 240. Needles from pet. ether. M.p. 60–1°. B.p. 202–4°/12–13 mm.

Meisenheimer, Hanssen, Wächterowitz, J. *prakt. Chem.*, 1928, 119, 342.

2-Hydroxy-3 : 5-dimethylbenzophenone
(*Phenyl 2-hydroxy-3 : 5-dimethylphenyl ketone*, 5-benzoyl-m-4-xyleneol).

Oil. B.p. 202°/20 mm.

Oxime : m.p. 153–4°.

Meisenheimer, Hanssen, Wächterowitz, J. *prakt. Chem.*, 1928, 119, 338.

4-Hydroxy-3 : 5-dimethylbenzophenone
(*Phenyl 4-hydroxy-3 : 5-dimethylphenyl ketone*, 5-benzoyl-m-2-xyleneol).

Plates from $AcOH$. Aq. M.p. 141–2°. Very sol. $EtOH$, $AcOH$. Spar. sol. C_6H_6 , ligroin.

Me ether : $C_{16}H_{16}O_2$. MW, 240. Cryst. M.p. 44°.

Auwers, Markovits, *Ber.*, 1908, 41, 2339.
Auwers, Janssen, *Ann.*, 1930, 483, 44.

2-Hydroxy-5 : 4'-dimethylbenzophenone
(*p-Tolyl 5-hydroxy-m-tolyl ketone*, 3-p-tolyl-p-cresol).

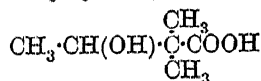
Yellow cryst. M.p. 90°.

Shriner, Moffett, *J. Am. Chem. Soc.*, 1941, 63, 1694.

3-Hydroxy-2 : 2-dimethylbutane.

See Methyl-tert.-butylcarbinol.

2-Hydroxy-1 : 1-dimethylbutyric Acid
(1 : 1 : 2-Trimethylhydracrylic acid)



$C_6H_{12}O_3$ MW, 132

Hygroscopic cryst. M.p. 34° (31°). B.p. 150°/22 mm., 148°/15 mm. $k = 2.2 \times 10^{-5}$. Very sol. H_2O , $EtOH$, Et_2O . Sol. hot ligroin.

Et ester : $C_8H_{16}O_3$. MW, 160. B.p. 194–5°, 93–4°/18 mm., 91°/13 mm. D_0 0.9974. Very sol. $EtOH$, Et_2O , C_6H_6 . Insol. H_2O . *Acetyl* : b.p. 110°/24 mm.

Anhydride : $C_{12}H_{22}O_5$. MW, 246. B.p. 200–3°/15 mm.

Lactone : $C_6H_{10}O_2$. MW, 114. B.p. 63–5°/14 mm.

Diet. of Org. Comp.—II.

3-Hydroxy-2 : 2-dimethylbutyric Acid

Acetyl : cryst. from pet. ether. M.p. 58°. B.p. 147°/12 mm.

Salkowski, *J. prakt. Chem.*, 1923, 106, 263.

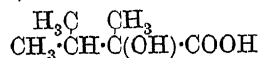
Courtot, *Bull. soc. chim.*, 1906, 35, 114.

Bouveault, *Bull. soc. chim.*, 1899, 21, 1063.

2'-Hydroxy-1 : 1-dimethylbutyric Acid.

See 1-Methyl-1-ethylhydracrylic Acid.

1-Hydroxy-1 : 2-dimethylbutyric Acid
(1 : 2 : 2-Trimethyl-lactic acid, 1-hydroxy-1-methyl-isovaleric acid)



$C_6H_{12}O_3$ MW, 132

Cryst. M.p. 75–7° (63°). Very sol. H_2O , $EtOH$, Et_2O . $k = 1.35 \times 10^{-4}$ at 25°.

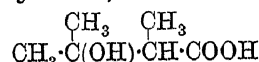
Nitrile : methyl isopropyl ketone cyanhydrin. $C_6H_{11}ON$. MW, 113. B.p. 182°/764 mm., 97°/19 mm. D_{18}^{20} 0.9249. n_D^{20} 1.42885. Sol. $EtOH$, Et_2O . Insol. H_2O . *Acetyl* : b.p. 212°/764 mm. D_{18}^{20} 0.9750. Insol. H_2O .

Perkin, *J. Chem. Soc.*, 1896, 69, 1486.

Pomeranz, *Monatsh.*, 1897, 18, 577.

Henry, *Chem. Zentr.*, 1899, I, 195.

2-Hydroxy-1 : 2-dimethylbutyric Acid
(2-Hydroxy-1-methylisovaleric acid, 1 : 2 : 2-trimethylhydracrylic acid)



$C_6H_{12}O_3$ MW, 132

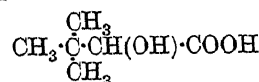
Oil. Decomp. on boiling to trimethylacrylic acid. $k = 3.33 \times 10^{-5}$.

Et ester : $C_8H_{16}O_3$. MW, 160. B.p. 189–189.5°/746 mm., 105°/30 mm.

Perkin, Thorpe, *J. Chem. Soc.*, 1896, 69, 1482.

Ewan, *J. Chem. Soc.*, 1896, 69, 1483.

1-Hydroxy-2 : 2-dimethylbutyric Acid
(2 : 2 : 2-Trimethyl-lactic acid, 1-hydroxy-2 : 2 : 2-trimethylpropionic acid)

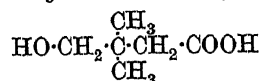


$C_6H_{12}O_3$ MW, 132

Cryst. from H_2O . M.p. 87–8°. Very sol. H_2O , Et_2O .

Glücksman, *Monatsh.*, 1889, 10, 779; 1891, 12, 356.

3-Hydroxy-2 : 2-dimethylbutyric Acid
(2-Hydroxymethyl-isovaleric acid)



$C_6H_{12}O_3$ MW, 132

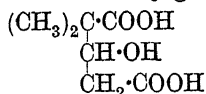
Lactone: $C_6H_{10}O_2$. MW, 114. Cryst. mass. M.p. 55–7°. B.p. 207–8°. Volatile in steam.

Windaus, Klanhardt, *Ber.*, 1921, 54, 587.

Hydroxy-dimethylcyclohexane.

See Dimethylcyclohexanol.

2-Hydroxy-1 : 1-dimethylglutaric Acid

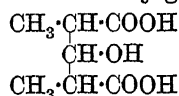


$C_7H_{12}O_5$ MW, 176

Prisms from H_2O . M.p. 158–60°. Very sol. H_2O , EtOH. Spar. sol. Et_2O , ligroin, C_6H_6 .

Perkin, Smith, *J. Chem. Soc.*, 1903, 83, 12.

2-Hydroxy-1 : 3-dimethylglutaric Acid



$C_7H_{12}O_5$ MW, 176

Exists in two forms, solid and liquid.

Solid form:

Needles from Me_2CO . M.p. 136–7°. Very sol. H_2O , Et_2O , EtOH, Me_2CO , AcOH, formic acid. Spar. sol. CS_2 , $CHCl_3$, pet. ether, C_6H_6 . $k = 1.08 \times 10^{-4}$ at 25°.

Acetyl: m.p. 120–1°. Sol. Et_2O , $CHCl_3$. Insol. ligroin. $k = 2 \times 10^{-4}$ at 25°.

Et ester: $C_9H_{16}O_5$. MW, 204. Oil. B.p. 270–1°.

Anhydride: $C_7H_{10}O_4$. MW, 158. M.p. 109–10°.

Liquid form:

Acetyl: cryst. M.p. 82.5–83.5°.

Reformatski, *Chem. Zentr.*, 1898, II, 886.

Hydroxydimethylheptane.

See Dimethylheptanol, Di-isobutylcarbinol and Di-sec-butylcarbinol.

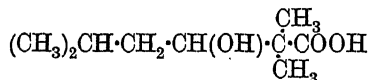
Hydroxydimethylhexahydrobenzoic Acid.

See Dimethylcyclohexanol-carboxylic Acid.

Hydroxydimethylhexane.

See Dimethylhexanol and Dimethyl-n-hexyl Alcohol.

2-Hydroxy-1 : 1-dimethylisoamylacetic Acid (2-Hydroxy-1 : 1 : 4-trimethylcaproic acid, 2-hydroxy-1 : 1-dimethylisoheptylic acid)



$C_9H_{18}O_3$ MW, 174

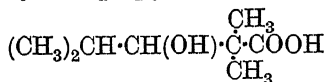
Leaflets from H_2O . M.p. 81°. Sol. EtOH, Et_2O . $k = 1.47 \times 10^{-5}$ at 25°. Dist. with dil. $H_2SO_4 \rightarrow$ lactone.

Et ester: $C_{11}H_{22}O_3$. MW, 202. Oil. B.p. 173–5°/140–5 mm.

Lactone: $C_9H_{16}O_2$. MW, 156. B.p. 221–2°/742 mm.

Coucoulesco, *Chem. Zentr.*, 1924, I, 1354.

2-Hydroxy-1 : 1-dimethylisocaproic Acid (2-Hydroxy-1 : 1 : 3-trimethyl-n-valeric acid, 1 : 1-dimethyl-2-isopropylhydracrylic acid)



$C_8H_{16}O_3$ MW, 160

Cryst. M.p. 92°. Very sol. EtOH. Sol. Et_2O . Sol. to 2.03% in H_2O at 19°. $k = 2.2 \times 10^{-5}$ at 25°.

Et ester: $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. 221–2°/738.5 mm., 160°/140 mm.

Reformatski, *Ber.*, 1895, 28, 2842.

Franke, *Monatsh.*, 1896, 17, 675.

Franke, Kohn, *Monatsh.*, 1898, 19, 357.

2-Hydroxy-1 : 2-dimethylisocaproic Acid (2-Hydroxy-1 : 2 : 3-trimethyl-n-valeric acid, 1 : 2-dimethyl-2-isopropylhydracrylic acid)



$C_8H_{16}O_3$ MW, 160

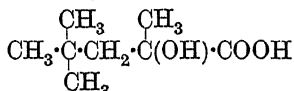
Syrup. B.p. 136–40°/9.5 mm. Spar. sol. H_2O .

Et ester: $C_{10}H_{20}O_3$. MW, 188. B.p. 90–93.5°/11.5 mm. $D_{17}^{25} 0.977$.

Lactone: $C_8H_{14}O_2$. MW, 142. Needles. M.p. 47.5°. B.p. 90.5–93°/10 mm.

Willstätter, Hatt, *Ann.*, 1919, 418, 148.

1-Hydroxy-1 : 3-dimethylisocaproic Acid (1-Hydroxy-1 : 3 : 3-trimethyl-n-valeric acid, 1-methyl-2-tert-butyl-lactic acid)

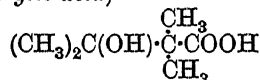


$C_8H_{16}O_3$ MW, 160

Needles or prisms. M.p. 117°. Distills above 300° with part. decomp. Very sol. EtOH, Et_2O . Sol. H_2O .

Butlerow, *Ber.*, 1882, 15, 1575.

2-Hydroxy-1 : 1-dimethylisovaleric Acid (2-Hydroxy-1 : 1 : 2-trimethylbutyric acid, tetramethylhydracrylic acid)



$C_7H_{14}O_3$ MW, 146

Cryst. from ligroin. M.p. 153° decomp. B.p. 192–3°. Very sol. H_2O , EtOH, Et_2O . $k = 4.35 \times 10^{-5}$ at 25°.

Et ester: $C_9H_{18}O_3$. MW, 174. B.p. 196–7°, 91°/17 mm. Very sol. EtOH, Et_2O . *Acetyl*: b.p. 119°/23 mm.

Reformatski, Plesconossow, *Ber.*, 1895, 28, 2839.

4-Hydroxy-2 : 6-dimethyloctane.

See 2 : 6-Dimethyloctanol-4.

Hydroxydimethylol- α -picoline.

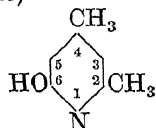
See Adermin.

3-Hydroxy-2 : 2-dimethylpentane.See Ethyl-*tert.*-butylcarbinol.**2-Hydroxy-1 : 1-dimethylpropionaldehyde.**

See Hydroxypivalic Aldehyde.

2-Hydroxy-1 : 1-dimethylpropionic Acid.

See Hydroxypivalic Acid.

6-Hydroxy-2 : 4-dimethylpyridine (4 : 6-Dimethyl- α -pyridone, ψ -lutidostyryl, 6-hydroxy- α - γ -lutidine, α -lutidone) C_7H_9ON

MW, 123

Cryst. from H_2O . M.p. 180° ($172-3^\circ$). Sublimes in needles. Very sol. EtOH, $CHCl_3$. Sol. hot H_2O . Spar. sol. cold H_2O , Et_2O , ligroin, C_6H_6 .

Knoevenagel, Cremer, *Ber.*, 1902, 35, 2395.

6-Hydroxy-2 : 5-dimethylpyridine (3 : 6-Dimethyl- α -pyridone, 6-hydroxy- $\alpha\beta'$ -lutidine).

Cryst. + $\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. 138° . Very sol. EtOH, H_2O . $FeCl_3 \rightarrow$ red-dish-violet col.

Errera, *Ber.*, 1901, 34, 3696.

4-Hydroxy-2 : 6-dimethylpyridine (2 : 6-Dimethyl- γ -pyridone, γ -lutidone, 4-hydroxy- $\alpha\alpha'$ -lutidine).

Cryst. from H_2O . M.p. $227-5-229^\circ$ (225°). B.p. $349-51^\circ$. Very sol. H_2O , EtOH. Spar. sol. Et_2O , $CHCl_3$, C_6H_6 . $FeCl_3 \rightarrow$ brownish-red col.

Me ether: $C_8H_{11}ON$. MW, 137. B.p. 203° . D_{15}^{25} 1.011.

Et ether: $C_9H_{13}ON$. MW, 151. B.p. 215° , $107-8^\circ/19$ mm. D_{25}^{25} 0.9822. n_D^{25} 1.5018. *Methiodide*: cryst. from H_2O . M.p. $195-6^\circ$. *Picrate*: m.p. $113-14^\circ$.

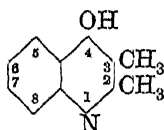
B_2, H_2PtCl_6 : plates from H_2O . M.p. $224-5^\circ$. *Methiodide*: prisms from H_2O . M.p. 242° .

Picrate: cryst. from EtOH. M.p. $219-20^\circ$.

Rassweiler, Adams, *J. Am. Chem. Soc.*, 1924, 46, 2763.

Hydroxydimethylpyrimidine.

See Dimethylpyrimidone.

4-Hydroxy-2 : 3-dimethylquinoline (4-Hydroxy-3-methylquinolinaldine) $C_{11}H_{11}ON$

MW, 173

Prisms + $1H_2O$ from H_2O . Sublimes at about 300° . M.p. 315° . Spar. sol. EtOH.

Conrad, Limpach, *Ber.*, 1891, 24, 2991.

Mander-Jones, Trikojus, *Chem. Abstracts*, 1933, 27, 1350.

5-Hydroxy-2 : 4-dimethylquinoline (5-Hydroxy-4-methylquinolinaldine).

Brown needles from EtOH. M.p. 200° .

Bülow, Issler, *Ber.*, 1903, 36, 4017.

6-Hydroxy-2 : 4-dimethylquinoline (6-Hydroxy-4-methylquinolinaldine).

Prisms from EtOH. M.p. 214° . Distills with decomp. at 360° . Very sol. Me_2CO . Sol. EtOH. Spar. sol. Et_2O . Insol. H_2O , C_6H_6 . Sol. dil. acids and alkalis. $FeCl_3 \rightarrow$ brown col.

B, HCl: yellow needles from EtOH. Sublimes. *Et ether*: $C_{13}H_{15}ON$. MW, 201. Cryst. from pet. ether. B.p. $314-16^\circ$.

B_2, H_2PtCl_6 : dark yellow needles. Decomp. above 110° . Spar. sol. H_2O , EtOH.

Picrate: yellow plates from EtOH. M.p. 225° decomp. Spar. sol. EtOH, Me_2CO , $CHCl_3$, C_6H_6 .

Engler, Bauer, *Ber.*, 1889, 22, 214.

Palkin, Harris, *Ind. Eng. Chem.*, 1922, 14, 704.

Clarke, Taylor, U.S.P., 1,701,144, (*Chem. Abstracts*, 1929, 23, 1420).

7-Hydroxy-2 : 4-dimethylquinoline (7-Hydroxy-4-methylquinolinaldine).

Needles from EtOH. M.p. 218° .

Bülow, Issler, *Ber.*, 1903, 36, 4016.

8-Hydroxy-2 : 4-dimethylquinoline (8-Hydroxy-4-methylquinolinaldine).

Prisms from Et_2O . M.p. 65° . B.p. 281° . Very sol. EtOH, Me_2CO . Sol. Et_2O , $CHCl_3$, C_6H_6 . Volatile in steam. Sublimes. Br in EtOH \rightarrow yellow cryst. ppt.

B, HCl: yellow plates from EtOH. Sublimes without melting. Very sol. H_2O . Insol. Et_2O .

Picrate: plates or prisms from EtOH. M.p. 207° . Spar. sol. EtOH, Me_2CO , C_6H_6 .

Engler, Bauer, *Ber.*, 1889, 22, 211.

4-Hydroxy-2 : 6-dimethylquinoline (4-Hydroxy-6-methylquinolinaldine, 4-hydroxy-*p*-toluquinolinaldine).

Cryst. + $1H_2O$ from H_2O . M.p. $274-5^\circ$ anhyd. $FeCl_3 \rightarrow$ brownish-red col.

B_2, H_2PtCl_6 : orange-yellow prisms from H_2O . M.p. 228° .

Conrad, Limpach, *Ber.*, 1888, 21, 525.

Geissman *et al.*, *J. Org. Chem.*, 1946, 11, 741.

4-Hydroxy-2 : 8-dimethylquinoline (4-Hydroxy-8-methylquinolinaldine, 4-hydroxy-*o*-toluquinolinaldine).

Plates + $1H_2O$ from H_2O . M.p. $260-1^\circ$ anhyd. Partly sublimes at m.p. Very sol. EtOH. Spar. sol. H_2O , Et_2O , $CHCl_3$, C_6H_6 .

$B_2H_2PtCl_6$: yellow needles. Decomp. at 250–70°. Very sol. H_2O , EtOH.

Conrad, Limpach, *Ber.*, 1888, 21, 524.

2-Hydroxy-3 : 4-dimethylquinoline (3 : 4-Dimethylcarbostyryl).

Cryst. from AcOH. M.p. 269–71° (266°, 262°). Spar. sol. hot NaOH.

Knorr, *Ann.*, 1888, 245, 359.

Camps, *Arch. Pharm.*, 1899, 237, 676.

2-Hydroxy-4 : 6-dimethylquinoline (4 : 6-Dimethylcarbostyryl).

Prisms from EtOH. M.p. 249–50°. Sol. hot EtOH. Spar. sol. H_2O , Et_2O , $CHCl_3$, ligroin, C_6H_6 . Sol. alkalis and dil. acids. Salts hyd. by H_2O .

Picrate: yellow needles. M.p. 188°.

Knorr, *Ann.*, 1888, 245, 365.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 110.

2-Hydroxy-4 : 7-dimethylquinoline (4 : 7-Dimethylcarbostyryl).

Cryst. from AcOH.Aq. M.p. 220°. Spar. sol. hot H_2O . Insol. cold H_2O . Salts hyd. by H_2O . *Chloroplatinate*: yellow needles from HCl. M.p. 233–4°.

Picrate: yellow needles. M.p. 189–91°. sym.-*Trinitrobenzene add. comp.*: yellow needles. M.p. 213–14°.

Knorr, *Ann.*, 1888, 245, 370.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 109.

2-Hydroxy-4 : 8-dimethylquinoline (4 : 8-Dimethylcarbostyryl).

Plates from AcOH.Aq. M.p. 217–18°. Spar. sol. cold H_2O , more sol. hot. Salts hyd. by H_2O .

Picrate: yellow needles. M.p. 192–4°. sym.-*Trinitrobenzene add. comp.*: yellow needles. M.p. 199–200°.

Ewins, King, *J. Chem. Soc.*, 1913, 103, 107.

2-Hydroxy-6 : 8-dimethylquinoline.

See Cytisoline.

4-Hydroxy-6 : 8-dimethylquinoline (4-Hydroxy- β -cytisolidine).

Needles from H_2O . M.p. 219–21°.

Späth, *Monatsh.*, 1919, 40, 111.

5-Hydroxy-6 : 8-dimethylquinoline (5-Hydroxy- β -cytisolidine).

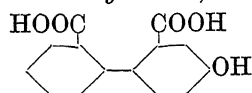
Plates from $CHCl_3$. M.p. 197–8°. Very sol. EtOH. Sol. hot H_2O , $CHCl_3$, C_6H_6 . Sublimes in needles.

Noelting, Trautmann, *Ber.*, 1890, 23, 3683.

α -Hydroxydinaphthylmethane.

See Dinaphthylcarbinol.

4-Hydroxydiphenic Acid (4-Hydroxydiphenyl-2 : 2'-dicarboxylic acid)



$C_{14}H_{10}O_5$ MW, 258

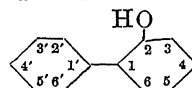
Prisms from H_2O . M.p. 245–6°. Very sol. EtOH, Et_2O . Sol. H_2O . Spar. sol. C_6H_6 .

Schmidt, Schall, *Ber.*, 1905, 38, 3770.

Hydroxydiphenoxypropane.

See under Glycerol.

2-Hydroxydiphenyl (o-Phenylphenol)



$C_{12}H_{10}O$ MW, 170

Needles from pet. ether. M.p. 56°. B.p. 275°, 145°/14 mm.

Me ether: $C_{13}H_{12}O$. MW, 184. Prisms from pet. ether. M.p. 29°. B.p. 274°.

Et ether: $C_{14}H_{14}O$. MW, 198. Prisms from pet. ether. M.p. 34°. B.p. 276°.

Phenyl ether: m.p. 49–5°.

Acetyl: needles from pet. ether. M.p. 62–3°. B.p. 164–5°/15 mm.

Benzenesulphonyl: m.p. 66–8°.

p-Toluenesulphonyl: m.p. 64–6°.

Hirsch, *Ber.*, 1890, 23, 3710.

Honigschmid, *Monatsh.*, 1901, 22, 566.

Späth, *Monatsh.*, 1914, 35, 328.

Auwers, Wittig, *J. prakt. Chem.*, 1924, 108, 105.

Gesellschaft für Teerverwertung, D.R.P., 492,064, (*Chem. Abstracts*, 1930, 24, 2475).

Finzi, *Gazz. chim. ital.*, 1931, 61, 41.

3-Hydroxydiphenyl (m-Phenylphenol).

Needles from H_2O or pet. ether. M.p. 78° (75°). Sol. EtOH, C_6H_6 . Spar. sol. H_2O , pet. ether. Volatile in steam.

Et ether: cryst. M.p. 34°. B.p. 305°. Sol. usual org. solvents.

Benzoyl: plates from EtOH. M.p. 60–1°.

Benzenesulphonyl: b.p. 273°/16 mm.

p-Toluenesulphonyl: m.p. 52–5°.

Jacobson, Loeb, *Ber.*, 1903, 36, 4085.

Errara, La Spada, *Gazz. chim. ital.*, 1905, 35, 552.

Jacobson, Franz, Hönigsberger, *Ber.*, 1903, 36, 4075.

4-Hydroxydiphenyl (p-Phenylphenol).

Needles or plates from EtOH.Aq. M.p. 164–5° (160–2°). B.p. 305–8°. Sol. EtOH, Et_2O , $CHCl_3$. Spar. sol. pet. ether. Spar. volatile in steam. Sublimes.

Me ether: $C_{13}H_{12}O$. MW, 184. Plates from EtOH. M.p. 90°.

Acetyl: plates from EtOH. M.p. 88–9°.

Butyryl: m.p. 59–60.5°.

Benzoyl: cryst. M.p. 121° (150°).

Benzenesulphonyl: m.p. 104–5°.

p-Toluenesulphonyl: plates from AcOH. M.p. 177°.

Hirsch, *Ber.*, 1890, 23, 3708.

Kaiser, *Ann.*, 1890, 257, 101.

Friebel, Rassow, *J. prakt. Chem.*, 1901, 63, 453.

Werner, Rekner, *Ann.*, 1902, 322, 167.

Raiford, Colbert, *J. Am. Chem. Soc.*, 1925, 47, 1456.

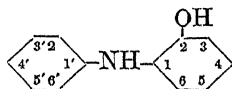
Bell, Kenyon, *J. Chem. Soc.*, 1926, 3049.

Finzi, *Gazz. chim. ital.*, 1931, 61, 38.

Booth, U.S.P., 1,925,367, (*Chem. Abstracts*, 1933, 27, 5342).

Rossi, *Chem. Abstracts*, 1946, 40, 6448.

2-Hydroxydiphenylamine (o-Anilinophenol)



$C_{12}H_{11}ON$

MW, 185

Prisms from H_2O . M.p. 69–70° (68°). B.p. 180–9°/20 mm. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O , C_6H_6 . Reduces Fehling's. $FeCl_3 \rightarrow$ blue-black col.

N-Acetyl: needles from pet. ether. M.p. 144–6°. Very sol. EtOH, Me_2CO , $CHCl_3$, AcOH, AcOEt. Spar. sol. pet. ether, Et_2O , CS_2 , C_6H_6 .

Me ether: *N*-phenyl-*o*-anisidine. $C_{13}H_{13}ON$. MW, 199. B.p. 325–6°/732 mm. (320–5°/730 mm.). Darkens in air. Misc. with EtOH, Et_2O .

Deninger, *J. prakt. Chem.*, 1894, 50, 89.

Gambarjan, *Ber.*, 1909, 42, 4012.

Ullmann, Kipper, *Ann.*, 1907, 355, 344.

Goldberg, D.R.P., 187,870, (*Chem. Zentr.*, 1907, II, 1465).

3-Hydroxydiphenylamine (m-Anilino-phenol).

Leaflets from H_2O . M.p. 81.5–82°. B.p. 340°. Very sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , ligroin. Sol. dil. acids and alkalis. Salts hyd. by cold H_2O .

O-Benzoyl: needles from EtOH. M.p. 125–5–126–5°. Very sol. Et_2O , C_6H_6 . Sol. EtOH, AcOH. Spar. sol. ligroin.

N-Benzoyl: cryst. from EtOH.Aq. M.p. 201°.

Calm, *Ber.*, 1883, 16, 2787.

Merz, Weith, *Ber.*, 1881, 14, 2345.

Auwers, *Ann.*, 1909, 364, 171 (*Note*).

4-Hydroxydiphenylamine (p-Anilino-phenol).

Leaflets from H_2O . M.p. 73°. B.p. 330°, 215–16°/12 mm. Very sol. EtOH, Et_2O , $CHCl_3$, warm C_6H_6 . Spar. sol. H_2O , ligroin.

O:N-Diacetyl: prisms from C_6H_6 -ligroin.

M.p. 120°. Very sol. EtOH, Et_2O , AcOH, hot C_6H_6 .

O-Benzoyl: yellowish-white plates from ligroin. M.p. 114–15°.

O:N-Dibenzoyl: yellow prisms from EtOH. M.p. 175°. Sol. Et_2O , AcOH, C_6H_6 . Spar. sol. cold EtOH.

p-Toluenesulphonyl: plates from EtOH. M.p. 126–5°. Sol. $CHCl_3$, C_6H_6 . Spar. sol. EtOH, AcOH, petrol.

Me ether: *N*-phenyl-*p*-anisidine. $C_{13}H_{13}ON$. MW, 199. Prisms from EtOH. M.p. 105°. B.p. 195°/12 mm.

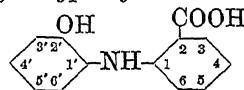
Et ether: *N*-phenyl-*p*-phenetidine. $C_{14}H_{15}ON$. MW, 213. Needles from ligroin. M.p. 73–4°. B.p. 348°. Very sol. Et_2O , C_6H_6 . Spar. sol. ligroin.

Philip, *Calm, Ber.*, 1884, 17, 2431.

Willstätter, Kubli, *Ber.*, 1909, 42, 4138.

Bradfield, Cooper, Orton, *J. Chem. Soc.*, 1927, 2856.

2'-Hydroxydiphenylamine-2-carboxylic Acid (N-o-Hydroxyphenylantranilic acid)



$C_{13}H_{11}O_3N$

MW, 329

Needles from EtOH.Aq. M.p. 190°. Sol. hot EtOH, hot C_6H_6 . Spar. sol. cold EtOH, cold C_6H_6 , ligroin. Insol. H_2O .

Me ether: $C_{14}H_{13}O_3N$. MW, 343. Needles from C_6H_6 . M.p. 176°. Sol. EtOH, AcOH. Spar. sol. C_6H_6 . Heat \rightarrow 2-methoxydiphenylamine. Conc. $H_2SO_4 \rightarrow$ 4-methoxyacridone.

Ullmann, Kipper, *Ann.*, 1907, 355, 342.

Sherlin et al., *J. Gen. Chem. U.S.S.R.*, 1938, 8, 884, (*Chem. Abstracts*, 1939, 33, 1330).

3'-Hydroxydiphenylamine-2-carboxylic Acid (N-m-Hydroxyphenylantranilic acid).

Me ether: needles from C_6H_6 -ligroin. M.p. 132°. Sol. EtOH, AcOH, C_6H_6 . Spar. sol. ligroin. Insol. H_2O .

Ullmann, Kipper, *Ann.*, 1907, 355, 342.

4'-Hydroxydiphenylamine-2-carboxylic Acid (N-p-Hydroxyphenylantranilic acid).

Me ether: *Me ester*, m.p. 53–5°.

Et ether: $C_{14}H_{15}O_3N$. MW, 345. Needles from AcOH.Aq. M.p. 209°. Sol. hot EtOH, AcOH, C_6H_6 . Insol. H_2O , ligroin.

Ullmann, Kipper, *Ann.*, 1907, 355, 344.

4-Hydroxydiphenylamine-3-carboxylic Acid (5-Anilinosalicic acid).

Needles from H_2O . M.p. 217–5°. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. Spar. sol. H_2O . $FeCl_3 \rightarrow$ violet col.

Dierbach, *Ann.*, 1893, 273, 120.

5-Hydroxydiphenylamine-3-carboxylic Acid

5-Hydroxydiphenylamine-3-carboxylic Acid.

M.p. 220°.

Anilide : m.p. 160-1°.

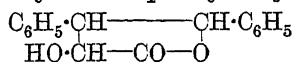
I.G., B.P. 355,114, (*Chem. Zentr.*, 1931, II, 3663).

3-Hydroxydiphenylamine-4-carboxylic Acid (4-Anilinosalicylic acid).

Cryst. from EtOH.Aq. M.p. 180-1°. Alc. FeCl₃ → red col.

Laska, Haller, D.R.P., 515,208, (*Chem. Zentr.*, 1931, I, 1828).

1-Hydroxy-2 : 3-diphenylbutyrolactone



C₁₆H₁₄O₃ MW, 254

Exists in four forms.

(i) Needles from CHCl₃-ligroin. M.p. 127°. Sol. hot EtOH, CHCl₃, C₆H₆. Spar. sol. H₂O, Et₂O, ligroin.

(ii) Cryst. from EtOH. M.p. 170°. Has same solubilities and chemical reactions as (i).

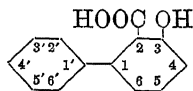
(iii) Cryst. powder from CHCl₃-ligroin. Sol. hot CHCl₃.

(iv) Needles from EtOH. M.p. 171°. Almost insol. CHCl₃.

Erlenmeyer, Lux, *Ber.*, 1898, 31, 2224.

Erlenmeyer, *Ber.*, 1905, 38, 3121.

3-Hydroxydiphenyl-2-carboxylic Acid (6-Hydroxy-2-phenylbenzoic acid, 6-phenylsalicylic acid)



C₁₃H₁₀O₃ MW, 214

Needles or plates from H₂O. M.p. 195°. Very sol. CHCl₃. Volatile in steam. FeCl₃ → violet col. H₂SO₄ → deep red. col.

Et ester : C₁₅H₁₄O₃. MW, 242. Plates from EtOH. M.p. 46-7°.

Heyl, *Ber.*, 1898, 31, 3034; *J. prakt. Chem.*, 1899, 59, 456.

5-Hydroxydiphenyl-2-carboxylic Acid (4-Hydroxy-2-phenylbenzoic acid).

Cryst. from H₂O. M.p. (+ 1H₂O) 123°, (anhyd.) 147°. Very sol. EtOH. Sol. pet. ether, C₆H₆. Spar. sol. cold H₂O.

Errera, La Spada, *Gazz. chim. ital.*, 1905, 35, 549.

6-Hydroxydiphenyl-2-carboxylic Acid (3-Hydroxy-2-phenylbenzoic acid).

Cryst. + 1H₂O from EtOH. M.p. anhyd. 154°. Very sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Me ester : C₁₄H₁₂O₃. MW, 228. Cryst. from Et₂O. M.p. 84-5°. Distils undecomp.

Et ester : C₁₅H₁₄O₃. MW, 242. Plates from Et₂O. M.p. 111°.

3-Hydroxydiphenyl-4 : 4'-dicarboxylic Acid

Me ether : needles from C₆H₆. M.p. 176-7°. Me ester : cryst. from pet. ether. M.p. 55-6°. Nitride : leaflets from EtOH. M.p. 86°.

Amide : C₁₃H₁₁O₂N. MW, 213. Needles from EtOH. M.p. 262-3°. Sol. hot EtOH. Spar. sol. H₂O, Et₂O, C₆H₆.

Graebe, Schestakow, *Ann.*, 1895, 284, 320.

2'-Hydroxydiphenyl-2-carboxylic Acid.

Passes immediately on formation into its lactone.

Lactone : dibenz- α -pyrone, 3 : 4-benzcoumarin. C₁₃H₈O₂. MW, 196. Needles from EtOH. M.p. 92.5°. Distils with slight decomp. Very sol. EtOH, Et₂O.

Richter, *J. prakt. Chem.*, 1883, 28, 294.

Graebe, Schestakow, *Ann.*, 1895, 284, 308, 317.

4'-Hydroxydiphenyl-2-carboxylic Acid.

Prisms from H₂O. M.p. 206.5° (205°). Sol. hot H₂O. Insol. C₆H₆.

Griess, *Ber.*, 1888, 21, 981.

Graebe, Schestakow, *Ann.*, 1895, 284, 317, 323.

2-Hydroxydiphenyl-3-carboxylic Acid (2-Hydroxy-3-phenylbenzoic acid, 3-phenylsalicylic acid).

M.p. 180°.

v. Heyden, D.R.P., 61,125.

4'-Hydroxydiphenyl-4-carboxylic Acid.

M.p. 293-4° (290°).

Me ester : m.p. 224-5°.

Me ether : m.p. 248-9°. Me ester : m.p. 172-3°.

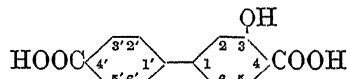
I.G., F.P., 735,846, (*Chem. Abstracts*, 1933, 27, 1001).

Fieser, Bradsher, *J. Am. Chem. Soc.*, 1936, 58, 1738.

4-Hydroxydiphenyl-2 : 2'-dicarboxylic Acid.

See 4-Hydroxydiphenic Acid.

3-Hydroxydiphenyl-4 : 4'-dicarboxylic Acid



C₁₄H₁₀O₅ MW, 258

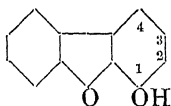
Needles from MeOH or AcOH. M.p. 324-5° decomp. Very sol. EtOH, AcOEt. Almost insol. CHCl₃, CS₂, C₆H₆.

4-Me ester : C₁₅H₁₂O₅. MW, 272. Needles from C₆H₆. M.p. 215-16°. Very sol. EtOH, Et₂O, CHCl₃.

4'-Me ester : plates from EtOH. M.p. 240-241.5° decomp. Very sol. MeOH, Et₂O, CHCl₃, C₆H₆.

Di-Me ester : C₁₆H₁₄O₅. MW, 286. Plates or needles from EtOH. M.p. 168°. Acetyl : needles from EtOH.Aq. M.p. 119°.

Mudrović, *Monatsh.*, 1913, 34, 1432.

1-Hydroxydiphenylene oxide (4-Dibenzfuranol)

$C_{12}H_8O_2$ MW, 184

Cryst. from pet. ether. M.p. 101–2°. $FeCl_3$ in EtOH \rightarrow green col.

Benzoyl: cryst. from EtOH. M.p. 91–2°.

Gilman, Young, *J. Am. Chem. Soc.*, 1935, 57, 1121.

2-Hydroxydiphenylene oxide (3-Dibenzfuranol).

Cryst. from dil. AcOH. M.p. 139–9.5°.

Tsuzuki, *Bull. Chem. Soc. Japan*, 1927, 2, 79.

Gilman, Bywater, Parker, *J. Am. Chem. Soc.*, 1935, 57, 885.

3-Hydroxydiphenylene oxide (2-Dibenzfuranol).

Cryst. from EtOH. M.p. 134°.

Acetyl: m.p. 115–16°.

Gilman, Van Ess, *J. Am. Chem. Soc.*, 1939, 61, 1365.

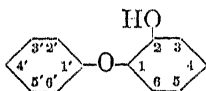
4-Hydroxydiphenylene oxide (1-Dibenzfuranol).

Cryst. from H_2O . M.p. 140–140.5°.

Gilman, Van Ess, *J. Am. Chem. Soc.*, 1939, 61, 1365.

 α -Hydroxydiphenylethane.

See Phenylbenzylcarbinol.

2-Hydroxydiphenyl Ether (Catechol phenyl ether)

$C_{12}H_{10}O_2$ MW, 186

Needles from H_2O , EtOH, or pet. ether. M.p. 106–7°. B.p. 151–5°/11 mm. Sol. EtOH, hot Et_2O , C_6H_6 , AcOH, CS_2 . Spar. sol. H_2O , pet. ether. Spar. volatile in steam.

Me ether: guaiacol phenyl ether. $C_{13}H_{12}O_2$. MW, 200. Needles from ligroin. M.p. 79° (77°). B.p. 288°. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O . Spar. volatile in steam.

Acetyl: b.p. 358–60°.

Benzoyl: cryst. M.p. 48.5°.

Norris, Macintire, Corso, *Am. Chem. J.*, 1903, 29, 127.

Fichter, Brunner, *Bull. soc. chim.*, 1916, 19, 286.

Fritzche, D.R.P., 269,543, (*Chem. Zentr.*, 1914, I, 591).

Lock, *Monatsh.*, 1930, 55, 167.

Ungnade, Orwoll, *J. Am. Chem. Soc.*, 1943, 65, 1736.

3-Hydroxydiphenyl Ether (Resorcinol phenyl ether).

B.p. 185°/12 mm., 150°/4.5 mm.

Me ether: b.p. 303°/745 mm.

Klarmann, Gatyas, Shternov, *J. Am. Chem. Soc.*, 1931, 53, 3405.

Lock, *Monatsh.*, 1930, 55, 180.

4-Hydroxydiphenyl Ether (Hydroquinone phenyl ether).

Needles from H_2O or ligroin. M.p. 84–5°.

B.p. 175–7°/10 mm. Sol. usual org. solvents.

Me ether: b.p. 163–5°/14 mm.

Benzoyl: needles from EtOH or ligroin. M.p. 97–8°.

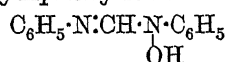
Häussermann, Bauer, *Ber.*, 1896, 29, 2085.

Oesterlin, *Monatsh.*, 1931, 57, 31.

Lock, *Monatsh.*, 1930, 55, 183.

2-Hydroxy-1:2-diphenylethylamine.

See α -Hydroxy- β -aminodibenzyl.

N-Hydroxydiphenylformamidine

$C_{13}H_{12}ON_2$ MW, 212

Needles from C_6H_6 , m.p. 130–1° (126–7°): needles + $1H_2O$ from H_2O , m.p. 107–17°. Sol. EtOH, Me_2CO , hot H_2O , $CHCl_3$, C_6H_6 , dil. min. acids. Spar. sol. pet. ether, cold H_2O . Forms metallic salts. Hot dil. $H_2SO_4 \rightarrow$ formic acid + aniline + *p*-aminophenol. Hot $H_2O \rightarrow$ aniline + formylphenylhydroxylamine. $Ac_2O \rightarrow$ diphenylurea.

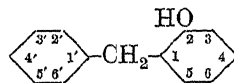
Ley, *Ber.*, 1902, 35, 1452.

5-Hydroxydiphenylene.

See 5-Hydroxy-2:4'-diaminodiphenyl.

1-Hydroxy-2:2'-diphenylisobutyric Acid.

See Dibenzylglycollic Acid.

2-Hydroxydiphenylmethane (*o*-Benzylphenol)

$C_{13}H_{12}O$ MW, 184

Exists in two forms. (i) *Stable*: m.p. 52°.

(ii) *Labile*: m.p. 21°. B.p. 312°, 175°/18 mm. Me ether: *o*-benzylanisole. $C_{14}H_{14}O$. MW, 198. M.p. 30°. B.p. 159–60°/12 mm. Phenylurethane: cryst. from C_6H_6 . M.p. 115°.

Phenylurethane: needles from ligroin. M.p. 117.5–118°.

Benzoyl: b.p. 249°.

Claisen, *Ann.*, 1925, 442, 239.

Stoermer, Frick, *Ber.*, 1924, 57, 27.

McMaster, Bruner, *Ind. Eng. Chem.*, 1936, 28, 505.

Lal, Dutt, *J. Indian Chem. Soc.*, 1945, 12, 389.

4-Hydroxydiphenylmethane (p-Benzyl-phenol).

Cryst. from EtOH. M.p. 84°. B.p. 320–2° (325–30°), 198–200°/10 mm. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, AcOH, caustic alkalis. Mod. sol. hot H₂O.

Me ether: p-benzylanisole. C₁₄H₁₄O. MW, 198. Cryst. M.p. 20°. B.p. 305°, 177°/10 mm., 157–8°/8 mm.

Et ether: p-benzylphenetole. C₁₅H₁₆O. MW, 212. Oil. B.p. 317°, 217°/37 mm. D₂₄ 1.038. Volatile in steam.

Benzyl ether: b.p. 365–7°.

Acetyl: b.p. 317°. D₄ 1.1168. Decomp. in moist air.

Benzoyl: m.p. 87°.

Clemmensen, *Ber.*, 1914, 47, 682.

Späth, *Monatsh.*, 1913, 34, 2007.

Klages, Allendorff, *Ber.*, 1898, 31, 1001.

Paternò, Fileti, *Gazz. chim. ital.*, 1875, 5, 382.

Papa, Schwenk, Whitman, *J. Org. Chem.*, 1942, 7, 587.

Monacelli, Hennion, *J. Am. Chem. Soc.*, 1941, 63, 1722.

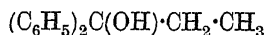
α-Hydroxydiphenylmethane.

See Benzhydrol.

4-Hydroxydiphenylmethane - 3-carboxylic Acid.

See 5-Benzylsalicylic Acid.

1-Hydroxy-1:1-diphenylpropane (1:1-Diphenylpropyl alcohol, ethyldiphenylcarbinol, α-ethylbenzhydrol, α-hydroxy-α-ethyldiphenylmethane)



C₁₅H₁₆O MW, 212

Cryst. from EtOH. M.p. 95° (91–2°). B.p. 171–3°/14 mm., 175–80°/17 mm.

Et ether: C₁₇H₂₀O. MW, 240. Cryst. M.p. 160–1°.

Hell, Bauer, *Ber.*, 1904, 37, 231.

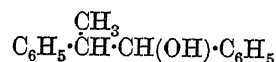
Schorigin, *Ber.*, 1908, 41, 2715.

Konowalow, Dobrowolski, *Chem. Zentr.*, 1905, II, 826.

Kharasch, Sayles, *J. Am. Chem. Soc.*, 1942, 64, 2972.

McKenzie, Ritchie, *Ber.*, 1937, 70, 23.

1-Hydroxy-1:2-diphenylpropane (1:2-Diphenylpropyl alcohol, β-hydroxy-α-methyldibenzyl)



C₁₅H₁₆O MW, 212

Exists in two forms.

α-.

B.p. 181–2°/18 mm.

Phenylurethane: m.p. 116°.

β-.

M.p. 48°.

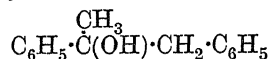
Acetyl: m.p. 107°.

Phenylurethane: m.p. 122°.

Tiffeneau, *Ann. chim.*, 1907, 10, 192, 353.

Kayser, *Ann. chim.*, 1936, 6, 145.

2-Hydroxy-1:2-diphenylpropane (*Methylphenylbenzylcarbinol*, 1:2-diphenylisopropyl alcohol, α-hydroxy-α-methyldibenzyl)



C₁₅H₁₆O MW, 212

Cryst. from ligroin. M.p. 50–1°. B.p. 289–92°, 175°/15 mm, 122–4°/2 mm.

Hell, *Ber.*, 1904, 37, 457.

Sabatier, Murat, *Ann. chim.*, 1915, 4, 288.

Koelsch, White, *J. Org. Chem.*, 1941, 6, 602.

3-Hydroxy-1:2-diphenylpropane (2:3-Diphenylpropyl alcohol, α-hydroxymethyldibenzyl)

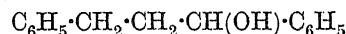


C₁₅H₁₆O MW, 212

Oil. B.p. 300–2°. Sol. EtOH, Et₂O.

Freund, Remse, *Ber.*, 1890, 23, 2863.

1-Hydroxy-1:3-diphenylpropane (1:3-Diphenylpropyl alcohol)



C₁₅H₁₆O MW, 212

Viscous oil. B.p. 330–2°, 192–4°/12 mm. D₄²⁴ 1.0585. n_D²⁰ 1.5742.

Urethane: m.p. 83°.

Dieckmann, Kämmerer, *Ber.*, 1906, 39, 3049.

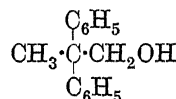
Bauer, *Compt. rend.*, 1912, 154, 1094.

Mastagli, *Compt. rend.*, 1937, 204, 1656.

2-Hydroxy-1:3-diphenylpropane.

See Dibenzylcarbinol.

1-Hydroxy-2:2-diphenylpropane (2:2-Diphenylpropyl alcohol, α-methyl-α-hydroxymethyldiphenylmethane, α-methylbenzhydrylicarbinol)



C₁₅H₁₆O MW, 212

B.p. 186–7°/15 mm. D₂₀²⁰ 1.0968, D₂₀²⁵ 1.0835.

Acetyl: b.p. 182–3°/14 mm.

Phenylurethane: m.p. 148–9°.

Faworski, Korolew, *Chem. Zentr.*, 1923, III, 668.

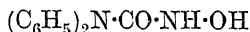
Hydroxydiphenylpropylene - carboxylic Acid.

See Hydroxydiphenylvinylacetic Acid.

Hydroxy-sym.-diphenylurea.

See Hydroxycarbanilide.

3-Hydroxy-*unsym.*-diphenylurea (*Di-phenylcarbamyldihydroxamic acid, N-diphenylcarbamyldihydroxylamine*)



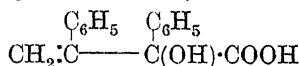
$\text{C}_{13}\text{H}_{12}\text{O}_2\text{N}_2$ MW, 228

M.p. 134–134.5°. Colourless sol. in H_2SO_4 , blue col. with addn. of HNO_3 .

Acetyl: m.p. 126.5–127°.

Hurd, *J. Am. Chem. Soc.*, 1923, 45, 1485.

1-Hydroxy-1:2-diphenylvinylacetic Acid (*3-Hydroxy-2:3-diphenylpropylene-3-carboxylic acid, 2-methylene-1:2-diphenyl-lactic acid, isocinnamemylmandelic acid*)



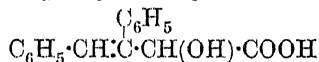
$\text{C}_{16}\text{H}_{14}\text{O}_3$ MW, 254

Needles from C_6H_6 . M.p. 161° decomp. Sol. hot C_6H_6 . Spar. sol. hot H_2O , cold C_6H_6 .

Acetyl: needles from C_6H_6 . M.p. 145–6°.

Japp, Lander, *J. Chem. Soc.*, 1897, 71, 135.

1-Hydroxy-2:3-diphenylvinylacetic Acid (*3-Hydroxy-1:2-diphenylpropylene-3-carboxylic acid, 2-phenyl-2-benzylidenelactic acid*)



$\text{C}_{16}\text{H}_{14}\text{O}_3$ MW, 254

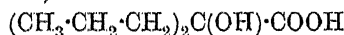
Needles from CHCl_3 -ligroin. M.p. 125°. Sol. EtOH, Et₂O, Me₂CO, CHCl_3 , C_6H_6 . Boiling NaOH.Aq. \rightarrow dibenzyl + oxalic acid.

Me ester: $\text{C}_{17}\text{H}_{16}\text{O}_3$. MW, 268. Needles from ligroin. M.p. 89°. Sol. EtOH, Et₂O, CHCl_3 , CS_2 , C_6H_6 . Spar. sol. H_2O , cold ligroin.

Erlenmeyer, *Ann.*, 1904, 333, 190.

Erlenmeyer, Lux, *Ber.*, 1898, 31, 2228.

1-Hydroxydipropylacetic Acid (*Dipropylglycollic acid*)



$\text{C}_8\text{H}_{16}\text{O}_3$ MW, 160

Needles from H_2O . M.p. 80–1° (78°). Sol. EtOH, Et₂O. Spar. sol. cold H_2O . Sublimes. Volatile in steam.

Et ester: $\text{C}_{10}\text{H}_{20}\text{O}_3$. MW, 188. B.p. 208–10°.

Basse, Klinger, *Ber.*, 1898, 31, 1218.

Crichton, *J. Chem. Soc.*, 1906, 89, 932.

2-Hydroxydipropyl Ketone.

See 2-Heptanolone-4.

***o*-Hydroxydithiobenzoic Acid.**

See Dithiosalicylic Acid.

Hydroxydocosane.

See Docosyl Alcohol.

1-Hydroxydocosene.

See Erucyl Alcohol.

3-Hydroxydodecane.

See Ethylnonylcarbinol.

1-Hydroxydotriacontane.

See Lacceryl.

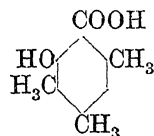
Hydroxydroserone.

See 3:5:8-Trihydroxy-2-methyl-1:4-naphthoquinone.

Hydroxydurene.

See Durenol.

6-Hydroxydurylic Acid (*6-Hydroxy-2:4:5-trimethylbenzoic acid, 3:4:6-trimethylsalicylic acid*)



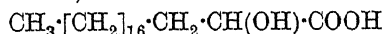
$\text{C}_{10}\text{H}_{12}\text{O}_3$ MW, 180

Needles from EtOH.Aq. M.p. 181–2° (148°). Spar. sol. H_2O . Sublimes. Alc. $\text{FeCl}_3 \rightarrow$ blue col. HCl at 200° \rightarrow 6-hydroxy- ψ -cumene.

Jacobsen, Schnapauff, *Ber.*, 1885, 18, 2844.

Smith et al., *J. Am. Chem. Soc.*, 1943, 65, 1594.

1-Hydroxyeicosanic Acid (*1-Hydroxyarachidic acid*)



$\text{C}_{20}\text{H}_{40}\text{O}_3$ MW, 328

Leaflets from C_6H_6 -pet. ether. M.p. 91–2°. Sol. most org. solvents.

Me ester: $\text{C}_{21}\text{H}_{42}\text{O}_3$. MW, 342. Needles. M.p. 62–4°.

Et ester: $\text{C}_{22}\text{H}_{44}\text{O}_3$. MW, 356. Cryst. from EtOH. M.p. 62–3°.

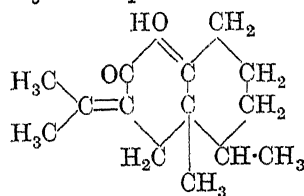
Et ether: $\text{C}_{22}\text{H}_{44}\text{O}_3$. MW, 356. Needles from AcOH. M.p. 53–6°. *Et ester*: $\text{C}_{24}\text{H}_{48}\text{O}_3$. MW, 384. Needles from EtOH. M.p. 35–7°.

Baczewski, *Monatsh.*, 1896, 17, 534.

ω -Hydroxyeremodin methyl Ether.

See Carviolin.

2-Hydroxyeremophilone



Suggested structure

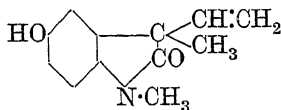
$\text{C}_{15}\text{H}_{22}\text{O}_2$ MW, 234

Constituent of oil of *Eremophila Mitchellii*. Prisms from MeOH. M.p. 66–7°. B.p. 189–90°/22 mm. D_{25}^{20} 1.0620. n_D^{20} 1.5564. $[\alpha]_{5461}^{20} + 153^\circ$ in MeOH. Resinifies rapidly in air. Reduces Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. $\text{FeCl}_3 \rightarrow$ bluish-black col. Sol. NaHSO_3 .Aq.

Benzoyl: prisms from MeOH. M.p. 119–20°. $[\alpha]_{5461}^{20} + 162^\circ$ in AcOEt.

Simonsen, Barton, *The Terpenes*, (Cambridge University Press), Vol. III, p. 212.

Hydroxyeserolene (*ψ*-Geneserolene, *oxeserolene*)



$C_{12}H_{13}O_2N$ MW, 203

Needles. M.p. 215° (224°). Spar. sol. H_2O .
Picrate: m.p. 215°.

Polonowski, Polonowski, *Compt. rend.*,
1925, 180, 73; *Bull. soc. chim.*, 1918,
23, 347, 354.

Hydroxyethanesulphonic Acid.

See Isethionic Acid.

2-Hydroxy-5-ethoxybenzaldehyde.

See under Gentisic Aldehyde.

4-Hydroxy-3-ethoxybenzaldehyde.

See Bourbonal.

2-Hydroxy-5-ethoxybenzoic Acid.

See under Gentisic Acid.

3-Hydroxy-4-ethoxy-1-propenylbenzene.

See Isosafroeuogenol.

ω -Hydroxy-4-ethylacetophenone.

See 4-Ethylphenacyl Alcohol.

1-Hydroxyethylacetylene.

See 1-Methylpropargyl Alcohol.

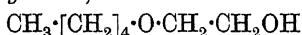
2-Hydroxyethyl allyl Ether.

See under Ethylene Glycol.

Hydroxyethylamine.

See Aminoethyl Alcohol.

2-Hydroxyethyl *n*-amyl Ether (*Ethylene glycol n-amyl ether*)



$C_7H_{16}O_2$ MW, 132

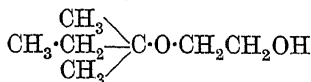
B.p. 181°/745 mm. D_{15}^{15} 0.8926, D_{25}^{25} 0.9144.
 n_D^{25} 1.42125.

p-Nitrobenzoyl: m.p. 74.5°. B.p. 186.6–
7.6°/4 mm.

Picramide: yellow cryst. M.p. 120–8°.

Cretcher, Pittenger, *J. Am. Chem. Soc.*,
1924, 46, 1503.

2-Hydroxyethyl *tert*-amyl Ether (*Ethylene glycol *tert*-amyl ether*)



$C_7H_{16}O_2$ MW, 132

B.p. 188.3°/751 mm., 50–5°/3 mm. D_4^{20} 0.8993.
 n_D^{25} 1.42266.

p-Nitrobenzoyl: b.p. 191.5–2.5°/4 mm.
 D 1.1301. n 1.5141.

p-Aminobenzoyl: m.p. 57°.

Picramide: yellow. M.p. 115.5°.

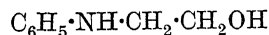
Baatfsche Petroleum Maatschappij, F.P.,
739,266, (*Chem. Zentr.*, 1933, II, 607).

Ashburn, Collett, Lazzell, *J. Am. Chem.*
Soc., 1936, 58, 1549.

Hydroxy-ethylaniline.

See Ethylaminophenol.

β -Hydroxyethylaniline (2-*Anilinoethyl alcohol*)



$C_8H_{11}ON$ MW, 137

B.p. 286°, 167°/17 mm. Sol. EtOH, Et₂O,
CHCl₃. Spar. sol. H_2O . KOH fusion \rightarrow
indoxyl.

p-Tolyl ether: $C_{15}H_{17}ON$. MW, 227. Plates
from EtOH. M.p. 55°.

2-Naphthyl ether: $C_{18}H_{17}ON$. MW, 263.
Plates from EtOH. M.p. 75°.

O-Benzoyl: $C_{15}H_{15}O_2N$. MW, 241. Needles
from EtOH. M.p. 77°.

Knorr, *Ber.*, 1889, 22, 2092.

Auwers, Bergs, *Ann.*, 1904, 332, 209.

Schreiber, *Ber.*, 1891, 24, 192.

Butler, Renfrew, *J. Am. Chem. Soc.*,
1938, 60, 1582.

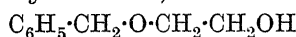
Hydroxy-ethylbenzene.

See Ethylphenol.

Hydroxyethylbenzene.

See Phenylethyl Alcohol and Methylphenyl-
carbinol.

Hydroxyethyl benzyl Ether (*Benzylglyoxy-
ethanol, benzyl cellosolve*)



$C_9H_{12}O_2$ MW, 152

Colourless liq. B.p. 137–8°/17 mm., 132.5°/15
mm., 131°/13 mm. D_4^{20} 1.0640. n_D^{20} 1.5233.

Possesses anæsthetic and analgesic properties.
Formyl: b.p. 150°/21 mm., D_4^{20} 1.0010. n_D^{16}
1.5050.

Acetyl: b.p. 145–6°/15 mm. D_4^{18} 1.0723.
 n_D^{17} 1.4979.

Acrylyl: b.p. 107°/0.7 mm. D_4^{20} 1.0741.
 n_D^{20} 1.5075.

Isobutyryl: b.p. 124.5°/3 mm.

3:4:5-Tri-iodobenzoyl: m.p. 103.5–104°.

p-Toluenesulphonyl: m.p. 45°.

Allophanyl: m.p. 156°.

n-Butyl ether: b.p. 139–40°/15 mm. D_4^{17}
1.0065. n_D^{18} 1.5030.

Kayser, Schranz, U.S.P. 1,651,458, (*Chem.*
Abstracts, 1928, 22, 845).

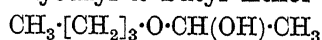
Butler, Renfrew, Clapp, *J. Am. Chem.*
Soc., 1938, 60, 1472.

Halasz, *Bull. soc. chim.*, 1941, 8, 170.

Hydroxyethylbutylamine.

See *n*-Butylaminoethyl Alcohol.

1-Hydroxyethyl *n*-butyl Ether



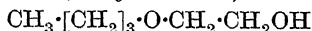
$C_6H_{14}O_2$ MW, 118

Acetyl: b.p. 166–72°, 54–54.5°/19 mm. D_4^{20}
0.9122. n_D^{20} 1.4709.

Henze, Murchison, *J. Am. Chem. Soc.*,
1933, 55, 4255.

I.G., D.R.P., 566,033, (*Chem. Abstracts*,
1933, 27, 996).

2-Hydroxyethyl *n*-butyl Ether (*Ethylene glycol butyl ether, butylcellosolve*)



$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. 170.6°/743 mm. D_4^{15} 0.9011.

Urethane: b.p. 132°/2.5 mm.

Benzoyl: b.p. 156.5–157°/14.5 mm., 131.6–132.6°/3 mm. D_{25}^{25} 1.0277. n_D^{25} 1.4925.

p-Nitrobenzoyl: b.p. 179–80°/3.5 mm. D_{25}^{25} 1.1518. n_D^{25} 1.5125.

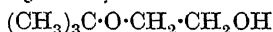
3-Nitrophthaloyl: m.p. 120°.

p-Toluenesulphonyl: b.p. 142°/0.1 mm. n_D^{25} 1.4960.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.

Conn, Collett, Lazzell, *J. Am. Chem. Soc.*, 1932, 54, 4370.

2-Hydroxyethyl *tert*.-butyl Ether (*Ethylene glycol *tert*.-butyl ether*)



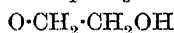
$\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118

B.p. 151°/750 mm., 72°/2 mm. D_4^{20} 0.9374 (0.8970). n 1.41322.

I.G., F.P., 39,773, (Addn. to F.P. 610,282) (*Chem. Abstracts*, 1932, 26, 4826).

Bataafsche Petroleum Maatschappij, F.P., 739,266, (*Chem. Zentr.*, 1933, II, 607).

2-Hydroxyethyl *o*-chlorophenyl Ether (*Ethylene glycol *o*-chlorophenyl ether*)



$\text{C}_8\text{H}_9\text{O}_2\text{Cl}$ MW, 172.5

Oil. B.p. 159–61°/22 mm.

p-Nitrobenzoyl: pale yellow plates from EtOH. M.p. 81–2°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2136.

2-Hydroxyethyl *m*-chlorophenyl Ether (*Ethylene glycol *m*-chlorophenyl ether*).

Oil. B.p. 163–4°/22 mm.

p-Nitrobenzoyl: pale yellow cryst. from EtOH. M.p. 104°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2136.

2-Hydroxyethyl *p*-chlorophenyl Ether (*Ethylene glycol *p*-chlorophenyl ether*).

Cryst. M.p. about 28°.

p-Nitrobenzoyl: pale yellow needles from EtOH. M.p. 90–1°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2136.

α -Hydroxyethylcyclobutane.

See Methylcyclobutylcarbinol.

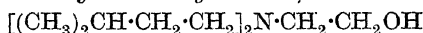
α -Hydroxyethylcyclohexane.

See Methylcyclohexylcarbinol.

α -Hydroxyethylcyclopropane.

See Methylcyclopropylcarbinol.

***N*-[2-Hydroxyethyl]-di-isoamylamine** (*2-Di-isoamylaminoethyl alcohol*)



$\text{C}_{13}\text{H}_{27}\text{ON}$ MW, 201

Oil. B.p. 247–8°/748 mm. D_4^{20} 0.8492. n_D^{20} 1.4435. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. H₂O.

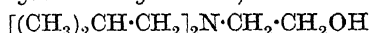
p-Nitrobenzoyl: hydrochloride, m.p. 123–4°.

Picrolonate: yellow plates from EtOH.Aq. M.p. about 88°. Sol. EtOH.

Matthes, *Ann.*, 1901, 316, 315.

Einhorn, Fiedler, Ladisch, Uhlfelder, *Ann.*, 1909, 371, 148.

***N*-[2-Hydroxyethyl]-di-isobutylamine** (*2-Di-isobutylaminoethyl alcohol*)



$\text{C}_{10}\text{H}_{23}\text{ON}$ MW, 173

Oil. B.p. 213–14°/754 mm. D_4^{20} 0.8407. n_D^{20} 1.4355. Sol. EtOH, Et₂O, CHCl₃, ligroin.

p-Nitrobenzoyl: hydrochloride, m.p. 160–1°.

B.HAuCl₄: yellow cryst. M.p. 86–8°. Spar. sol. H₂O, EtOH.

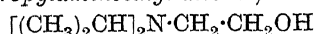
Picrate: yellow prisms from EtOH.Aq. M.p. 123–5°. Spar. sol. H₂O, EtOH.

Picrolonate: yellow needles from EtOH.Aq. M.p. 134–5° decomp.

Matthes, *Ann.*, 1901, 316, 312.

Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, 371, 146.

***N*-[2-Hydroxyethyl]-di-isopropylamine** (*2-Di-isopropylaminoethyl alcohol*)



$\text{C}_8\text{H}_{19}\text{ON}$ MW, 145

Oil. B.p. 187–92°.

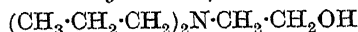
p-Nitrobenzoyl: hydrochloride, m.p. 162.5°.

Einhorn, Fiedler, Uhlfelder, *Ann.*, 1909, 371, 145.

α -Hydroxy- α -ethyldiphenylmethane.

See 1-Hydroxy-1:1-diphenylpropane.

***N*-[2-Hydroxyethyl]-dipropylamine** (*2-Dipropylaminoethyl alcohol*)



$\text{C}_8\text{H}_{19}\text{ON}$ MW, 145

Oil. B.p. 195–6°/748 mm. D_4^{20} 0.8576. n_D^{20} 1.4402. Sol. EtOH, Et₂O. Spar. sol. H₂O.

p-Nitrobenzoyl: hydrochloride, m.p. 133–5–4.5°.

p-Fluorobenzoyl: b.p. 149–50°/7 mm. Hydrochloride: m.p. 115–17°.

3-Nitro-4-fluorobenzoyl: m.p. 123–4°.

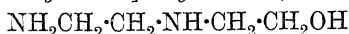
Picrate: yellow leaflets from EtOH. M.p. 80–2°.

Picrolonate: plates from EtOH.Aq. M.p. 128–30°.

Matthes, *Ann.*, 1901, 316, 312.

Hydroxyethylene dibromide.

See 1 : 2-Dibromoethyl Alcohol.

N-[β-Hydroxyethyl]-ethylenediamine (2-[β-Aminoethylamino]-ethyl alcohol) $\text{C}_4\text{H}_{12}\text{ON}_2$ MW, 104B.p. 238–40°/752 mm., 103·7°/10 mm., 91·2°/5 mm. Misc. with H_2O , EtOH. Spar. sol. Et_2O . D_4^{25} 0·9556. n_D^{25} 1·4672, n_D^{28} 1·4655.*B, 2HCl*: m.p. 195·7–6·4°.*Picrate*: m.p. 198·5–200·5° decomp.*Di-2 : 4-dinitro-6-cyclohexylphenol salt*: cryst. from EtOH. M.p. 160–3°.Knorr, Brownson, *Ber.*, 1902, 35, 4470.Kitchen, Pollard, *J. Org. Chem.*, 1943, 8, 367.**2-α-Hydroxyethylfuran.**

See Methyl-2-furylcarbinol.

Hydroxyethylguanidine.

See Guanidinoethyl Alcohol.

N-2-Hydroxyethylheptylamine (2-Heptylaminoethyl alcohol) $\text{C}_9\text{H}_{21}\text{ON}$ MW, 159Cryst. M.p. 35°. B.p. 250–3°/751 mm., 120–1°/7 mm. D_4^{20} 0·8819. n_D^{20} 1·4510. Sol. EtOH, Et_2O . Spar. sol. H_2O .*p-Nitrobenzoyl*: hydrochloride, m.p. 139–41°.*p-Aminobenzoyl*: hydrochloride, m.p. 157–8°.*Picrate*: yellow needles from H_2O . M.p. 70–1°. Sol. EtOH. Spar. sol. H_2O .*Picolonate*: brown leaflets from EtOH.Aq. M.p. 196°. Sol. EtOH. Spar. sol. H_2O .Matthes, *Ann.*, 1901, 315, 115.Pierce, Salisbury, Fredericksen, *J. Am. Chem. Soc.*, 1942, 64, 1691.**3-Hydroxy-3-ethyl-n-hexane.**

See Diethylpropylcarbinol.

N-2-Hydroxyethylhexylamine (2-Hexylaminoethyl alcohol) $\text{C}_8\text{H}_{19}\text{ON}$ MW, 145B.p. 231°/747 mm. D_4^{20} 0·8829. n_D^{20} 1·4472. Sol. EtOH, Et_2O . Spar. sol. H_2O .*Picrate*: yellow prisms from EtOH.Aq. M.p. 80°. Sol. EtOH. Spar. sol. H_2O .*Picolonate*: brown plates from EtOH.Aq. M.p. 208–10° decomp. Sol. EtOH. Spar. sol. H_2O .Matthes, *Ann.*, 1901, 315, 114.**β-Hydroxy-β-ethylhydrocinnamic Acid.**

See 2-Hydroxy-2-phenyl-n-valeric Acid.

1 - Hydroxyethyl p - hydroxyphenyl Ketone.

See 4-β-Dihydroxypropiofenone.

2-Hydroxyethylidene bromide.

See 2 : 2-Dibromoethyl Alcohol.

3-ω-Hydroxyethylindole.

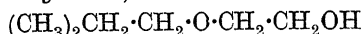
See Tryptophol.

N-2-Hydroxyethylisoamylamine.

See 2-Isoamylaminoethyl Alcohol.

N-2-Hydroxyethylisobutylamine.

See 2-Isobutylaminoethyl Alcohol.

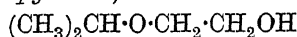
2-Hydroxyethyl isobutyl Ether (*Ethylene glycol isobutyl ether*) $\text{C}_6\text{H}_{14}\text{O}_2$ MW, 118B.p. 157–8°. D_{15}^{15} 0·8950.

I.G., F.P., 39,773, (Addn. to F.P. 610,282)

(Chem. Abstracts, 1932, 26, 4826): B.P. 271,169, (Chem. Abstracts, 1928, 22, 1596).

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.**N-2-Hydroxyethylisopropylamine.**

See 2-Isopropylaminoethyl Alcohol.

2-Hydroxyethyl isopropyl Ether (*Ethylene glycol isopropyl ether*) $\text{C}_5\text{H}_{12}\text{O}_2$ MW, 104B.p. 144°/743 mm. D_{15}^{15} 0·9115.

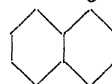
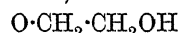
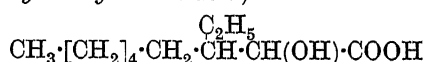
3 : 4 : 5-Tri-iodobenzoyl: m.p. 79·5–80°.

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.**Hydroxyethyl Mercaptan.**

See Ethylene Thioglycol.

Hydroxyethylnaphthalene.

See Naphthylethyl Alcohol and Methyl-naphthylcarbinol.

2-Hydroxyethyl 1-naphthyl Ether (*Ethylene glycol α-naphthyl ether*) $\text{C}_{12}\text{H}_{12}\text{O}_2$ MW, 188Plates from Et_2O -pet. ether. M.p. 42°.Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2135.**2-Hydroxyethyl 2-naphthyl Ether** (*Ethylene glycol β-naphthyl ether*).Cryst. from C_6H_6 . M.p. 76°. Veterinary anaesthetic (Anavenol).Rindfusz, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, 42, 164.Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2135.Carlson, Cretcher, *J. Am. Chem. Soc.*, 1947, 69, 1952.**1-Hydroxy-2-ethylpelargonic Acid** (1-Hydroxy-2-ethylnonoic acid) $\text{C}_{11}\text{H}_{22}\text{O}_3$ MW, 202

Cryst. from pet. ether. M.p. 47°. *Et ester*: C₁₃H₂₆O₃. MW, 230. B.p. 148-50°/15 mm.

Bagard, *Bull. soc. chim.*, 1907, 1, 361.

***p*-β-Hydroxyethylphenol.**

See Tyrosol.

2-α-Hydroxyethyl-3-phenylbutyric Acid.

See 3-Hydroxy-2-benzyl-*n*-valeric Acid.

2-Hydroxyethyl phenyl Ether (2-Phenoxyethyl alcohol, ethylene glycol phenyl ether)



C₈H₁₀O₂ MW, 138

Oil. B.p. 237°, 165°/80 mm., 134-5°/18 mm. D₂₅²² 1.102. *n*_D²⁰ 1.534. Sol. EtOH, Et₂O. Insol. H₂O. Sol. KOH.Aq. Heat. with ZnCl₂ → coumaran. Esters are used as perfumes and flavourings.

Et ether: 1-ethoxy-2-phenoxyethane. C₁₀H₁₄O₂. MW, 166. B.p. 230°. D₄¹¹ 1.018. Insol. H₂O.

Phenyl ether: see under Ethylene Glycol.

Acetyl: b.p. 241-3°.

Oxalyl: C₁₈H₁₈O₆. M.p. 114°.

Propionyl: b.p. 121°/4 mm.

Butyryl: b.p. 129-31°/4 mm.

Benzoyl: m.p. 64°.

3:4:5-*Tri-iodobenzoyl*: m.p. 145°.

Cinnamoyl: m.p. 64°.

p-Toluenesulphonyl: m.p. 80°.

Allophanyl: m.p. 123°.

Roithner, *Monatsh.*, 1894, 15, 674.

Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).

Bentley, Haworth, Perkin, *J. Chem. Soc.*, 1896, 69, 164.

Smith, Niederl, *J. Am. Chem. Soc.*, 1931, 53, 808.

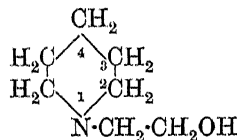
Hydroxyethyl phenyl Ketone.

See β- and γ-Hydroxypropiophenone.

7-Hydroxy-3-ethylphthalide.

See Iso-ochracin.

1-β-Hydroxyethylpiperidine (1-Piperidinoethyl alcohol)



C₇H₁₅ON MW, 129

B.p. 90°/12 mm. Very sol. EtOH, H₂O.

B.HCl: m.p. 64-5°. Hygroscopic.

Basileiados, *Bull. soc. chim.*, 1937, 4, 1131.

2-β-Hydroxyethylpiperidine (2-Piperidinoethyl alcohol).

Benzoyl deriv.: hydrochloride, m.p. 189-91°.

Walter, Fosbinder, *J. Am. Chem. Soc.*, 1939, 61, 1713.

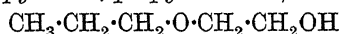
β-Hydroxyethyl-propylacetylene.

See 3-Hexynol-1.

***N*-2-Hydroxyethylpropylamine.**

See 2-Propylaminoethyl Alcohol.

2-Hydroxyethyl propyl Ether (Ethylene glycol propyl ether, propylcellosolve)



C₅H₁₂O₂ MW, 104

B.p. 150°/743 mm. D₁₅¹⁵ 0.9141.

Urethane: b.p. 132°/7 mm.

p-Toluenesulphonyl: m.p. 8°. B.p. 140°/0.1 mm. *n*_D²⁰ 1.5004.

I.G., B.P. 271,169, (*Chem. Abstracts*, 1928, 22, 1596).

Cretcher, Pittenger, *J. Am. Chem. Soc.*, 1924, 46, 1503.

Hydroxyethylsuccinic Acid.

See Ethylmalic Acid.

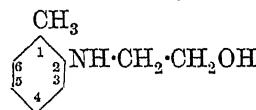
5-Hydroxy-2-ethyltetrahydrofuran.

See 3-Hydroxy-*n*-caproic Aldehyde.

α-Hydroxyethyltoluene.

See Methyltolylcarbinol.

***N*-β-Hydroxyethyl-*o*-toluidine (2-*o*-Toluidinoethanol, 2-*o*-toluidinoethyl alcohol)**



C₉H₁₃ON MW, 151

Straw-coloured oil. B.p. 172°/12 mm., 145-50°/3 mm. D₂₀²⁵ 1.0962. *n*_D²⁰ 1.5675.

Dains, Brewster, Blair, Thompson, *J. Am. Chem. Soc.*, 1922, 44, 2639.

Adams, Segur, *J. Am. Chem. Soc.*, 1923, 45, 788.

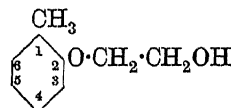
***N*-β-Hydroxyethyl-*p*-toluidine (2-*p*-Toluidinoethanol, 2-*p*-toluidinoethyl alcohol).**

Plates from Et₂O-ligroin. M.p. 42-3°. B.p. 153-5°/4 mm.

Adams, Segur, *J. Am. Chem. Soc.*, 1923, 45, 788.

Kiprianov, Tiselskit, Ushenko, *Chem. Abstracts*, 1940, 34, 1023.

2-Hydroxyethyl *o*-tolyl Ether (Ethylene glycol *o*-tolyl ether)



C₉H₁₂O₂ MW, 152

Oil. B.p. 141°/19 mm. D₂₀²⁹ 1.079. *n*_D²⁷ 1.528.

Isobutyryl: b.p. 128-30°/4 mm.

p-Nitrobenzoyl: plates from EtOH. M.p. 78-5-79.5°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2133.

Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).

Rindfusz, Ginnings, Harnack, *J. Am. Chem. Soc.*, 1920, 42, 161.

2-Hydroxyethyl *m*-tolyl Ether (*Ethylene glycol m-tolyl ether*).

Oil. B.p. 145–7°/19 mm.

p-Nitrobenzoyl: plates from EtOH. M.p. 80.5–81.5°.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2133.

2-Hydroxyethyl *p*-tolyl Ether (*Ethylene glycol p-tolyl ether*).

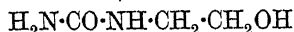
Prisms from pet. ether. M.p. 44–5°.

Isobutyryl: b.p. 124–5°/3 mm.

Boyd, Marle, *J. Chem. Soc.*, 1914, 105, 2134.

Bollmann, U.S.P., 1,841,430, (*Chem. Abstracts*, 1932, 26, 1617).

***N*-2-Hydroxyethylurea** (*Ureidoethyl alcohol, carbamylethanolamine*)



$\text{C}_3\text{H}_8\text{O}_2\text{N}_2$ MW, 104

Cryst. from EtOH. M.p. 95°. Sol. H_2O . EtOH, MeOH.

Diacetyl deriv.: m.p. 102°.

Benzoyl deriv.: m.p. 129°.

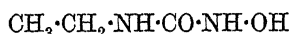
Et ether: $\text{C}_5\text{H}_{12}\text{O}_2\text{N}_2$. MW, 132. Cryst. M.p. 56°. Sol. H_2O , EtOH. Insol. Et₂O.

Franchimont, *Rec. trav. chim.*, 1894, 13, 488.

Knorr, Meyer, *Ber.*, 1905, 38, 3131.

Gabriel, *Ber.*, 1917, 50, 826.

***N'*-Hydroxy-*N*-ethylurea** (*Ethylglycylhydrazine*)

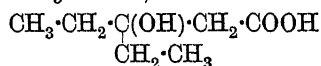


$\text{C}_3\text{H}_8\text{O}_2\text{N}_2$ MW, 104

M.p. 129° decomp. Sol. H_2O . Mod. sol. EtOH.

Francesconi, Parrozzani, *Gazz. chim. ital.*, 1901, 31, 344.

2-Hydroxy-2-ethylvaleric Acid (2:2-Diethylhydracrylic acid)



$\text{C}_7\text{H}_{14}\text{O}_3$ MW, 146

Needles. M.p. 38–9°. Sol. H_2O , EtOH, Et₂O. $k = 3.03 \times 10^{-5}$ at 25°. Dist. with dil. H_2SO_4 → 2:2-diethylacrylic acid.

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 174. B.p. 77°/14 mm. D_4^{20} 0.90432. n_D^{20} 1.4440.

Schirokow, *J. prakt. Chem.*, 1881, 23, 201. Fichter, Kiefer, Bernouilli, *Ber.*, 1909, 42, 4712.

Kon, Nargund, *J. Chem. Soc.*, 1932, 2462.

α -Hydroxyethyl-vinylacetylene.

See 1-Hexen-3-yn-5-ol.

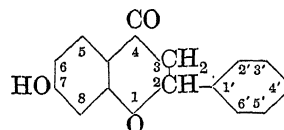
ω -Hydroxyeugenol.

See Lubanol.

4-Hydroxyflavan.

See Flavanol.

7-Hydroxyflavanone



$\text{C}_{15}\text{H}_{12}\text{O}_3$

MW, 240

d-.

M.p. 181–2°. $[\alpha]_D^{17} + 33.8^\circ$, $[\alpha]_D^{10} + 29.3^\circ$.

l-.

Menthoxycetyl: m.p. 96–7°. $[\alpha]_D^{14.5} - 30.0^\circ$.

dl-.

Needles from toluene. M.p. 189°. Sol. EtOH, AcOH. Insol. H_2O . Yellow sol. in NaOH.Aq.

Me ether: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. M.p. 89°.

Benzyl ether: m.p. 126°.

Acetyl: m.p. 98°.

Ellison, *J. Chem. Soc.*, 1927, 1722.

Shinoda, *Chem. Abstracts*, 1928, 22, 2947.

Huzise, Tatsita, *Ber.*, 1941, 74, 275.

4'-Hydroxyflavanone.

M.p. 186–7°.

Me ether: m.p. 92–4°. $\text{PCl}_5 \rightarrow$ 4'-methoxyflavone.

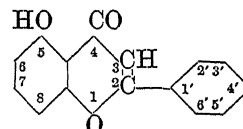
Acetyl: m.p. 158–8.5°.

Hattori, *Chem. Abstracts*, 1926, 20, 2162.

3-Hydroxyflavone.

See Flavonol.

5-Hydroxyflavone (5-Hydroxy-2-phenylchromone)



$\text{C}_{15}\text{H}_{10}\text{O}_3$

MW, 238

Occurs in leaves and stems of primrose. Yellow cryst. M.p. 156–7°. Alc. $\text{FeCl}_3 \rightarrow$ deep purple col.

Acetyl: m.p. 145°.

Me ether: $\text{C}_{16}\text{H}_{12}\text{O}_3$. MW, 252. M.p. 135°.

Simonis, Danshevski, *Ber.*, 1926, 59, 2914.

Sugasawa, *Chem. Abstracts*, 1934, 28, 6717.

6-Hydroxyflavone (6-Hydroxy-2-phenylchromone).

Yellow needles from EtOH.Aq. M.p. 231–2°. NaOH → greenish-yellow col.

Et ether: $\text{C}_{17}\text{H}_{14}\text{O}_3$. MW, 266. Needles from EtOH.Aq. or ligroin. Prisms from C_6H_6 . M.p. 146–7°.

Acetyl: m.p. 157–8°.

Kostanecki, Levi, Tambor, *Ber.*, 1899, 32, 331.

7-Hydroxyflavone (7-Hydroxy-2-phenyl-chromone).

Needles from dil. EtOH. M.p. 240°. NaOH \rightarrow yellow col.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Needles from EtOH. M.p. 110–11°.

Et ether: needles. M.p. 138–9°. $H_2SO_4 \rightarrow$ blue fluor.

Acetyl: m.p. 129–30°.

Chloroacetyl: m.p. 138–9°.

Emilewicz, Kostanecki, *Ber.*, 1899, 32, 312.

2'-Hydroxyflavone (2-o-Hydroxyphenyl-chromone).

Plates from EtOH. M.p. 249–50°. Conc. $H_2SO_4 \rightarrow$ greenish-yellow col. NaOEt \rightarrow salicylic acid + o-hydroxyacetophenone.

Me ether: prisms from CS_2 . M.p. 103°.

Acetyl: m.p. 88.5–89°.

Bogert, Marcus, *J. Am. Chem. Soc.*, 1919, 41, 95.

3'-Hydroxyflavone (2-m-Hydroxyphenyl-chromone).

Prisms from dil. EtOH. M.p. 208°.

Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from dil. EtOH. M.p. 118°.

Acetyl: m.p. 97°.

Kostanecki, Tambor, *Ber.*, 1901, 34, 1692.

4'-Hydroxyflavone (2-p-Hydroxyphenyl-chromone).

Needles from EtOH-Py. M.p. 269–70°. Sol. dil. NaOH. Spar. sol. hot EtOH.

Me ether: $C_{16}H_{12}O_3$. MW, 252. M.p. 158.5°.

Et ether: $C_{17}H_{14}O_3$. MW, 266. Needles from EtOH. M.p. 139–40°.

Benzyl ether: m.p. 190°.

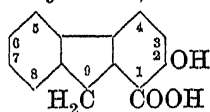
Acetyl: m.p. 136°.

Grossmann, Kostanecki, *Ber.*, 1900, 33, 2516.

Hattori, *Chem. Abstracts*, 1926, 20, 2162.

Hydroxyfluorene.

See Fluorenol.

2-Hydroxyfluorene-1-carboxylic Acid (2-Fluorenol-1-carboxylic acid)

$C_{14}H_{10}O_3$ MW, 226

Yellow cryst. from EtOH. M.p. 236–40°. Easily sol. EtOH. $FeCl_3 \rightarrow$ blue col.

o-Toluidide: m.p. 178–80°.

Ballauf, Schmelzer, D.R.P., 530,293, (*Chem. Zentr.*, 1930, II, 3852).

2-Hydroxyfluorene-3-carboxylic Acid (2-Fluorenol-3-carboxylic acid).

Grey cryst. from EtOH. M.p. 256–60°. Spar. sol. EtOH. $FeCl_3 \rightarrow$ blue col.

o-Toluidide: m.p. 221°.

Ballauf, Schmelzer, D.R.P., 530,293, (*Chem. Zentr.*, 1930, II, 3852).

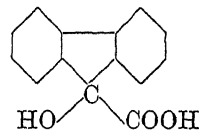
9-Hydroxyfluorene-4-carboxylic Acid (9-Fluorenol-4-carboxylic acid).

Cryst. from H_2O . M.p. 203°. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$, C_6H_6 . Insol. cold H_2O . Sol. conc. H_2SO_4 to green sol. $KMnO_4 \rightarrow$ fluorenone-4-carboxylic acid. $P + HI \rightarrow$ fluorene.

Amide: $C_{14}H_{11}O_3N$. MW, 225. Leaflets from H_2O . M.p. 206–10°. Sublimes.

Graebe, Aubin, *Ann.*, 1888, 247, 284.

Wegerhoff, *Ann.*, 1889, 252, 29.

9-Hydroxyfluorene-9-carboxylic Acid (α -Hydroxydiphenyleneacetic acid, diphenyleneglycollic acid, 9-fluorenol-9-carboxylic acid)

$C_{14}H_{10}O_3$ MW, 226

Leaflets + $\frac{1}{2}H_2O$ from H_2O , m.p. 125°; anhyd. 169°. Spar. sol. cold H_2O , C_6H_6 . $k = 1.0 \times 10^{-3}$ at 25°. Ox. \rightarrow fluorenone. $P + HI \rightarrow$ fluorenone-9-carboxylic acid.

Me ester: $C_{15}H_{12}O_3$. MW, 240. Cryst. from Me_2CO . Aq. M.p. 160°. *Acetyl*: leaflets from EtOH. M.p. 147–8°.

Et ester: $C_{16}H_{14}O_3$. MW, 254. Prisms from EtOH. Aq. M.p. 96° (92°). *Acetyl*: prisms from EtOH. M.p. 103–4°.

Me ether: $C_{15}H_{12}O_3$. MW, 240. Needles from EtOH. M.p. 181° decomp. *Me ester*: $C_{16}H_{14}O_3$. MW, 254. M.p. 124°. *Et ester*: $C_{17}H_{16}O_3$. MW, 268. Needles. M.p. 72°.

Et ether: $C_{16}H_{14}O_3$. MW, 254. Cryst. M.p. 169°. *Me ester*: $C_{17}H_{16}O_3$. MW, 268. Needles from EtOH. Aq. M.p. 77–8°.

Staudinger, *Ber.*, 1906, 39, 3062.

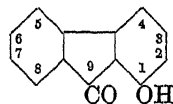
Klinger, *Ann.*, 1912, 390, 373.

Schmidt, Mezger, *Ber.*, 1906, 39, 3897.

Baeyer, Friedländer, *Ber.*, 1877, 10, 126.

Schlenk *et al.*, *Ann.*, 1928, 463, 98.

Kliegel, *Ber.*, 1931, 64, 2420.

1-Hydroxyfluorenone (1-Hydroxy-9-keto-fluorene, 9-keto-1-fluorenol)

$C_{13}H_8O_2$ MW, 196

Yellow needles. M.p. 115°. Sol. C_6H_6 , AcOH. Volatile in steam. KOH fusion \rightarrow 3-hydroxydiphenyl-2-carboxylic acid. Conc. $H_2SO_4 \rightarrow$ wine-red col.

Me ether: $C_{14}H_{10}O_2$. MW, 210. Yellow needles from EtOH. M.p. 141.5–142.5°.

Et ether: $C_{15}H_{12}O_2$. MW, 224. Yellow plates from EtOH. M.p. 99–100°.

Benzyl ether: $C_{20}H_{14}O_2$. MW, 286. Yellow needles from ligroin. M.p. 93–4°.

Acetyl: plates or needles from EtOH.Aq. M.p. 130–1°.

Benzoyl: m.p. 128–9°.

Oxime: yellow needles from C_6H_6 . M.p. 169–70°.

Phenylhydrazone: m.p. 173–4°.

Staedel, *Ber.*, 1895, 28, 113.

Heyl, *J. prakt. Chem.*, 1899, 59, 447.

2-Hydroxyfluorenone (2-Hydroxy-9-keto-fluorene, 9-keto-2-fluorenone).

Red needles from AcOH.Aq. M.p. 210–11°. Spar. sol. hot H_2O , EtOH, Et_2O . Sublimes.

Me ether: yellow needles from EtOH. M.p. 77–8°. *Oxime*: yellow. M.p. 174°.

Hydrazone: yellow needles. M.p. 201–2°.

Acetyl: m.p. 157°.

Ketazine: brown powder. M.p. 301–3°.

Diels, *Ber.*, 1901, 34, 1767.

Werner, Rekner, Schwabacher, *Ann.*, 1902, 322, 168.

Gerhardt, *Monatsh.*, 1920, 41, 199.

Patrizietti, *Chem. Zentr.*, 1934, II, 3617.

3-Hydroxyfluorenone (3-Hydroxy-9-keto-fluorene, 9-keto-3-fluorenone).

Yellow needles from EtOH. M.p. 228–9° (225°). Sol. EtOH, AcOH, xylene. Spar. sol. C_6H_6 . Insol. H_2O . Violet sol. in conc. H_2SO_4 .

Me ether: yellow plates from C_6H_6 -pet. ether. M.p. 99° (96–7°). Sol. EtOH, C_6H_6 , AcOH. Violet-red sol. in conc. H_2SO_4 .

Acetyl: yellow needles from EtOH.Aq. M.p. 115°.

Oxime: brown cryst. from C_6H_6 . M.p. 187–8° decomp. Sol. EtOH, AcOH. Mod. sol. C_6H_6 . Spar. sol. hot H_2O .

Ullmann, Bleier, *Ber.*, 1902, 35, 4278.

Errara, La Spada, *Gazz. chim. ital.*, 1905, 35, 546.

Bardout, *Chem. Abstracts*, 1932, 26, 1275.

4-Hydroxyfluorenone (4-Hydroxy-9-keto-fluorene, 9-keto-4-fluorenone).

Orange-red cryst. from EtOH. M.p. 249°. Sol. EtOH, Et_2O . Spar. sol. hot H_2O . KOH fusion \rightarrow 6-hydroxydiphenyl-2-carboxylic acid + 2'-hydroxydiphenyl-2-carboxylic acid.

Graebe, Schestakow, *Ann.*, 1895, 284, 315.

Richtzenhain, Nippus, *Ber.*, 1944, 77, 566.

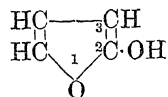
Hydroxyformylacetic Acid.

See Hydroxypyruvic Acid.

Hydroxyfumaric Acid.

See Oxalacetic Acid.

2-Hydroxyfuran (α -Furanol)



$C_4H_4O_2$

MW, 84

Prisms. M.p. 80°.

Hodgson, Davies, *J. Chem. Soc.*, 1939, 806.

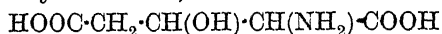
3-Hydroxyfuran (β -Furanol).

Needles from Et_2O . M.p. 58°. Volatile in steam.

Maleic anhydride add. comp.: needles from Et_2O . M.p. 132° decomp.

Hodgson, Davies, *J. Chem. Soc.*, 1939, 806.

2-Hydroxyglutamic Acid (2-Hydroxy-1-aminopropane-1:3-dicarboxylic acid, 2-hydroxy-1-aminoglutaric acid)



$C_5H_9O_5N$

MW, 163

d-.

Prisms from H_2O . Sinters at 100°. Sol. H_2O , AcOH. Spar. sol. MeOH. Insol. EtOH, Et_2O . HI at 150° \rightarrow *d*-glutamic acid.

Brucine salt: m.p. 200° decomp. $[\alpha]_D^{20} - 25.0^\circ$.

Strychnine salt: m.p. about 245°.

dl-.

M.p. anhyd. 195° decomp. Sol. H_2O . Insol. EtOH.

B,HCl: m.p. 187° decomp.

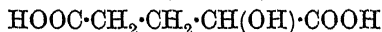
Et ester: $C_7H_{13}O_5N$. MW, 191. *Hydrochloride*: m.p. 168.5°.

Dakin, *Biochem. J.*, 1918, 12, 306; *Chem. Zentr.*, 1920, I, 681.

Harington, Randall, *Biochem. J.*, 1931, 25, 1923.

Abderhalden, Pitschak, *Z. physiol. Chem.*, 1940, 265, 31.

1-Hydroxyglutaric Acid (1-Hydroxy-propane-1:3-dicarboxylic acid)



$C_5H_8O_5$

MW, 148

d-.

Cryst. from Et_2O . M.p. 72°. $[\alpha]_D^{19} + 1.76^\circ$ in H_2O . HI at 120° \rightarrow glutaric acid.

Di-Na salt: $[\alpha]_D^{22} + 8.58^\circ$ in H_2O .

l-.

Cryst. M.p. 72–3°. $[\alpha]_D - 1.98^\circ$ in H_2O .

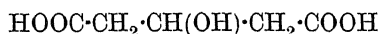
Di-Na salt: $[\alpha]_D^{19} - 8.65^\circ$ in H_2O .

dl-.

Cryst. M.p. 72°. Evaporation of aq. sol. \rightarrow butyrolactone- γ -carboxylic acid.

v. Lippmann, *Ber.*, 1882, 15, 1156.

Karrer, Kaase, *Helv. Chim. Acta*, 1919, 2, 446.

2-Hydroxyglutaric Acid (2-Hydroxy-propane-1 : 3-dicarboxylic acid)
 $\text{C}_5\text{H}_8\text{O}_5$ MW, 148

Needles from H_2O . M.p. 95° . Sol. H_2O , EtOH. Spar. sol. Et_2O . Vacuum dist. \rightarrow vinylacetic acid + glutaconic acid + glutaconic anhydride. HI at $180^\circ \rightarrow$ glutaric acid. NaOH or 60% $\text{H}_2\text{SO}_4 \rightarrow$ glutaconic acid. CH_3COCl in the cold \rightarrow 2-acetoxyglutaric anhydride.

Di-Et ester: $\text{C}_9\text{H}_{16}\text{O}_5$. MW, 204. B.p. $156-7^\circ/23$ mm., $150-1^\circ/11$ mm. *Acetyl*: b.p. $153-4^\circ/11$ mm.

Monoamide: $\text{C}_5\text{H}_9\text{O}_4\text{N}$. MW, 147. Cryst. from EtOH-Et₂O. M.p. 108° . Sol. H_2O , MeOH, EtOH.

Acetyl: m.p. $65-6^\circ$. $k = 1.57 \times 10^{-4}$.

Dakin, *Biochem. J.*, 1919, 13, 415.

Lutz, *Chem. Zentr.*, 1910, I, 908.

v. Pechmann, Jenisch, *Ber.*, 1891, 24, 3250.

Lochte, Pickard, *J. Am. Chem. Soc.*, 1946, 68, 721.

Hydroxygranatanine.

See Granatoline.

Hydroxyhemimellitene.

See Hemimellitenol.

14-Hydroxyheptacosane.

See Heptacosanol-14.

4-Hydroxy-1 : 5-heptadiene.

See Propenylallylcarbinol.

4-Hydroxyheptadi-ynol-2 : 5.

See 2 : 5-Heptadi-ynol-4.

Hydroxyheptane.

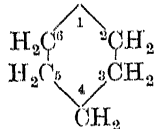
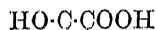
See *n*-Heptyl Alcohol, Methyl-*n*-amylcarbinol, Ethyl-*n*-butylcarbinol and Dipropylcarbinol.

Hydroxyheptane-dicarboxylic Acid.

See Hydroxyazelaic Acid.

16-Hydroxy-6-hexadecenoic Acid.

See Ambrettolic Acid.

1-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-1-carboxylic acid)
 $\text{C}_7\text{H}_{12}\text{O}_3$

MW, 144

Prisms from H_2O or EtOH. M.p. $108-9^\circ$ (107°). Sol. EtOH, Et_2O , C_6H_6 . Mod. sol. H_2O . P + HI at $200^\circ \rightarrow$ hexahydrobenzoic acid.

Me ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. $103^\circ/17$ mm., $96^\circ/16$ mm.

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. Prisms or needles. M.p. $20-2^\circ$. B.p. $99-100^\circ/15$ mm., $111^\circ/18$ mm. D_4^{25} 1.0471. n_D^{25} 1.457.

Dict. of Org. Comp.—II.

Amide: $\text{C}_7\text{H}_{13}\text{O}_2\text{N}$. MW, 143. Needles from AcOEt. M.p. $128-9^\circ$ (124°). Sol. EtOH, Me_2CO , AcOH, hot AcOEt. Mod. sol. C_6H_6 . Spar. sol. pet. ether. *Benzoate*: m.p. 118° .

Nitrile: cyclohexanone cyanhydrin. $\text{C}_7\text{H}_{11}\text{ON}$. MW, 125. M.p. 29° . B.p. $125-6^\circ/17-5$ mm. Sol. H_2O . Insol. usual org. solvents. *Benzoate*: cryst. m.p. 71° .

Ultée, *Rec. trav. chim.*, 1909, 28, 4, 19.

Tarbouriech, *Compt. rend.*, 1909, 149, 604.

Aloy, Rabaut, *Compt. rend.*, 1913, 156, 1548.

Meerwein, *Ann.*, 1913, 396, 239.

Auwers, Krollpfeiffer, *Ber.*, 1915, 48, 1392.

Boeseken, Lutgerhost, *Rec. trav. chim.*, 1932, 51, 164.

2-Hydroxyhexahydrobenzoic Acid.

See Hexahydrosalicylic Acid.

3-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-3-carboxylic acid).

Cis:

Plates from AcOEt. M.p. 132° . Sol. EtOH, Et_2O , H_2O .

Me ester: $\text{C}_8\text{H}_{14}\text{O}_3$. MW, 158. B.p. $140-50^\circ/14$ mm.

Et ester: $\text{C}_9\text{H}_{16}\text{O}_3$. MW, 172. B.p. $148-58^\circ/14$ mm.

Amide: $\text{C}_7\text{H}_{13}\text{O}_2\text{N}$. MW, 143. Plates from H_2O . M.p. 161° .

Trans:

Cryst. from Et_2O . M.p. $119-20^\circ$. Sol. H_2O , EtOH. Spar. sol. Et_2O .

Einhorn, Coblitz, D.R.P., 81,443; *Ann.*, 1896, 291, 298.

Perkin, Tattersall, *J. Chem. Soc.*, 1907, 91, 482.

Schwenk, Jordan, U.S.P., 1,877,991, (*Chem. Abstracts*, 1933, 27, 311).

Balas, Srol, *Chem. Zentr.*, 1930, II, 1072.

4-Hydroxyhexahydrobenzoic Acid (Cyclohexanol-4-carboxylic acid).

Cis:

Needles or prisms from pet. ether. M.p. 152° . Sol. Et_2O , C_6H_6 , pet. ether. Slightly sol. Me_2CO , H_2O .

Lactone: cryst. from Et_2O . M.p. $109-10^\circ$.

Trans:

Needles from Me_2CO . M.p. $120-1^\circ$.

Me ester: n_D^{25} 1.4693. *Acetyl*: m.p. $45-5-6.5^\circ$. *Benzoyl*: m.p. $92-4^\circ$.

Acetyl: m.p. $139-40^\circ$.

Perkin, *J. Chem. Soc.*, 1904, 85, 430.

Balas, Srol, *Chem. Zentr.*, 1930, II, 1072.

6-Hydroxyhexahydrophenyl- α -alanine.

See Hexahydrotyrosine.

4-Hydroxyhexahydrophenylethylamine.

See Hexahydrotyramine.

Hydroxyhexahydrodrotoluic Acid.

See Methylcyclohexanol-carboxylic Acid.

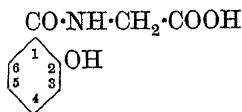
Hydroxyhexane.

See *n*-Hexyl Alcohol, Methyl-*n*-butylcarbinol and Ethylpropylcarbinol.

Hydroxyhexene.

See Hexenol.

2-Hydroxyhippuric Acid (*Salicyloylaminoacetic acid*, *o*-hydroxybenzoylglycine, *salicyloylglycine*)



$\text{C}_9\text{H}_9\text{O}_4\text{N}$

MW, 195

Needles from H_2O or $\text{EtOH}\cdot\text{C}_6\text{H}_6$. M.p. $170\text{--}2^\circ$ (164°). Sol. EtOH , MeOH , Me_2CO , AcOEt . Spar. sol. H_2O , Et_2O , C_6H_6 , CHCl_3 , pet. ether. Strong acid. $\text{FeCl}_3 \rightarrow$ violet col. *Et ester*: $\text{C}_{11}\text{H}_{13}\text{O}_4\text{N}$. MW, 223. Needles from H_2O or Et_2O . M.p. $98\text{--}9^\circ$ (88°).

Acetyl: m.p. $147\text{--}9^\circ$.

Bondi, *Z. physiol. Chem.*, 1907, 52, 172.

Fischer, *Ber.*, 1909, 42, 221.

Schroeter, *Ber.*, 1919, 52, 2226.

3-Hydroxyhippuric Acid (*3-Hydroxybenzoylaminoacetic acid*, *m*-hydroxybenzoylglycine).

Needles from H_2O . Sol. EtOH , Et_2O . Spar. sol. cold H_2O . Conc. $\text{HCl} \rightarrow$ glycine + *m*-hydroxybenzoic acid.

Baumann, Herter, *Z. physiol. Chem.*, 1877, 1, 260.

Conrad, *J. prakt. Chem.*, 1877, 15, 259.

4-Hydroxyhippuric Acid (*4-Hydroxybenzoylaminoacetic acid*, *p*-hydroxybenzoylglycine).

Prisms from H_2O . M.p. 240° decomp. Sol. hot EtOH . Spar. sol. hot Me_2CO , AcOEt . Insol. Et_2O , C_6H_6 , CHCl_3 , pet. ether. Millon's reagent \rightarrow red col.

Me ether: see Anisoylglycine.

Baumann, Herter, *Z. physiol. Chem.*, 1877, 1, 260.

Fischer, *Ber.*, 1908, 41, 2880.

Matsuo, *J. Biol. Chem.*, 1918, 35, 295.

1-Hydroxyhomopiperidinic Acid.

See 1-Hydroxy-4-aminovaleric Acid.

 α -Hydroxyhomopiperonylic Acid.

See 3:4-Methylenedioxymandelic Acid.

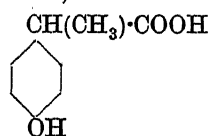
 α -Hydroxyhydratropic Acid.

See Atrolactic Acid.

 β -Hydroxyhydratropic Acid.

See Tropic Acid.

4-Hydroxyhydratropic Acid (*1-p-Hydroxyphenylpropionic acid*)



$\text{C}_9\text{H}_{10}\text{O}_3$

MW, 166

l-.
Me ether: 1-*p*-methoxyphenylpropionic acid.

$\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. M.p. 57° . $[\alpha]_D^{25} - 67^\circ 40'$ in 96% EtOH .

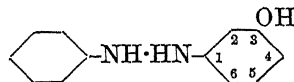
dl-.
Needles from H_2O , prisms from Et_2O . M.p. 130° . Sol. hot H_2O , EtOH , Et_2O . Spar. sol. cold H_2O . Insol. CS_2 .

Me ether: $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. Prisms from Et_2O -pet. ether. M.p. 57° . Sol. EtOH , Et_2O , C_6H_6 . Spar. sol. cold pet. ether, cold H_2O .

Et ether: $\text{C}_{11}\text{H}_{14}\text{O}_3$. MW, 194. Cryst. from H_2O . M.p. 68° . Sol. hot H_2O , Et_2O , EtOH .

Bougault, *Ann. chim.*, 1902, 25, 519, 530.

3-Hydroxyhydrazobenzene (*3-Hydroxy-sym.-diphenylhydrazine*, *sym.-phenyl-m-hydroxyphenylhydrazine*)



$\text{C}_{12}\text{H}_{12}\text{ON}_2$

MW, 200

Needles from C_6H_6 -ligroin. M.p. $126\text{--}126.5^\circ$. Sol. hot H_2O , EtOH , Et_2O . Spar. sol. ligroin. Min. acids \rightarrow 2-hydroxybenzidine.

Et ether: $\text{C}_{14}\text{H}_{16}\text{ON}_2$. MW, 228. Needles. M.p. $74\text{--}5^\circ$.

Jacobson, Hönigsberger, *Ber.*, 1903, 36, 4112.

4-Hydroxyhydrazobenzene (*4-Hydroxy-sym.-diphenylhydrazine*, *sym.-phenyl-p-hydroxyphenylhydrazine*).

Et ether: m.p. 86° .

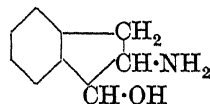
Acetyl: needles from C_6H_6 -ligroin. M.p. $114\text{--}15^\circ$. Sol. EtOH , C_6H_6 . Spar. sol. ligroin. Insol. alkalis.

Benzoyl: prisms. M.p. 173° . Sol. EtOH , Et_2O , C_6H_6 .

Goldschmidt, Brubacher, *Ber.*, 1891, 24, 2309.

Jacobson, Hegershoff, *Ber.*, 1903, 36, 3848.

1-Hydroxy-2-hydrindamine (*2-Amino-indanol-1*, *1-hydroxy-2-aminohydrindene*)



$\text{C}_9\text{H}_{11}\text{ON}$

MW, 149

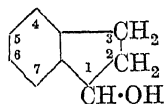
Plates from Et_2O . M.p. $132\text{--}3^\circ$. Sol. H_2O , EtOH . Spar. sol. Et_2O , C_6H_6 . $\text{HNO}_2 \rightarrow$ hydrindene glycol.

B, HCl: m.p. $171\text{--}2^\circ$.

Benzylidene deriv.: cryst. from EtOH . M.p. $163\text{--}4^\circ$.

Spilker, *Ber.*, 1893, 26, 1542.

Levin *et al.*, *J. Org. Chem.*, 1944, 9, 380.

1-Hydroxyhydrindene (1-Indanol, 1-hydroxyindane) $C_9H_{10}O$

MW, 134

Plates from pet. ether. M.p. 54. B.p. 128°/12 mm. Very sol. EtOH, $CHCl_3$, C_6H_6 . Spar. sol. pet. ether, H_2O .

Acetyl: oil. B.p. 241°, 135°/15 mm.

Me ether: $C_{10}H_{12}O$. MW, 148. Oil. B.p. about 98°/10 mm.

Et ether: $C_{11}H_{14}O$. MW, 162. Oil. B.p. 106–9°/16 mm.

Weissgerber, *Ber.*, 1911, 44, 1445.

4-Hydroxyhydrindene (4-Indanol, 4-hydroxyindane).

Cryst. from pet. ether. M.p. 49–50° (39–40°). B.p. 120°/12 mm.

Me ether: oil. B.p. 225–7°.

Goth, *Ber.*, 1928, 61, 1459.

Moschner, *Ber.*, 1901, 34, 1258.

5-Hydroxyhydrindene (5-Indanol, 5-hydroxyindane).

Needles from pet. ether. M.p. 55°. B.p. 255°. Very sol. EtOH, Et_2O . Spar. sol. hot H_2O , pet. ether.

Me ether: oil. B.p. 233–4°.

Et ether: oil. B.p. 246°.

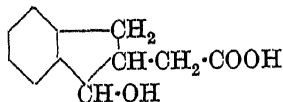
Acetyl: m.p. 16–17°. B.p. 136°/18 mm.

Benzoyl: plates from EtOH. M.p. 106–7°.

Borsche, John, *Ber.*, 1924, 57, 659.

Moschner, *Ber.*, 1900, 33, 739.

Paranjpe *et al.*, *Chem. Abstracts*, 1944, 38, 1740, 3279.

1-Hydroxyhydrindenyl-2-acetic Acid (1-Indanol-2-acetic acid, 1-hydroxy-2-carboxymethylhydrindene) $C_{11}H_{12}O_3$

MW, 192

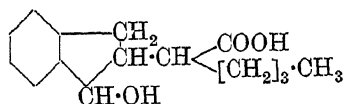
Cis:

Lactone: $C_{11}H_{10}O_2$. MW, 174. Cryst. from pet. ether. M.p. 73°. Sol. EtOH, MeOH, C_6H_6 , Et_2O , NH_3 , NaOH. Insol. $NaHCO_3$.

Trans:

Cryst. from hot H_2O , dil. EtOH, or C_6H_6 - Me_2CO . M.p. 131°. Sol. EtOH, Et_2O . Spar. sol. cold H_2O , C_6H_6 .

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

 α -1-Hydroxyhydrindenyl-2-*n*-hexoic Acid $C_{15}H_{20}O_3$

MW, 248

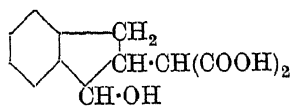
Cis:

Lactone: $C_{15}H_{18}O_2$. MW, 230. Cryst. from pet. ether or EtOH. M.p. 105°.

Trans:

Cryst. from C_6H_6 . M.p. 122°.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

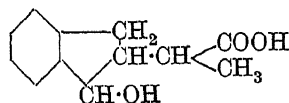
1-Hydroxyhydrindenyl-2-malonic Acid (1-Indanol-2-malonic acid) $C_{12}H_{12}O_5$

MW, 236

Trans:

Cryst. from H_2O or EtOH- C_6H_6 . M.p. 118°. Spar. sol. Et_2O , C_6H_6 . Heat at 120–30° \rightarrow trans-1-hydroxyhydrindenyl-2-acetic acid.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1299.

 α -1-Hydroxyhydrindenyl-2-propionic Acid (1-Indanol-2- α -propionic acid) $C_{12}H_{14}O_3$

MW, 206

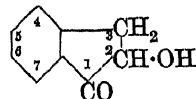
Cis:

Lactone: $C_{12}H_{12}O_2$. MW, 188. Cryst. from pet. ether. M.p. 102°.

Trans:

Cryst. from C_6H_6 - Me_2CO . M.p. 131°.

Peacock, Menon, *J. Chem. Soc.*, 1934, 1302.

2-Hydroxyhydrindone (2-Hydroxyindanone) $C_9H_8O_2$

MW, 148

M.p. 40°. B.p. 128–33°/1 mm. Reduces cold Fehling's.

Acetyl: b.p. 137°/1 mm.

Phenylurethane: cryst. M.p. 133–4°.

Ishiwara, *J. prakt. Chem.*, 1924, 108, 194.

5-Hydroxyhydrindone (5-Hydroxyindanone).

Yellow prisms from EtOH. M.p. 183° decomp. Sol. Et_2O , C_6H_6 , hot EtOH. Spar. sol. pet. ether.

Me ether: $C_{10}H_{10}O_2$. MW, 162. Needles from H_2O . M.p. 110° . Sol. usual org. solvents. Spar. sol. Et_2O , pet. ether. *Semicarbazone*: leaflets from $AcOH.Aq$. M.p. 239° . *Oxime*: needles from $MeOH$. M.p. 151° . *p-Nitrophenylhydrazones*: orange cryst. M.p. $209-211.5^\circ$ decomp. *2:4-Dinitrophenylhydrazones*: red cryst. M.p. $282-4^\circ$ decomp.

Acetyl: m.p. 93° .

Semicarbazone: cryst. from $EtOH$. M.p. 223° decomp.

Auwers, Hilliger, *Ber.*, 1916, 49, 2412.

Ingold, Piggott, *J. Chem. Soc.*, 1923, 123, 1503.

6-Hydroxyhydrindone (6-Hydroxyindanone).

Needles from H_2O . M.p. $151-3^\circ$. $FeCl_3 \rightarrow$ violet col.

Me ether: plates from $EtOH$. M.p. 109° . *Oxime*: needles from $EtOH$. M.p. 133° .

Benzoyl: m.p. 141° .

Ingold, Piggott, *J. Chem. Soc.*, 1923, 123, 1492.

7-Hydroxyhydrindone (7-Hydroxyindanone).

Cryst. from $EtOH$. M.p. 111° . B.p. $144^\circ/20$ mm. Sol. $EtOH$, Et_2O , C_6H_6 . Spar. sol. pet. ether. Volatile in steam.

Acetyl: cryst. from Et_2O . M.p. 78° .

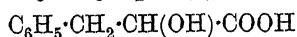
Semicarbazone: micro-cryst. from $EtOH$. M.p. 243° .

Ingold, Piggott, *J. Chem. Soc.*, 1923, 123, 1492.

Auwers, Hilliger, *Ber.*, 1916, 49, 2412.

Johnson, Anderson, Shelberg, *J. Am. Chem. Soc.*, 1944, 66, 218.

α -Hydroxyhydrocinnamic Acid (2-Phenyllactic acid, 1-hydroxy-2-phenylpropionic acid)



$C_9H_{10}O_3$ MW, 166

d.

Needles from H_2O . M.p. $124-6^\circ$ (122°). Sol. hot H_2O , $MeOH$, $EtOH$, Me_2CO , Et_2O , $AcOEt$, hot C_6H_6 . Spar. sol. $CHCl_3$, pet. ether, CS_2 . $[\alpha]_D^{20} + 22.2^\circ$ in H_2O .

Me ester: $C_{10}H_{12}O_3$. MW, 180. M.p. $48-5^\circ$.

Et ester: $C_{11}H_{14}O_3$. MW, 194. Needles from H_2O . M.p. $46-7^\circ$. B.p. $152-4^\circ/20$ mm. $[\alpha]_D^{17.5} + 22.5^\circ$ in C_6H_6 .

Amide: $C_9H_{11}O_2N$. MW, 165. Plates from C_6H_6 . M.p. $112-13^\circ$. $[\alpha]_D^{20} + 81.4^\circ$ in $EtOH$.

Et-amide: $C_{11}H_{15}O_2N$. MW, 193. Plates from C_6H_6 -pet. ether. M.p. $56-56.5^\circ$. Sol. H_2O , $EtOH$, Et_2O , C_6H_6 . Spar. sol. pet. ether.

l.

Needles from H_2O . M.p. $124-5^\circ$. $[\alpha]_D^{12} - 18.7^\circ$ in $EtOH$. Sol. H_2O , $EtOH$, Et_2O .

Me ester: needles from $EtOH$. M.p. $48-5^\circ$. B.p. $155^\circ/17$ mm. $[\alpha]_D^{18.5} + 6.4^\circ$.

Et ester: m.p. $46-7^\circ$. B.p. $159-60^\circ/26$ mm. $[\alpha]_D^{18} - 22.6^\circ$ in C_6H_6 .

dl.

Cryst. from $CHCl_3$ or C_6H_6 . M.p. $97-8^\circ$. B.p. $148-50^\circ/15$ mm. $k = 1.93 \times 10^{-4}$ at 25° . Dil. H_2SO_4 at $200^\circ \rightarrow$ 2-phenylnaphthalene.

Me ester: m.p. 33° . B.p. $143^\circ/15$ mm.

Et ester: b.p. $156^\circ/20$ mm.

Phenyl ether: $C_{15}H_{14}O_3$. MW, 242. M.p. 81° . Sol. hot H_2O , $EtOH$. Insol. cold H_2O .

Amide: plates from C_6H_6 . M.p. $111-12^\circ$. Sol. H_2O , $EtOH$. Spar. sol. C_6H_6 .

Nitrile: phenylacetaldehyde cyanhydrin. C_9H_9ON . MW, 147. Needles from C_6H_6 . M.p. $57-8^\circ$. Sol. $EtOH$, Et_2O , $CHCl_3$. Spar. sol. hot pet. ether.

Acetyl: m.p. 72° .

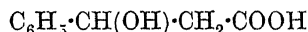
Darapsky, *J. prakt. Chem.*, 1917, 96, 308.

McKenzie, Wren, *J. Chem. Soc.*, 1910, 97, 1358.

Dakin, Dudley, *J. Biol. Chem.*, 1914, 18, 44.

Biquard, *Ann. chim.*, 1933, 20, 137.

β -Hydroxyhydrocinnamic Acid (2-Phenylhydracrylic acid, 2-hydroxy-2-phenylpropionic acid)



$C_9H_{10}O_3$ MW, 166

d.

Cryst. from C_6H_6 . M.p. $115-16^\circ$. $[\alpha]_D^{18} + 19.2^\circ$ in $EtOH$. Conc. $HCl \rightarrow$ cinnamic acid.

Me ester: $C_{10}H_{12}O_3$. MW, 180. $[\alpha]_D + 14.1^\circ$ in $EtOH$.

Amide: $C_9H_{11}O_2N$. MW, 165. Needles from C_6H_6 . M.p. $105-6^\circ$. $[\alpha]_D^{15} + 38.4^\circ$ in $EtOH$. Sol. H_2O , $EtOH$, Et_2O . Spar. sol. $CHCl_3$, C_6H_6 , CS_2 .

l.

Needles from C_6H_6 . M.p. $115-16^\circ$. $[\alpha]_D - 18.9^\circ$ in $EtOH$.

Me ester: $[\alpha]_D - 17.0^\circ$ in $EtOH$.

Et-amide: $C_{11}H_{15}O_2N$. MW, 193. Needles from C_6H_6 -pet. ether. M.p. $108-9^\circ$. $[\alpha]_D^{15.5} - 26.2^\circ$ in $EtOH$. Sol. H_2O , $EtOH$, Et_2O , $CHCl_3$. Spar. sol. pet. ether, C_6H_6 , CS_2 .

dl.

Prisms from H_2O . M.p. 96° . Sol. H_2O , $MeOH$, $EtOH$, Me_2CO . Spar. sol. pet. ether, C_6H_6 . $k = 4.0 \times 10^{-5}$ at 25° .

Me ester: b.p. $158-61^\circ/17-18$ mm.

Et ester: $C_{11}H_{14}O_3$. MW, 194. B.p. $160^\circ/15-16$ mm., $135^\circ/9-10$ mm. Sol. H_2O .

Me ether: $C_{10}H_{12}O_3$. MW, 180. Plates from pet. ether. M.p. 98° . Sol. $EtOH$, Et_2O , $CHCl_3$, $AcOEt$, CCl_4 , C_6H_6 , warm pet. ether. *Me ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 253° .

Et ether: $C_{11}H_{14}O_3$. MW, 194. Plates from pet. ether. M.p. 75° . Sol. H_2O . *Me ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 256° .

Phenyl ether: $C_{15}H_{14}O_3$. MW, 242. Needles from C_6H_6 . M.p. 150–1°.

Acetyl: m.p. 100–1°.

Posner, *Ber.*, 1905, **38**, 2319.

Schrauth, Schoeller, Struensee, *Ber.*, 1911, **44**, 1436.

Darapsky, *J. prakt. Chem.*, 1917, **96**, 308.

Abbot *et al.*, *Ber.*, 1938, **71**, 9.

Hauer, Breslow, *Organic Syntheses*, 1941, **XXI**, 51.

Davis, Carmack, *J. Org. Chem.*, 1947, **12**, 76.

2-Hydroxyhydrocinnamic Acid.

See Melilotic Acid.

3-Hydroxyhydrocinnamic Acid.

See m-Hydrocoumaric Acid.

4-Hydroxyhydrocinnamic Acid.

See Phloretic Acid.

Hydroxyhydroquinone.

See 1 : 2 : 4-Trihydroxybenzene.

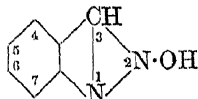
5-Hydroxy-2-hydroxymethyl- γ -pyrone.

See Kojic Acid.

Hydroxyindane.

See Hydroxyhydrindene.

2-Hydroxyindazole (N-Hydroxyindazole, 2-indazolol)



$C_7H_6ON_2$ MW, 134

Needles from H_2O . M.p. 139–139.5°. Sol. EtOH, hot C_6H_6 . Mod. sol. Et_2O , ligroin. Spar. sol. H_2O , pet. ether. $FeCl_3 \rightarrow$ orange-red col. $Sn + HCl \rightarrow$ indazole. Polymerises.

Bamberger, Demuth, *Ber.*, 1902, **35**, 1891.

3-Hydroxyindazole (3-Indazolol).

Plates from EtOH or AcOH. M.p. 206°. Sol. Me_2CO , hot AcOEt. Spar. sol. H_2O , Et_2O , C_6H_6 . Alc. $FeCl_3 \rightarrow$ blue col.

2-Acetyl: cryst. from AcOH. M.p. 188°. Sol. hot AcOH. Spar. sol. H_2O , EtOH, Me_2CO , C_6H_6 , AcOEt. Insol. Et_2O , $CHCl_3$. No col. with alc. $FeCl_3$.

Heller, Köhler, *Ber.*, 1923, **56**, 1598.

Hantzsch, *Ber.*, 1925, **58**, 680.

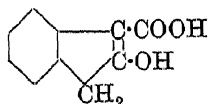
6-Hydroxyindazole (6-Indazolol).

Plates from H_2O . M.p. 215–16°. Sol. hot H_2O . Spar. sol. Et_2O . Sublimes.

Witt, Nölting, Grandmougin, *Ber.*, 1890, **23**, 3641; *Ber.*, 1892, **25**, 3152.

Fries, Roth, *Ann.*, 1914, **404**, 84.

2-Hydroxyindene-3-carboxylic Acid (2-Hydroxyindene-1-carboxylic acid)



$C_{10}H_8O_3$

MW, 176

Et ester: $C_{12}H_{10}O_3$. MW, 204. Cryst. from EtOH. M.p. 68–9°. Reacts acid. Alc. $FeCl_3 \rightarrow$ intense blue col.

Cu salt: greyish-brown cryst., m.p. 222°.

Nitrile: $C_{10}H_7ON$. MW, 157. Leaflets from EtOH.Aq. M.p. 172° decomp. Sol. AcOH.

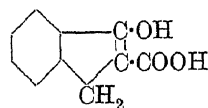
Me ether: $C_{11}H_9ON$. MW, 171. Needles from MeOH. M.p. 88°. B.p. 195°/25 mm. *Et ether*:

$C_{12}H_{11}ON$. MW, 185. Needles from EtOH. M.p. 84°. B.p. 212°/25 mm. *Benzoate*: needles from EtOH. M.p. 123°.

Moore, Thorpe, *J. Chem. Soc.*, 1908, **93**, 178.

Dieckmann, *Ber.*, 1922, **55**, 2489.

3-Hydroxyindene-2-carboxylic Acid (1-Hydroxyindene-2-carboxylic acid)



$C_{10}H_8O_3$

MW, 176

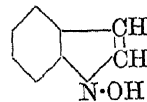
Et ester: $C_{12}H_{12}O_3$. MW, 204. Oil. B.p. 185°/20 mm. *Cu salt*: cryst. from C_6H_6 or $CHCl_3$, m.p. 195–9°.

Nitrile: $C_{10}H_7ON$. MW, 157. Needles from EtOH.Aq. M.p. 73°. Steam + dil. $H_2SO_4 \rightarrow$ 1-hydrindone. Alc. $FeCl_3 \rightarrow$ green col. *Me ether*: $C_{11}H_9ON$. MW, 171. Oil. B.p. 185°/20 mm. *Benzoate*: needles from EtOH. M.p. 101.5°.

Dieckmann, *Ber.*, 1922, **55**, 2489.

Mitchell, Thorpe, *J. Chem. Soc.*, 1910, **97**, 2277.

N-Hydroxyindole (1-Hydroxyindole, 1-indolol)



C_8H_7ON

MW, 133

Brown cryst. M.p. 160°. Insol. dil. min. acids. Does not form picrate. Conc. $H_2SO_4 \rightarrow$ intense green col.

Ingraffia, *Gazz. chim. ital.*, 1933, **63**, 175.

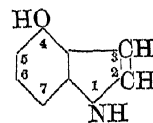
2-Hydroxyindole.

See Oxindole.

3-Hydroxyindole.

See Indoxyl.

4-Hydroxyindole (4-Indolol)



C_8H_7ON

MW, 133

Me ether: C_9H_9ON . MW, 147. Needles from pet. ether. M.p. 69.5°. *Picrate*: red needles from EtOH. M.p. 159–60°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, **125**, 328.

5-Hydroxyindole (5-Indolol).

Me ether: C_8H_9ON . MW, 147. Needles from pet. ether. M.p. 55°. B.p. 176–8°/17 mm. Spar. sol. hot H_2O . Slightly volatile in steam. *N-Acetyl*: needles from EtOH. M.p. 82°. B.p. 210–11°/25 mm. *Picrate*: red needles from EtOH. M.p. 145°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 322.

6-Hydroxyindole (6-Indolol).

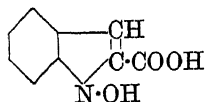
Me ether: C_8H_9ON . MW, 147. Plates from pet. ether. M.p. 91–2°. *Picrate*: red needles from C_6H_6 –pet. ether. M.p. 137°.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1922, 121, 1879.

7-Hydroxyindole (7-Indolol).

Me ether: C_8H_9ON . MW, 147. B.p. 157°/17 mm., 159–61°/21 mm. Volatile in steam. *Picrate*: red needles. M.p. 156°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 327.

N-Hydroxyindole-2-carboxylic Acid (1-Indolol-2-carboxylic acid)

$C_8H_7O_3N$

MW, 177

Prisms from Me_2CO .Aq. M.p. 159.5° decomp. Sol. EtOH, Me_2CO , Et_2O , AcOH. Mod. sol. H_2O . Spar. sol. C_6H_6 , $CHCl_3$, ligroin. $FeCl_3 \rightarrow$ blue col. Reduces warm Fehling's. Conc. $H_2SO_4 \rightarrow$ blue col. on warming. Cold conc. $H_2SO_4 \rightarrow$ indigo. $Zn + AcOH \rightarrow$ indole-1-carboxylic acid. $CrO_3 + AcOH \rightarrow$ isatin.

Me ester: $C_{10}H_9O_3N$. MW, 191. Needles from ligroin. M.p. 100–1°.

Et ester: $C_{11}H_{11}O_3N$. MW, 205. Prisms from ligroin. M.p. 65°. Volatile in steam. *Acetyl*: needles from EtOH. M.p. 76–7°. *Benzoyl*: cryst. from EtOH. M.p. 104–5°.

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from Me_2CO .Aq. M.p. 185° decomp. Sol. hot EtOH, Et_2O , C_6H_6 , Me_2CO . Spar. sol. H_2O , ligroin. Does not reduce Fehling's. $NaHg \rightarrow$ indole-2-carboxylic acid. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Cryst. from ligroin. M.p. 68°. Sol. usual org. solvents. *Chloride*: $C_{10}H_8O_2NCl$. MW, 209.5. Needles from ligroin. M.p. 61°. Sol. usual org. solvents. *Amide*: $C_{10}H_{10}O_2N_2$. MW, 190. Plates from H_2O . M.p. 108°. Sol. most org. solvents. Spar. sol. H_2O , ligroin.

Acetyl: needles from Me_2CO .Aq. M.p. 161°. Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , ligroin.

Benzoyl: cryst. from C_6H_6 . M.p. 151° de-

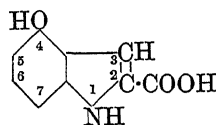
comp. Sol. hot EtOH, Et_2O , Me_2CO , $CHCl_3$. Spar. sol. ligroin.

Reissert, *Ber.*, 1896, 29, 646.

Gabriel, Gerhardt, Wolter, *Ber.*, 1923, 56, 1025.

3-Hydroxyindole-2-carboxylic Acid.

See Indoxyllic Acid.

4-Hydroxyindole-2-carboxylic Acid (4-Indolol-2-carboxylic acid)

$C_9H_7O_3N$

MW, 177

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. 234–5° decomp. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from EtOH. M.p. 143–5°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 161–5°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 312.

5-Hydroxyindole-2-carboxylic Acid (5-Indolol-2-carboxylic acid).

M.p. 246° decomp.

Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. 196–7° decomp. Sol. EtOH, Et_2O , AcOH. Spar. sol. hot H_2O , C_6H_6 . *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 177°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Colourless needles from EtOH. M.p. 156° (152–3°).

Carbobenzoyloxy: m.p. 193–4°. *Me ester*: m.p. 150–1°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 309.

Bergel, Morrison, *J. Chem. Soc.*, 1943, 49.

6-Hydroxyindole-2-carboxylic Acid (6-Indolol-2-carboxylic acid).

Me ether: $C_{10}H_9O_3N$. MW, 191. Sandy cryst. M.p. 196–7°. Sol. EtOH, AcOH. Above m.p. \rightarrow 6-methoxyindole.

Kermack, Perkin, Robinson, *J. Chem. Soc.*, 1921, 119, 1632.

7-Hydroxyindole-2-carboxylic Acid (7-Indolol-2-carboxylic acid).

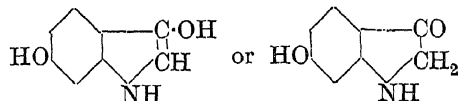
Me ether: $C_{10}H_9O_3N$. MW, 191. Needles from H_2O . M.p. 182°. *Me ester*: $C_{11}H_{11}O_3N$. MW, 205. Plates from MeOH. M.p. 120°. *Et ester*: $C_{12}H_{13}O_3N$. MW, 219. Needles from EtOH. M.p. 114°.

Blaikie, Perkin, *J. Chem. Soc.*, 1924, 125, 311.

 β -[3-Hydroxy-2-indolyl]-indole.

See Indileucin.

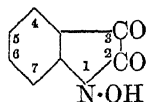
6-Hydroxyindoxyl (3 : 6-Dihydroxyindole)

 $C_8H_7O_2N$

MW, 149

Dibenzoyl deriv.: prisms from EtOH. M.p. 136–7°.

Tutin, *J. Chem. Soc.*, 1910, 97, 2515.

N-Hydroxyisatin (1-Hydroxyisatin) $C_8H_5O_3N$

MW, 163

Orange-red needles from AcOH. M.p. 200–1° (192–3°). Sol. EtOH, Me₂CO. Spar. sol. H₂O, Et₂O. Sol. Na₂CO₃, NaHCO₃, → violet col. Conc. H₂SO₄ → brownish-red col. → blue on addn. of C₆H₆. Hot dil. H₂SO₄ → anthroxanic acid.

Acetyl: orange-red plates from C₆H₆. M.p. 151–2°.

Mono-phenylhydrazone: yellow cryst. from EtOH. M.p. 220° (218–19°).

Di-phenylhydrazone: orange cryst. from EtOH. M.p. 173° (169°) decomp.

Heller, *Ber.*, 1906, 39, 2345.

Alessandri, *Gazz. chim. ital.*, 1927, 57, 195.

Arndt, Eistert, Partale, *Ber.*, 1927, 60, 1367.

5-Hydroxyisatin.

M.p. above 360°.

Me ether: C₉H₇O₃N. MW, 177. Reddish-brown powder. M.p. 201–2°. Sol. Me₂CO, AcOH. Mod. sol. EtOH, AcOEt. Spar. sol. H₂O, Et₂O, C₆H₆, CHCl₃. Insol. pet. ether, CS₂, CCl₄.

Anil: C₁₅H₁₂O₂N₂. MW, 252. Orange needles from amyl alcohol. M.p. 223°. Sol. Me₂CO, CHCl₃, AcOH. Mod. sol. AcOEt. Spar. sol. EtOH, Et₂O, C₆H₆, CS₂.

N-Acetyl: red prisms or needles from CHCl₃-pet. ether. M.p. 144–5°. Sol. Me₂CO, C₆H₆, CHCl₃, AcOH, AcOEt. Spar. sol. EtOH, Et₂O, CS₂, CCl₄. Insol. H₂O, pet. ether.

Halberkann, *Ber.*, 1921, 54, 3087.

Hartmann, Panizzon, *Helv. Chim. Acta*, 1936, 19, 1327.

Ferber, Schmolke, *J. prakt. Chem.*, 1940, 155, 234.

 α -Hydroxyisoamylbenzene.

See Isobutylphenylcarbinol.

Hydroxyisoamylbenzene.

See Isoamylphenol.

1-Hydroxyisobutane-1 : 1-dicarboxylic Acid.

See Isopropyltartronic Acid.

Hydroxyisobutylacetic Acid.

See Hydroxyisocaproic Acid.

2-Hydroxyisobutylamine.

See Amino-*tert.*-butyl Alcohol.

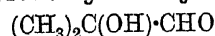
 α -Hydroxyisobutylbenzene.

See Isopropylphenylcarbinol.

 β -Hydroxyisobutylbenzene.

See Dimethyl-benzylcarbinol.

1-Hydroxyisobutyraldehyde

 $C_4H_8O_2$

MW, 88

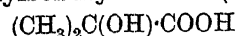
B.p. 137°, 50–5°/32 mm. Polymerises.

2 : 4-Dinitrophenylhydrazone : orange-red. M.p. 142°.

Franke, *Monatsh.*, 1900, 21, 213, 1127.

Dworzak, Pierri, *Monatsh.*, 1929, 52, 144.

Avy, *Bull. soc. chim.*, 1931, 49, 15.

1-Hydroxyisobutyric Acid (*Acetonic acid*) $C_4H_8O_3$

MW, 104

Hygroscopic prisms from Et₂O. Sublimes at 50°. M.p. 79° (76°). B.p. 212°, 114°/12 mm., 84°/1.5 mm. Volatile in steam. Very sol. H₂O, EtOH, Et₂O, hot C₆H₆. Spar. sol. cold C₆H₆. $k = 1.06 \times 10^{-4}$ at 25°.

Me ester: C₅H₁₀O₃. MW, 118. B.p. 137°.

Et ester: C₆H₁₂O₃. MW, 132. B.p. 150°.

Chaulmoogryl ester: b.p. 195–205°/0.1 mm. n_D^{20} 1.4617.

Amide: C₄H₉O₂N. MW, 103. Plates from Me₂CO. M.p. 98° (96°). B.p. 260°. Very sol. EtOH, H₂O.

Nitrile: acetone cyanhydrin. C₄H₇ON. MW, 85. M.p. –19°. B.p. 82°/23 mm. D_4^{20} 0.93. n_D^{20} 1.3996. Very sol. H₂O and most org. solvents except pet. ether.

Me ether: 1-methoxyisobutyric acid. C₅H₁₀O₂. MW, 118. *Me ester*: C₆H₁₂O₂. MW, 132. B.p. 134–7°/755 mm.

Et ether: 1-ethoxyisobutyric acid. C₆H₁₂O₃. MW, 132. B.p. 180°/741 mm. D_{18}^{18} 1.0101. Sol. hot H₂O.

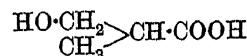
Acetyl: 1-acetoxyisobutyric acid. Needles from CS₂. M.p. 61°. *Nitrile*: b.p. 180–2°. D_{19}^{19} 0.997.

Anschütz, Motschmann, *Ann.*, 1912, 392, 108.

Hepworth, *J. Chem. Soc.*, 1919, 115, 1207.

Bucherer, Grotee, *Ber.*, 1906, 39, 1225.

Rule, Harrower, *J. Chem. Soc.*, 1930, 2326.

2-Hydroxyisobutyric Acid (1-Methylhydra-
acrylic acid) $C_4H_8O_3$

MW, 104

Liq. Misc. with H₂O.

Na salt: cryst. from EtOH.

Et ester: C₆H₁₂O₃. MW, 132. B.p. 76°/8 mm.

Acetyl: 2-acetoxyisobutyric acid. B.p. 132°/8 mm. *Et ester*: b.p. 75°/7 mm.

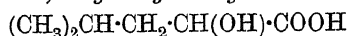
Lactone: $C_6H_6O_2$. MW, 86. B.p. 49–50°/10 mm. D_{20}^{20} 1.053.

Phenylurethane: m.p. 122°.

Blaise, Herman, *Ann. chim.*, 1909, 17, 390.

Johannson, *Chem. Zentr.*, 1916, II, 558.

1-Hydroxyisocaproic Acid (*Leucic acid*, *leucinic acid*, *1-hydroxyisobutylacetic acid*)



$C_6H_{12}O_3$ MW, 132

d-.

Prisms from Et_2O -pet. ether. M.p. 80–1°. $[\alpha]_D^{20} + 26.3^\circ$ (27.6° in 1% NaOH).

l-.

Cryst. from Et_2O . M.p. 81–2° after sintering at 78°. $[\alpha]_D^{20} - 27.8^\circ$ in 1% NaOH. Sublimes. Very sol. H_2O , EtOH, Et_2O .

Et ester: $C_8H_{16}O_3$. MW, 160. B.p. 79–80°/12 mm. $[\alpha]_D^{20} - 11.07^\circ$.

Acetyl: b.p. 155–7°/20 mm. *Me ester*: b.p. 103–4°/20 mm. *Et ester*: b.p. 120–1°/20 mm. *Chloride*: b.p. 87°/7 mm.

dl-.

Plates from Et_2O -pet. ether. M.p. 76–7°.

Et ester: b.p. 80–1°/16 mm. Very sol. EtOH, Et_2O . Spar. sol. H_2O .

Amide: $C_6H_{13}O_2N$. MW, 131. M.p. 51–2°.

Nitrile: isovaleraldehyde cyanhydrin. $C_6H_{11}ON$. MW, 113. Decomp. on dist. to isovaleraldehyde + HCN. *Acetyl*: b.p. 204°. D^{19} 0.960.

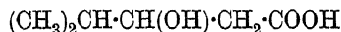
Scheibler, Wheeler, *Ber.*, 1911, 44, 2686.

Henry, *Chem. Zentr.*, 1898, II, 662.

Abderhalden, Weil, *Z. physiol. Chem.*, 1913, 84, 53.

Kodama, *Chem. Abstracts*, 1923, 17, 2562.

2-Hydroxyisocaproic Acid (*2-Hydroxyisobutylacetic acid*)



$C_6H_{12}O_3$ MW, 132

Syrup. B.p. 173–5°/43 mm., 165–6°/35 mm. Very sol. most org. solvents.

Et ether: 2-ethoxyisocaproic acid. $C_8H_{16}O_3$. MW, 160. *Et ester*: $C_{10}H_{20}O_3$. MW, 188. Oil. B.p. 75°/8 mm.

Linstead, *J. Chem. Soc.*, 1929, 2509.

Wogrinz, *Monatsh.*, 1903, 24, 250.

3-Hydroxyisocaproic Acid (*3-Hydroxyisobutylacetic acid*)



$C_6H_{12}O_3$ MW, 132

Passes readily into the lactone.

NH_4 salt: cryst. from EtOH. M.p. 127°.

Ag salt: needles from H_2O . Very sol. hot H_2O .

Ba salt: cryst. from EtOH. Very sol. H_2O . Spar. sol. EtOH.

Amide: $C_6H_{13}O_2N$. MW, 131. Plates from $CHCl_3$. M.p. 101° (98.5–99.5°). Very sol. EtOH. Spar. sol. $CHCl_3$. Insol. Et_2O , CS_2 , C_6H_6 .

Lactone: $C_6H_{10}O_2$. MW, 114. M.p. 10°. B.p. 205–7°, 95°/20 mm. $D_4^{16.2}$ 1.01460. $n_D^{16.2}$ 1.43541. Sol. 2 parts H_2O .

Ström, *J. prakt. Chem.*, 1893, 48, 220.

Hepworth, *J. Chem. Soc.*, 1919, 115, 1208.

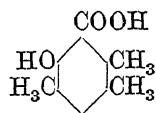
Hydroxyisocarbostryl.

See 1 : 4-Dihydroxyisoquinoline.

Hydroxyisodurene.

See Isodurenol.

6-Hydroxy-γ-isodurylic Acid (*6-Hydroxy-2 : 3 : 5-trimethylbenzoic acid*, *3 : 5 : 6-trimethylsalicylic acid*)

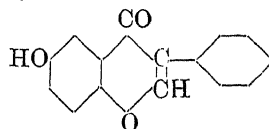


$C_{10}H_{12}O_3$ MW, 180

Needles from EtOH. M.p. 181°. Sol. Et_2O . Spar. sol. other solvents. Sublimes. Alc. $FeCl_3 \rightarrow$ blue col. Heat above m.p. \rightarrow 5-hydroxy-*p*-cumene.

Krohn, *Ber.*, 1888, 21, 884.

7-Hydroxyisoflavone



$C_{15}H_{10}O_3$ MW, 238

Leaflets from EtOH. M.p. 215° (205–6°). $H_2SO_4 \rightarrow$ sky-blue fluorescence.

Acetyl: needles from EtOH. M.p. 139°.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Plates from EtOH. M.p. 156°.

Benzyl ether: plates from EtOH. M.p. 171°.

Mahal, Rai, Venkatamaram, *J. Chem. Soc.*, 1934, 1121.

Baker, Robinson, *J. Chem. Soc.*, 1925, 1986.

2-Hydroxyisoheptane.

See 2-Methylhexanol-2.

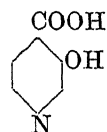
3-Hydroxyisohexane.

See Ethylisopropylcarbinol.

α-Hydroxyisohexylbenzene.

See Isoamylphenylcarbinol.

3-Hydroxyisonicotinic Acid (*3-Hydroxypyridine-4-carboxylic acid*)



$C_6H_5O_3N$

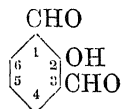
MW, 139

Leaflets or needles from H_2O . M.p. 315° (312°) decomp. Heat \rightarrow 3-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, **23**, 936.

Meyer, Graf, *Ber.*, 1928, **61**, 2214.

2-Hydroxyisophthalaldehyde (2:6-Dialdehydophenol)



$\text{C}_8\text{H}_6\text{O}_3$ MW, 150

Yellow needles from H_2O . M.p. 125° (88°). $\text{FeCl}_3 \rightarrow$ reddish-violet col. KOH fusion \rightarrow 2-hydroxyisophthalic acid. Volatile in steam. Forms bisulphite comp.

Voswinckel, *Ber.*, 1882, **15**, 2023.

Weil, Brimmer, *Ber.*, 1922, **55**, 304.

4-Hydroxyisophthalaldehyde (2:4-Dialdehydophenol).

Yellow needles from H_2O . M.p. 113° (108° , $108-9^\circ$). Sol. Et_2O , CHCl_3 . Mod. sol. EtOH. Spar. sol. hot H_2O . Insol. ligroin. $\text{FeCl}_3 \rightarrow$ red col. KOH fusion \rightarrow 4-hydroxyisophthalic acid. Forms bisulphite comp.

Me ether: $\text{C}_9\text{H}_8\text{O}_3$. MW, 164. M.p. $123-4^\circ$. *Dioxime*: yellow. M.p. $170-2^\circ$.

Voswinckel, *Ber.*, 1882, **15**, 2022.

Weil, Brimmer, *Ber.*, 1922, **55**, 305.

Burekhardt et al., *J. prakt. Chem.*, 1938, **151**, 251.

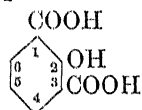
4-Hydroxyisophthalaldehydic Acid.

See 4-Hydroxy-3-aldehydobenzoic Acid.

6-Hydroxyisophthalaldehydic Acid.

See 5-Aldehydosalicylic Acid.

2-Hydroxyisophthalic Acid



$\text{C}_8\text{H}_6\text{O}_5$ MW, 182

Colourless needles + H_2O from H_2O , m.p. 239° ($244.5-245^\circ$): anhyd., m.p. $243-4^\circ$ ($250.0-250.5^\circ$). Very sol. EtOH, Et_2O . Mod. sol. CHCl_3 . Sol. 700 parts cold H_2O , 35-40 parts boiling H_2O . $\text{FeCl}_3 \rightarrow$ cherry-red col. Aq. and alc. sols. show blue fluor.

Mono-Me ester: $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Needles. M.p. 135° . *Amide*: $\text{C}_9\text{H}_9\text{O}_4\text{N}$. MW, 195. Needles from H_2O or MeOH. M.p. 185° .

Di-Me ester: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. M.p. 72° . Very sol. EtOH, Et_2O , C_6H_6 .

Di-Et ester: m.p. 112° .

Mono-p-bromophenacyl ester: m.p. 109° . *K salt*: m.p. 196° .

Di-p-bromophenacyl ester: colourless plates. M.p. 162° .

Mono-amide: $\text{C}_8\text{H}_7\text{O}_4\text{N}$. MW, 181. Needles from H_2O or MeOH. M.p. 245° decomp. $\text{FeCl}_3 \rightarrow$ wine-red col.

Me ether: 2-methoxyisophthalic acid. $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Prisms from H_2O . M.p. $216-18^\circ$ with decomp. and sublimation. Very sol. H_2O , EtOH, Et_2O . $\text{FeCl}_3 \rightarrow$ yellow ppt. *Acetyl*: m.p. 163° .

Tiemann, Reimer, *Ber.*, 1877, **10**, 1570.

Graebe, Kraft, *Ber.*, 1906, **39**, 799.

Wohl, *Ber.*, 1910, **43**, 3486.

Benica, Gisvold, *J. Am. Pharm. Assocn.*, 1945, **34**, 42.

4-Hydroxyisophthalic Acid.

Needles from H_2O . M.p. 310° . Very sol. EtOH, Et_2O , hot AcOH. Sol. 5000 parts H_2O at 10° , 158.5 parts at 100° . $\text{FeCl}_3 \rightarrow$ cherry-red col.

Di-Me ester: needles from MeOH.Aq. M.p. 96° .

Mono-Et ester: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Plates from EtOH.Aq. M.p. $194-5^\circ$.

Di-Et ester: $\text{C}_{12}\text{H}_{14}\text{O}_5$. MW, 238. Needles from EtOH. M.p. 52° . Sol. most org. solvents. Insol. H_2O .

Diamide: $\text{C}_8\text{H}_8\text{O}_3\text{N}_2$. MW, 180. Plates from EtOH. M.p. 250° . Spar. sol. hot EtOH.

Me ether: 4-methoxyisophthalic acid. Needles from H_2O . M.p. 275° (273° , 261°). Very sol. EtOH. Sol. Et_2O . Insol. H_2O , CHCl_3 , C_6H_6 . *Chloride*: m.p. 78° . *Di-Me ester*: m.p. 94° . *Di-Et ester*: m.p. 57° .

Phenyl ether: m.p. 221° .

Schall, *Ber.*, 1879, **12**, 828.

Ost, *J. prakt. chem.*, 1876, **14**, 104.

Loewenhertz, *Ber.*, 1892, **25**, 2796.

5-Hydroxyisophthalic Acid.

Present in leaves of *Vitex negundo*. Needles + $2\text{H}_2\text{O}$ from H_2O . M.p. $284-5^\circ$ (288°). Sublimes in needles. Very sol. EtOH, Et_2O . Sol. C_6H_6 . Sol. 3280 parts H_2O at 5° , 5.4 parts at 100° .

Di-Me ester: needles. M.p. $159-60^\circ$.

Di-Et ester: prisms. M.p. 103° . Sol. EtOH, Et_2O . Spar. sol. H_2O .

Me ether: 5-methoxyisophthalic acid. Needles from AcOH. M.p. 270° .

Kruber, Schmidt, *Ber.*, 1931, **64**, 2276.

Heine, *Ber.*, 1880, **13**, 494.

Lönnies, *ibid.*, 705.

3-Hydroxy-4-isopropyl-6-aldehydo-o-toluic Acid.

See Formylthymotinic Acid.

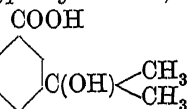
2-Hydroxyisopropylamine.

See 2-Aminopropyl Alcohol.

α -Hydroxyisopropylbenzene.

See Dimethyl-phenylcarbinol.

3- α -Hydroxyisopropylbenzoic Acid (*Dimethyl-m-carboxyphenylcarbinol*)



$\text{C}_{10}\text{H}_{12}\text{O}_3$

MW, 180

Plates from H_2O . M.p. 123–4°.

Wallach, *Ann.*, 1893, 275, 159.

Hydroxy-4-isopropylbenzoic Acid.

See Hydroxycuminic Acid.

4-Hydroxy-2-isopropylcoumarone.

See Isotubanol.

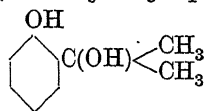
4-Hydroxy-2-isopropylcoumarone-5-carboxylic Acid.

See Isotubaic Acid.

Hydroxyisopropylmalonic Acid.

See Isopropyltartronic Acid.

2- α -Hydroxyisopropylphenol (2-*o*-Hydroxyphenylisopropyl alcohol, dimethyl-*o*-hydroxyphenylcarbinol, α -2-dihydroxyisopropylbenzene)



$\text{C}_9\text{H}_{12}\text{O}_2$ MW, 152

B.p. 135°/15 mm. Dist. at 760 mm. \rightarrow *o*-isopropenylphenol.

Me ether: 2- α -hydroxyisopropylanisole. $\text{C}_{10}\text{H}_{14}\text{O}_2$. MW, 166. M.p. 15°. B.p. 239°.

Hoering, Baum, D.R.P., 208,886, (*Chem. Zentr.*, 1909, I, 1522).

Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 315.

3- α -Hydroxyisopropylphenol (2-*m*-Hydroxyphenylisopropyl alcohol, dimethyl-*m*-hydroxyphenylcarbinol, α -3-dihydroxyisopropylbenzene).

Prisms from H_2O or C_6H_6 . M.p. 105–6°. Sol. EtOH , Et_2O . Spar. sol. cold H_2O . $\text{FeCl}_3 \rightarrow$ blue col.

Me ether: 3- α -hydroxyisopropylanisole. Needles from pet. ether. M.p. 34°. B.p. 242°/770 mm.

Auwers, *Ann.*, 1917, 413, 305.

Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 316.

α -Hydroxy-4-isopropylphenylacetic Acid.

See 4-Isopropylmandelic Acid.

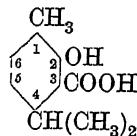
Hydroxyisopropyltoluene.

See Dimethyl-tolylcarbinol, Carvacrol and Thymol.

Hydroxy-4-isopropyl-*o*-toluic Acid.

See Thymotinic Acid.

2-Hydroxy-4-isopropyl-*m*-toluic Acid (3-Methyl-6-isopropylsalicylic acid, *o*-carvacrotinic acid, carvacrol-3-carboxylic acid, 4-isopropyl-*o*-cresotinic acid)



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

Needles from H_2O . M.p. 136° (133–4°). Sol. EtOH , Et_2O . Spar. sol. cold H_2O . Sublimes. $\text{FeCl}_3 \rightarrow$ bluish-violet col.

Kekulé, Fleischer, *Ber.*, 1873, 6, 1089.

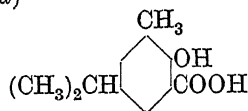
6-Hydroxy-4-isopropyl-*m*-toluic Acid (p-Carvacrotinic acid, carvacrol-6-carboxylic acid).

Me ether: 2-methyl-5-isopropylanisic acid. $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. Needles from EtOH . Aq. M.p. 154–5°. *Amide*: $\text{C}_{12}\text{H}_{17}\text{O}_3\text{N}$. MW, 207. Needles from EtOH . Aq. M.p. 163–4°.

Et ether: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. Needles from H_2O . M.p. 133°. *Amide*: $\text{C}_{13}\text{H}_{19}\text{O}_3\text{N}$. MW, 221. Needles from EtOH . Aq. M.p. 133–4°.

Gattermann, *Ber.*, 1899, 32, 1120.

2-Hydroxy-5-isopropyl-*m*-toluic Acid (3-Methyl-5-isopropylsalicylic acid, 5-isopropyl-*o*-cresotinic acid)



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

Needles from H_2O . M.p. 147°. Sol. EtOH . Insol. cold H_2O . $\text{FeCl}_3 \rightarrow$ bluish-violet col.

Me ester: $\text{C}_{12}\text{H}_{16}\text{O}_3$. MW, 208. Needles from EtOH . M.p. 148°.

Jesurun, *Ber.*, 1886, 19, 1414.

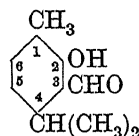
α -Hydroxy-4-isopropyl- α -toluic Acid.

See 4-Isopropylmandelic Acid.

Hydroxy-4-isopropyl-*o*-toluic Aldehyde.

See Thymotinic Aldehyde.

2-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (*o*-Carvacrotinic aldehyde, 3-methyl-6-isopropylsalicylaldehyde, 3-aldehydocarvacrol)



$\text{C}_{11}\text{H}_{14}\text{O}_2$ MW, 178

Oil. Volatile in steam. Alc. $\text{FeCl}_3 \rightarrow$ dark green col.

Phenylhydrazones: m.p. 150°.

Lustig, *Ber.*, 1886, 19, 14.

Gattermann, *Ann.*, 1907, 357, 330.

Duff, *J. Chem. Soc.*, 1941, 547.

6-Hydroxy-4-isopropyl-*m*-toluic Aldehyde (*p*-Carvacrotinic aldehyde, 5-aldehydocarvacrol).

Leaflets from ligroin. Needles from H_2O or AcOH . Aq. M.p. 96°. Sol. EtOH , Et_2O , C_6H_6 , CHCl_3 . Spar. sol. hot H_2O . Non-volatile in steam. No col. with FeCl_3 .

Me ether: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 208. B.p. 275°. *Azine*: m.p. 184–5°.

Phenylhydrazones: plates from AcOH . M.p. 109°.

Azine: yellow cryst. from EtOH . M.p. 238–40°.

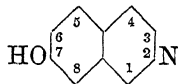
Nordmann, *Ber.*, 1884, 17, 2633.

Lustig, *Ber.*, 1886, 19, 16.

Gattermann, *Ann.*, 1907, 357, 329.

1-Hydroxyisoquinoline.

See Isocarbostyryl.

7-Hydroxyisoquinoline C_9H_7ON

MW, 145

Pale yellow plates from EtOH. M.p. 229.5–230.5° (226–7°). Sublimes. Spar. sol. EtOH.

Me ether: $C_{10}H_9ON$. MW, 159. Needles from ligroin. M.p. 49°. B.p. 182–6°/34 mm. Sol. EtOH. Dil. acids \rightarrow bluish-violet fluor. B_2H_6Cl : m.p. 221°. $B_2H_6PtCl_6$: needles. M.p. 235–6° decomp. *Picrate*: m.p. 194–5°. *Methiodide*: m.p. 196–7°. *Ethiodide*: m.p. 178–9°.

Et ether: $C_{11}H_{11}ON$. MW, 173. M.p. 7–9°. B.p. 199°/50 mm., 182–3°/27 mm. D_{20}^{25} 1.0768. n_D^{20} 1.6062. *Picrate*: m.p. 202°. $B_2H_6PtCl_6$: red needles. M.p. 245°. *Methiodide*: m.p. 193–4°. *Ethiodide*: m.p. 122–3°.

$B_2H_6PtCl_6$: reddish-yellow needles. M.p. 252° decomp.

Fritsch, *Ann.*, 1895, 286, 12; D.R.Ps., 85,566, 86,561.

Woodward, Doering, *J. Am. Chem. Soc.*, 1945, 67, 860.

8-Hydroxyisoquinoline.

Prisms from EtOH. M.p. 130°. Sol. EtOH. Insol. C_6H_6 , ligroin. Sublimes in needles.

B_2H_6Cl : yellow needles. M.p. 207°.

Methochloride: yellow needles + $1\frac{1}{2}H_2O$. M.p. anhyd. 259°.

Methiodide: yellow needles. M.p. 239°.

Ethiodide: yellow needles. M.p. 275°.

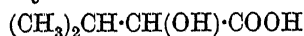
Claus, Raps, *J. prakt. Chem.*, 1892, 45, 244.

Claus, Gutzeit, *J. prakt. Chem.*, 1895, 52, 10.

Weissgerber, *Ber.*, 1914, 47, 3180.

Hydroxyisoquinoline-carboxylic Acid.

See Isocarbostyryl-carboxylic Acid.

1-Hydroxyisovaleric Acid $C_5H_{10}O_3$

MW, 118

d.

Cryst. from Et_2O -pentane. $[\alpha]_D^{25}$ -0.5° in H_2O .

Na salt: $[\alpha]_D^{25}$ -3.5° .

Et ester: b.p. 112–14°/110 mm.

Acetyl: b.p. 95–7°/3 mm. $[\alpha]_D^{25}$ $+8.62^\circ$ in Et_2O . *Me ester*: b.p. 50°/1 mm. $[\alpha]_D^{25}$ $+9.25^\circ$.

dl.

M.p. 86°. Sol. H_2O , EtOH, Et_2O . Ox. \rightarrow isobutyric acid. Conc. HCl \rightarrow H-COOH + isobutyraldehyde.

Et ester: $C_7H_{14}O_3$. MW, 146. B.p. 174–6°. Spar. sol. H_2O .

Amide: $C_5H_{11}O_2N$. MW, 117. M.p. 104°.

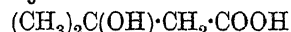
Nitrile: isobutyraldehyde cyanhydrin. C_5H_9ON . MW, 99. Liq. at -17° . B.p. 106°/22 mm. D_{20}^{16} 0.9543. n_D^{20} 1.4221. Sol. EtOH, Et_2O . Spar. sol. pet. ether. *Acetyl*: B.p. 193°. D_{20}^{19} 0.9745.

Schmidt, Sachtleben, *Ann.*, 1878, 193, 106.

Lipp, *Ann.*, 1880, 205, 24.

Nicolle, *Bull. soc. chim.*, 1926, 39, 55.

Bartlett et al., *J. Biol. Chem.*, 1937, 118, 503.

2-Hydroxyisovaleric Acid $C_5H_{10}O_3$

MW, 118

Syrup. Sol. H_2O , EtOH, Et_2O . HI \rightarrow 2-iodoisovaleric acid.

Et ester: b.p. 180°, 70°/13 mm.

Nitrile: m.p. -12° . B.p. 210–12°, 130–2°/30 mm. D_{20}^{20} 0.9676. n_D^{20} 1.4291. Sol. EtOH, Et_2O . Spar. sol. H_2O . *Acetyl*: b.p. 198–200°. D_{20}^{18} 0.9951. n_D^{25} 1.4193.

Phenylurethane: m.p. 129–30°.

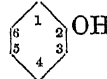
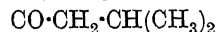
Kohn, *Monatsh.*, 1903, 24, 767.

v. Miller, *Ann.*, 1880, 200, 274.

Semljanzin, Saizew, *Ann.*, 1879, 197, 73.

Lemaire, *Rec. trav. chim.*, 1910, 29, 59.

o-Hydroxyisovalerophenone (2-Isovalerylphenol, isobutyl o-hydroxyphenyl ketone)

 $C_{11}H_{14}O_2$

MW, 178

B.p. 248–50°. D_{20}^{20} 1.0197. n_D^{20} 1.5126.

Tsukervanik, Terent'eva, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 1405.

p-Hydroxyisovalerophenone (4-Isovalerylphenol, isobutyl p-hydroxyphenyl ketone).

Prisms from Et_2O . M.p. 97–8° (95–6°). Sol. ord. org. solvents.

Et ether: b.p. 133–7°/18 mm. D_4^{15} 1.0406. n_D^{15} 1.5332. *Oxime*: m.p. 118–19°. *Semicarbazone*: m.p. 191–2°.

Auwers, *Ber.*, 1903, 36, 3891.

Tsukervanik, Terent'eva, *J. Gen. Chem. U.S.S.R.*, 1940, 10, 1405.

1-Hydroxy-2-keto-1 : 2-difurylthane.See α -Furoin.**3-Hydroxy-2-ketodihydroindole.**

See Dioxindole.

3-Hydroxy-4-keto-2 : 5-dimethylhexane.

See Isobutyroin.

 α -Hydroxy- β -ketodi-2-naphthylethane.

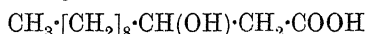
See Naphthoin.

Hydroxyketoheptane.

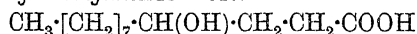
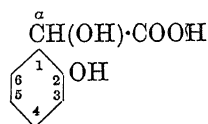
See Heptanolone.

Hydroxy-keto-hexane.

See Hexanolone.

**Hydroxy - keto - methyl - butenylcyclo -
pentene.***See* Cinerolone.**2-Hydroxy-4-keto-2-methylpentane.***See* Diacetone Alcohol.**1-Hydroxy-3-keto-3-phenyl - *n* - butyric
Acid.***See* Phenacylglycollic Acid.**2-Hydroxy-1-ketopropionaldehyde.***See* Glycerosone.***o*-Hydroxylaminobenzoic Anhydride.***See* Benzisoxazolone.**1-Hydroxylauric Acid** $\text{C}_{12}\text{H}_{24}\text{O}_3$ MW, 216Cryst. from CHCl_3 . M.p. 73-4°.*Et ester*: $\text{C}_{14}\text{H}_{28}\text{O}_4$. MW, 244. Cryst. from
pet. ether. M.p. 43° (38°). B.p. 165°/15 mm.
Acetyl: b.p. 172-3°/13 mm.*p*-Nitrobenzyl ester: m.p. 59-9.5°.*Phenacyl ester*: m.p. 63.4-64°.*p*-Bromophenacyl ester: m.p. 91-91.5°.*Acetyl*: cryst. from pet. ether. M.p. 47°.Guérin, *Bull. soc. chim.*, 1903, 29, 1124.**2-Hydroxylauric Acid** $\text{C}_{12}\text{H}_{24}\text{O}_3$ MW, 216

Cryst. M.p. 70-70.5°.

Adickes, Andresen, *Ann.*, 1943, 555, 41.**3-Hydroxylauric Acid** $\text{C}_{12}\text{H}_{24}\text{O}_3$ MW, 216Needles from C_6H_6 -pet. ether. M.p. 62.5-
63.5°. Heat \rightarrow lactone.*Lactone*: yellow liq. B.p. 170-1°/11 mm.
 D_{15}^{20} 0.9382.Chuit, Boelsing, Hausser, Malet, *Helv.
Chim. Acta*, 1927, 10, 114.**11-Hydroxylauric Acid.***See* Sabinic Acid.**Hydroxylepidine.***See* Hydroxy-4-methylquinoline.**Hydroxylepidine-carboxylic Acid.***See* Hydroxy-methylquinoline-carboxylic
Acid.**1-Hydroxylignoceric Acid.***See* Cerebronic Acid.**Hydroxylutidine.***See* Hydroxydimethylpyridine.**4-Hydroxyllysine** $\text{H}_2\text{N} \cdot \text{CH}_2 \cdot \text{CH}_2(\text{OH}) \cdot \text{CH}_2 \cdot \text{CH}_2 \cdot \text{CH}(\text{NH}_2) \cdot \text{COOH}$
 $\text{C}_6\text{H}_{14}\text{O}_3\text{N}_2$ MW, 162Occurs combined in gelatin and other pro-
teins.*Picrate*: m.p. 225° decomp.Heathcote, *Biochem. J.*, 1948, 42, 305.Van Slyke *et al.*, *Proc. Soc. Exptl. Biol.
Med.*, 1938, 38, 548.Schryver, Buston, Mukherjee, *Proc. Roy.
Soc.*, 1925, B, 98, 58.**Hydroxymaleic Acid.***See* Oxalacetic Acid.**Hydroxymalonic Acid.***See* Tartronic Acid.**2-Hydroxymandelic Acid** (2-Hydroxy-
phenylglycollic acid, 2- α -dihydroxyphenylacetic
acid, 2- α -dihydroxy- α -toluic acid) $\text{C}_8\text{H}_8\text{O}_4$ MW, 168*d*-.
l-.
dl-.
Oil.*2-Et ether*: $\text{C}_{10}\text{H}_{18}\text{O}_4$. MW, 196. Cryst.
from H_2O . M.p. 125.5-126.5°. $[\alpha]_D^{20} + 145.5^\circ$
in EtOH. *Me ester*: $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210.
Cryst. $[\alpha]_D^{20} + 115^\circ$ in EtOH. *Amide*:
 $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. Cryst. from C_6H_6 .
M.p. 124.5-125.5°. $[\alpha]_D^{20} + 125^\circ$ in EtOH.*2-Et ether*: cryst. from H_2O . M.p. 125.5-
126.5°. $[\alpha]_D^{20} - 144.9^\circ$ in EtOH. *Me ester*:
cryst. from C_6H_6 -ligroin. M.p. 30-31°. B.p.
84-6°/0.02 mm. $[\alpha]_D^{20} - 130^\circ$ in EtOH. *Amide*:
cryst. from C_6H_6 . M.p. 124.5-125.5°. $[\alpha]_D^{20}$
 $- 124^\circ$ in EtOH.*dl*-.
Oil.*2-Me ether*: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. *Et ester*:
 $\text{C}_{11}\text{H}_{14}\text{O}_4$. MW, 210. B.p. 108°/14 mm. D_{21}^{20}
1.16. n_D^{21} 1.521. *Nitrile*: $\text{C}_9\text{H}_9\text{O}_2\text{N}$. MW,
163. Cryst. from C_6H_6 . M.p. 71°. Sol. EtOH,
 Et_2O , CHCl_3 , C_6H_6 , ligroin. Insol. H_2O .
Benzoate of nitrile: cryst. from EtOH. M.p.
87-8°.*2-Et ether*: cryst. from C_6H_6 . M.p. 102.5-
103.5°. *Me ester*: cryst. from C_6H_6 . M.p.
71-2°. *Amide*: cryst. from C_6H_6 . M.p.
102.5-103.5°. *Nitrile*: cryst. M.p. 86-9°.
Nitrile: $\text{C}_8\text{H}_7\text{O}_2\text{N}$. *Dibenzoyl*: yellow
needles from propyl alcohol. M.p. 92-2.5°.Baeyer, Fritsch, *Ber.*, 1884, 17, 974.Francis, Davis, *J. Chem. Soc.*, 1909, 95,
1405.Bistrzycki, Paulus, Perrin, *Ber.*, 1911,
44, 2611.Lévy, Pernot, *Bull. soc. chim.*, 1931, 49,
1729.Weissberger, Dym, *Ann.*, 1933, 502, 79.**3-Hydroxymandelic Acid** (3-Hydroxy-
phenylglycollic acid, 3- α -dihydroxyphenylacetic
acid, 3- α -dihydroxy- α -toluic acid).*3-Me ether*: $\text{C}_9\text{H}_{10}\text{O}_4$. MW, 182. *Et ester*:

$C_{11}H_{14}O_4$, MW, 210. B.p. 169°/14 mm. D_{15}^{19} 1.17. n_D^{19} 1.519.

Dibenzoyl deriv. of nitrile: colourless needles from toluene. M.p. 118.5–19.5°.

Lévy, Pernot, *Bull. soc. chim.*, 1931, 49, 1729.

4-Hydroxymandelic Acid (4-Hydroxy-phenylglycollic acid, 4- α -dihydroxyphenylacetic acid, 4- α -dihydroxy- α -toluic acid).

d.

Plates + $1H_2O$ from H_2O . M.p. anhyd. 103–4°. $[\alpha]_D + 144.4^\circ$ in H_2O .

4-Me ether: $C_9H_{10}O_4$, MW, 182. Cryst. + $2H_2O$ from H_2O . M.p. 104–5°. $[\alpha]_D^{19} + 146.1^\circ$.

l.

Cryst. + $\frac{1}{2}H_2O$ from H_2O . M.p. anhyd. 102–3°. $[\alpha]_D - 144.4^\circ$ in H_2O .

4-Me ether: cryst. + $2H_2O$ from H_2O . M.p. 104–5°. $[\alpha]_D^{19} - 145.24^\circ$.

dl.

Plates + $1H_2O$ from H_2O , needles + $1H_2O$ from Et_2O -ligroin. M.p. anhyd. 109.5–110.5° (107–8°, 106°).

4-Me ether: prisms or plates from Et_2O -ligroin. M.p. 108–9°. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. D_{16}^{16} 1.397. *Et ester*: $C_{11}H_{14}O_4$, MW, 210. Needles from H_2O or ligroin. M.p. 47–8°. B.p. 173° (166–7°)/14 mm. *Benzyl ester*: b.p. 158°/19 mm. *Amide*: $C_9H_{11}O_3N$, MW, 181. Plates from EtOH.Aq. M.p. 163–4° (159°). Insol. H_2O , Et_2O . *Benzoate of amide*: cryst. M.p. 155°. Sol. EtOH, $CHCl_3$. Spar. sol. Et_2O . Insol. H_2O . *Nitrile*: anisaldehyde cyanhydrin. $C_9H_9O_2N$, MW, 163. Cryst. from C_6H_6 -pet. ether. M.p. 67° (57–8°, 63°). Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . *Benzoate of nitrile*: leaflets from EtOH. M.p. 66–7°.

4-Benzyl ether: m.p. 94.5°.

Et ester: m.p. 128.5–9°.

Amide: $C_8H_9O_3N$, MW, 167. *Dibenzoyl*: cryst. from EtOH. M.p. 183–4°. Insol. H_2O .

Nitrile: *p*-hydroxybenzaldehyde cyanhydrin. $C_8H_7O_2N$, MW, 149. *Dibenzoyl*: needles from $CHCl_3$ - Et_2O . M.p. 143–4°. Insol. H_2O , Et_2O .

Knorr, *Ber.*, 1904, 37, 3173.

McCombie, Parry, *J. Chem. Soc.*, 1909, 95, 585.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 831.

Ellinger, Kotake, *Z. physiol. Chem.*, 1910, 65, 409.

Bistrzycki, Paulus, Perrin, *Ber.*, 1911, 44, 2597.

Aloy, Rabaut, *Bull. soc. chim.*, 1912, 11, 390.

Ladenburg *et al.*, *J. Am. Chem. Soc.*, 1936, 58, 1292.

1-Hydroxy-2-mercaptoethane.

See Ethylene Thioglycol.

Hydroxymesitylene.

See Mesitol.

Hydroxymesitylenic Acid.

See 4-Hydroxy-3:5-dimethylbenzoic Acid.

4-Hydroxy-2-methoxyacetophenone.

See Isopaeonol.

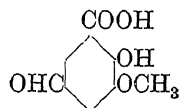
4-Hydroxy-3-methoxyacetophenone.

See Acetovanillone.

2-Hydroxy-4-methoxyacetophenone.

See Peonol.

2-Hydroxy-3-methoxy-5-aldehydobenz-oic Acid (6-Hydroxy-5-methoxyisophthalaldehydic acid, 3-methoxy-5-aldehydosalicylic acid)



$C_9H_8O_5$ MW, 196

Cryst. from Me_2CO . M.p. 272°. $FeCl_3 \rightarrow$ blue col.

Me ether: $C_{10}H_{10}O_5$, MW, 210. Yellow prisms from H_2O . Sublimes \rightarrow white needles, m.p. 152°.

Perkin, Stoyale, *J. Chem. Soc.*, 1923, 123, 3175.

4-Hydroxy-3-methoxy-5-aldehydobenz-oic Acid.

See 5-Aldehydovanillic Acid.

7-Hydroxy-5-methoxy-6-aldehydocoumarin.

See Apoxanthoxyletin.

2-Hydroxy-4-methoxy-3-aldehydoquinoline.

See Dictamnol.

Hydroxymethoxyallylbenzene.

See Eugenol, *o*-Eugenol and Chavibetol.

Hydroxymethoxybenzyl Alcohol.

See Vanillyl Alcohol and Isovanillyl Alcohol.

1-Hydroxymethoxybenzyl-2-dimethoxybenzyl-3-hydroxybutyric Acid.

See Arctigenic Acid.

2-[4-Hydroxy-3-methoxybenzyl]-3-[4-hydroxy-3-methoxybenzylidene]-butane.

See Guaiaretic Acid.

4-Hydroxy-3-methoxycinnamaldehyde.

See Ferula-aldehyde.

4-Hydroxy-3-methoxycinnamic Acid.

See Ferulic Acid.

3-Hydroxy-4-methoxycinnamic Acid.

See Isoferulic Acid.

p-Hydroxy-*m*-methoxycinnamyl Alcohol.

See Coniferyl Alcohol.

Hydroxymethoxydimethylbenzaldehyde.

See Rhizonaldehyde and Isorhizonaldehyde.

Hydroxymethoxydimethylbenzoic Acid.

See Rhizonic Acid and Isorhizonic Acid.

8-Hydroxy-6-methoxy-7-ethoxycoumarin.

See under Fraxetin.

7-Hydroxy-4'-methoxyflavone

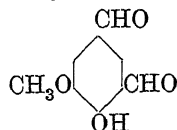
7-Hydroxy-4'-methoxyflavone.

See Pratul.

7-Hydroxy-4'-methoxyisoflavone.

See Formo-ononetin.

4-Hydroxy-5-methoxyisophthalaldehyde (3:5-Dialdehydoguaiacol)



$C_9H_8O_4$

MW, 180

Yellow needles from EtOH. M.p. 119–21°.

Me ether: 4:5-dimethoxyisophthalaldehyde, 3:5-dialdehydoveratrol. $C_{10}H_{10}O_4$. MW, 194. Needles from H_2O or MeOH. M.p. 125° (123–4°).

Monoxime: needles from C_6H_6 . M.p. 166–7°.

Dioxime: cryst. from EtOH. M.p. 185–6°.

Di-phenylhydrazone: yellow powder from EtOH. M.p. 188–91°.

Di-p-nitrophenylhydrazone: needles from $PhNO_2$. M.p. 286–7° decomp.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 485.

Hydroxy-methoxy-methyl-dialdehydo-benzoic Acid.

See Cyclopaldic Acid.

Hydroxy-methoxy-methyl-tetrahydroisoquinoline.

See Corypalline and Salsoline.

4-Hydroxy-3-methoxyphenylacetaldehyde.

See Homovanillin.

4-Hydroxy-3-methoxyphenylacetic Acid.

See Homovanillic Acid.

Hydroxymethoxyphenylallyl Alcohol.

See Lubanol.

Hydroxymethoxypropenylbenzene.

See Isochavibetol and Isoeugenol.

4-Hydroxy-5-methoxy-3-propenyltoluene.

See Homo-o-eugenol.

4-Hydroxy-3-methoxy-1-propylbenzene.

See Cœrulignol.

3-Hydroxy-4-methoxystyrene.

See Hesperetol.

5-Hydroxy-3-methoxy-o-toluic Acid.

See Isoeverninic Acid.

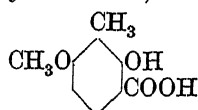
3-Hydroxy-5-methoxy-o-toluic Acid.

See Everninic Acid.

5-Hydroxy-4-methoxy-m-toluic Acid.

See under 4:5-Dihydroxy-m-toluic Acid.

2-Hydroxy-6-methoxy-m-toluic Acid (2-Hydroxy-3-methylanisic acid)



$C_9H_{10}O_4$

MW, 182

782 6-Hydroxy-5-methoxy-o-toluic Aldehyde

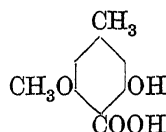
Needles from EtOH. M.p. 215–16° (210°) decomp.

Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from EtOH. M.p. 76–7°. Sol. EtOH, spar. sol. pet. ether.

Herzig, Wenzel, Haiser, *Monatsh.*, 1903, 24, 905.

Jones, Robertson, *J. Chem. Soc.*, 1932, 1690.

3-Hydroxy-5-methoxy-p-toluic Acid



$C_9H_{10}O_4$

MW, 182

Cryst. from EtOH. M.p. 171–2° (169–70°) decomp.

Me ester: $C_{10}H_{12}O_4$. MW, 196. Needles from MeOH. M.p. 95–7°.

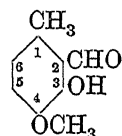
Herzig, Wenzel, Kurzweil, *Monatsh.*, 1903, 24, 897.

Asahina, Ihara, *Ber.*, 1929, 62, 1203.

5-Hydroxy-3-methoxy-o-toluic Aldehyde.

See Isoeverninaldehyde.

3-Hydroxy-4-methoxy-o-toluic Aldehyde (4-Methyl-3-aldehydoguaiacol)



$C_9H_{10}O_3$

MW, 166

Cryst. from H_2O . M.p. 61–2°.

Semicarbazone: needles from H_2O . Decomp. at 210° without melting.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 480.

5-Hydroxy-4-methoxy-o-toluic Aldehyde.

Needles from EtOH. M.p. 175° (165°). Sol. Et_2O .

Semicarbazone: plates from EtOH. M.p. 207°.

Heyden, D.R.P., 91,170.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 479.

3-Hydroxy-5-methoxy-o-toluic Aldehyde.

See Everninaldehyde.

6-Hydroxy-5-methoxy-o-toluic Aldehyde (3-Hydroxy-2-methylanisaldehyde, 3-methyl-4-aldehydoguaiacol).

Leaflets from H_2O . M.p. 133–5°. Sol. MeOH. Spar. sol. H_2O . $FeCl_3$ in MeOH → green col.

Me ether: 3-methyl-4-aldehydoveratrol. $C_{10}H_{12}O_3$. MW, 180. Needles from pet. ether. M.p. 52-3°.

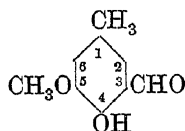
Perkin, *J. Chem. Soc.*, 1916, 109, 914.

5-Hydroxy-6-methoxy-o-toluic Aldehyde (6-Methyl-5-aldehydoguaiacol).

Cryst. from H_2O . M.p. 104.5-105.5°.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 482.

4-Hydroxy-5-methoxy-m-toluic Aldehyde (3-Methoxy-5-methylsalicylaldehyde, 5-methyl-3-aldehydoguaiacol)



$C_9H_{10}O_3$ MW, 166

Yellow oil. B.p. 270-5°. Alc. $FeCl_3 \rightarrow$ green col.

Tiemann, Koppe, *Ber.*, 1881, 14, 2026.

6-Hydroxy-5-methoxy-m-toluic Aldehyde (3-Methyl-4-aldehydoguaiacol).

Yellow needles from H_2O . M.p. 99°.

Phenylhydrazone: plates from EtOH. M.p. 125°.

Koetschet, Koetschet, *Helv. Chim. Acta*, 1930, 13, 477.

6-Hydroxy-5-methoxytoluquinone.

See Fumigatin.

N-Hydroxymethylacetamide (Methylol-acetamide, acetylaminomethanol, acetylaminocarbonol, acetylaminomethyl alcohol)



$C_3H_7O_2N$ MW, 89

Cryst. M.p. about 50-2°. Sol. H_2O , EtOH, $CHCl_3$. Mod. sol. glycerol. Insol. Et_2O . Reduces NH_3 , $AgNO_3$.

Kalle, D.R.P., 164,610, (*Chem. Zentr.*, 1905, II, 1751).

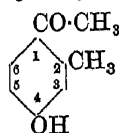
Einhorn, Ladisch, *Ann.*, 1905, 343, 265.

Walter, B.P. 291,712, (*Chem. Abstracts*, 1929, 23, 1136).

ω -Hydroxy-4-methylacetophenone.

See *p*-Methylphenacyl Alcohol.

4-Hydroxy-2-methylacetophenone (6-Aceto-m-cresol, methyl 4-hydroxy-o-tolyl ketone)



$C_9H_{10}O_2$

MW, 150

White cryst. from EtOH. M.p. 128°. B.p. 313°. Sol. EtOH, Et_2O . Spar. sol. cold H_2O . D^{15}_D 1.0592. n^{25}_D 1.5369. $FeCl_3 \rightarrow$ violet col. Does not form oxime.

Me ether: $C_{10}H_{12}O_2$. MW, 164. M.p. 12°. B.p. 268°, 150°/20 mm. D^{15}_D 1.0867. n^{15}_D 1.5503.

Et ether: $C_{11}H_{14}O_2$. MW, 178. M.p. 22°. B.p. 195°/80 mm., 155°/18 mm. D^{77}_D 1.0034. n^{77}_D 1.5142.

p-Thiocyanophenylhydrazone: m.p. 128°.

Nencki, Stoeber, *Ber.*, 1897, 30, 1770.

Eijkman, *Chem. Zentr.*, 1904, I, 1597.

2-Hydroxy-3-methylacetophenone (3-Aceto-o-cresol, methyl 2-hydroxy-m-tolyl ketone).

B.p. 106-7°/10.5 mm.

Semicarbazone: needles from EtOH. M.p. 228°.

Phenylhydrazone: m.p. 122°.

Azine: orange needles from EtOH. M.p. 237°.

Anschütz, Schöll, *Ann.*, 1911, 379, 342.

4-Hydroxy-3-methylacetophenone (5-Aceto-o-cresol, methyl 4-hydroxy-m-tolyl ketone).

Prisms from H_2O . M.p. 104°. Sol. hot H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ yellowish-brown col.

p-Thiocyanophenylhydrazone: m.p. 108-9°.

Klingel, *Ber.*, 1885, 18, 2699.

Nencki, Stoeber, *Ber.*, 1897, 30, 1770.

6-Hydroxy-3-methylacetophenone (3-Aceto-p-cresol, methyl 6-hydroxy-m-tolyl ketone).

Prisms from petrol. M.p. 50°. B.p. 120-5°/20 mm. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Sol. alkalis, conc. H_2SO_4 . Spar. sol. H_2O . D^{25}_D 1.0797. n^{25}_D 1.541. $FeCl_3 \rightarrow$ bluish-violet col.

Me ether: $C_{10}H_{12}O_2$. MW, 164. B.p. 254°, 132°/11 mm. D^{15}_D 1.0694. n^{15}_D 1.538. *Semicarbazone*: m.p. 199°.

Oxime: needles from EtOH. M.p. 145°.

Semicarbazone: needles from EtOH. M.p. 212°.

p-Thiocyanophenylhydrazone: m.p. 50°.

2'-Methoxybenzoyl: pale yellow. M.p. 85°.

Auwers, *Ann.*, 1909, 364, 166.

Anschütz, Schöll, *Ann.*, 1911, 379, 347.

2-Hydroxy-4-methylacetophenone (4-Aceto-m-cresol, methyl 2-hydroxy-p-tolyl ketone).

Cryst. M.p. 21°. B.p. 245°, 126°/20 mm., 103°/7 mm. D^{15}_D 1.1012. n^{15}_D 1.5527. $FeCl_3 \rightarrow$ violet col.

Me ether: $C_{10}H_{12}O_2$. MW, 164. M.p. 37°. B.p. 265°. D^{78}_D 1.0154. n^{78}_D 1.5093. *Oxime*: m.p. 136°.

Et ether: $C_{11}H_{14}O_2$. MW, 178. M.p. 71°. B.p. 140°/10 mm. D^{78}_D 0.9865. n^{78}_D 1.4998.

Oxime: m.p. 132°.

Oxime: m.p. 103°.

Semicarbazone: needles from EtOH. M.p. 214°.

p-Thiocyanophenylhydrazone: b.p. 245°/760 mm.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Hydroxymethylacetylene.

See Propargyl Alcohol.

Hydroxymethyl-allene.

See 4-Hydroxy-1:2-butadiene.

α -Hydroxy- β -methylaminoethylbenzene.

See Halostachine.

p-[α -Hydroxy- β -methylaminoethyl]-phenol.

See Sympathol.

α -Hydroxy- β -methylaminopropylbenzene.

See Ephedrine.

Hydroxymethyl *n*-amyl Ketone.

See 1-Heptanolone-2.

3-Hydroxy-2-methylanisaldehyde.

See 6-Hydroxy-5-methoxy-*o*-toluic Aldehyde.

6-Hydroxy-2-methylanisaldehyde.

See Everninaldehyde.

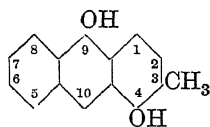
6-Hydroxy-2-methylanisisic Acid.

See Everninic Acid.

2-Hydroxy-3-methylanisisic Acid.

See 2-Hydroxy-6-methoxy-*m*-toluic Acid.

4-Hydroxy-3-methylantranol



$C_{15}H_{12}O_2$

MW, 224

Cryst. from MeOH. M.p. 197°.

Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

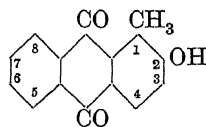
2-Hydroxy-4-methylantranol (2-Hydroxy-4-methyl-9-anthrone).

Needles from EtOH. M.p. 224°.

Diacetyl: prisms from EtOH. M.p. 172-3°.

Bistrzycki, de Schepper, *Ber.*, 1898, 31, 2795.

2-Hydroxy-1-methylantraquinone



$C_{15}H_{10}O_3$

MW, 238

Yellow needles from AcOH. M.p. above 300° (240°). Sol. EtOH, C_6H_6 , alkalis.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from MeOH. M.p. 184° (166°). Sol. AcOH, EtOH. Sublimes. $H_2SO_4 \rightarrow$ scarlet sol.

Acetyl: m.p. 186°.

Bentley, Gardner, Weizmann, *J. Chem. Soc.*, 1907, 91, 1631.

3-Hydroxy-1-methylantraquinone.

Cryst. from EtOH. M.p. 285° (299-300°).

Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. from MeOH. M.p. 145° (128-9°).

Acetyl: cryst. M.p. 151-2° (134-5°).

Keimatsu, Hirano, Tanabe, *J. Pharm. Soc. Japan*, 1929, 49, 531.

See also Bistrzycki, de Schepper, *Ber.*, 1898, 31, 2795.

4-Hydroxy-1-methylantraquinone.

Brown needles from AcOH. M.p. 175-6° (170°). Sublimes in red needles. Sol. C_6H_6 , AcOH, toluene, warm ligroin. Bluish-red sols. in alkalis. Insol. NH_3 , Na_2CO_3 . Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Orange-yellow needles from EtOH or AcOH. M.p. 128°. Sol. hot EtOH, Et_2O , C_6H_6 . Conc. $H_2SO_4 \rightarrow$ orange sol.

Acetyl: yellow needles from AcOH. M.p. 179-80°.

Baeyer, Drewson, *Ann.*, 1882, 212, 346.

Ullmann, Schmidt, *Ber.*, 1919, 52, 2103.

Ullmann, D.R.P., 292, 066, (*Chem. Zentr.*, 1916, I, 1211).

Fischer, Sapper, *J. prakt. Chem.*, 1911, 83, 207.

1-Hydroxy-2-methylantraquinone.

Orange-yellow needles from EtOH. M.p. 184-5° (182-3°, 178°). Sol. Et_2O , C_6H_6 . Spar. sol. EtOH. Insol. H_2O , NH_3 . Conc. $H_2SO_4 \rightarrow$ orange-red sol.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Cryst. M.p. 156-7°.

Phenyl ether: $C_{21}H_{14}O_3$. MW, 314. Yellow cryst. from AcOH. M.p. 190°. Sol. C_6H_6 , $PhNO_2$. Insol. EtOH, Et_2O . Conc. $H_2SO_4 \rightarrow$ wine-red sol.

Acetyl: orange or pale yellow plates from EtOH. M.p. 187-9° (185-6°, 177°).

Römer, Link, *Ber.*, 1883, 16, 700.

Holdermann, *Ber.*, 1906, 39, 1257.

Ullmann, Bincer, *Ber.*, 1916, 49, 743.

Eder, Widmer, Bütler, *Helv. Chim. Acta*, 1924, 7, 353.

Keimatsu, Hirano, *J. Pharm. Soc. Japan*, 1929, 49, 144.

3-Hydroxy-2-methylantraquinone.

Yellow plates. M.p. 260-2° decomp. Sublimes in yellow plates. Sol. EtOH, Et_2O , AcOH.

Acetyl: yellow needles from AcOH. M.p. 177°. Sol. C_6H_6 . Spar. sol. EtOH.

Baeyer, Fraude, *Ann.*, 1880, 202, 163.

Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, 3, 378.

4-Hydroxy-2-methylantraquinone.

Yellow needles from AcOH. M.p. 178°. Sol. EtOH, Me_2CO , C_6H_6 , $PhNO_2$. Mod. sol.

Et₂O, ligroin. Conc. H₂SO₄ → orange-red sol. Bluish-red sols. in alkalis.

Me ether: cryst. M.p. 142–3°.

Acetyl: yellowish-green needles from EtOH. M.p. 156–7°. Sol. AcOH. Insol. H₂O. Conc. H₂SO₄ → orange-yellow sol.

Benzoyl: yellowish-green cryst. from EtOH. M.p. 228–9°. Sol. AcOH. Insol. H₂O.

Schmidt, Ullmann, *Ber.*, 1919, 52, 2113.

Eder, Widmer, Bütler, *Helv. Chim. Acta*, 1924, 7, 353.

Keimatsu, Hirano, Tanabe, *J. Pharm. Soc. Japan*, 1929, 49, 538.

Keimatsu, Hirano, *J. Pharm. Soc. Japan*, 1931, 51, 909.

5-Hydroxy-2-methylantraquinone.

Yellow needles from AcOH. M.p. 147°.

Acetyl: cryst. from EtOH. M.p. 172°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, 7, 625.

6-Hydroxy-2-methylantraquinone.

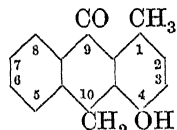
Yellow plates from EtOH. M.p. 278°.

Me ether: C₁₆H₁₂O₃. MW, 252. Yellow needles from EtOH. M.p. 177°.

Acetyl: yellow plates from EtOH. M.p. 145–7°.

Mitter, Sarkar, *J. Indian Chem. Soc.*, 1930, 7, 627.

4-Hydroxy-1-methylanthrone



C₁₅H₁₂O₂ MW, 224

Needles from C₆H₆-pet. ether. M.p. 226–7°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

1-Hydroxy-2-methylanthrone.

Yellow needles from C₆H₆-pet. ether or MeOH. M.p. 136–7°.

Diacetyl: prisms from EtOH. M.p. 180–2°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

Perkin, Haddock, *J. Chem. Soc.*, 1933, 1519.

4-Hydroxy-2-methylanthrone.

Light brown needles from C₆H₆-pet. ether. M.p. 258–9°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

1-Hydroxy-3-methylanthrone.

Yellow needles from C₆H₆-pet. ether. M.p. 158–9°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

Dict. of Org. Comp.—II.

2-Hydroxy-3-methylanthrone.

Prisms from AcOH. M.p. 276–7°. Spar. sol. EtOH, Me₂CO, CHCl₃, xylene.

Bistrzycki, Zen-Ruffinen, *Helv. Chim. Acta*, 1920, 3, 374.

4-Hydroxy-3-methylanthrone.

Needles from C₆H₆-pet. ether. M.p. 207–8° (197°).

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

Perkin, Haddock, *J. Chem. Soc.*, 1938, 541.

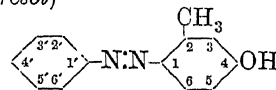
1-Hydroxy-4-methylanthrone.

Yellow needles from C₆H₆-pet. ether. M.p. 167–8°.

Steyermark, Gardner, *J. Am. Chem. Soc.*, 1930, 52, 4891.

Zahn, Koch, *Ber.*, 1938, 71, 172.

4-Hydroxy-2-methylazobenzene (6-Benzeneazo-m-cresol)



C₁₃H₁₂ON₂ MW, 212

Yellow needles from ligroin. M.p. 109°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

B.HCl: m.p. 185°.

Et ether: C₁₅H₁₆ON₂. MW, 240. Orange needles. M.p. 51–2°. Sol. EtOH, Et₂O, ligroin.

Noelting, Kohn, *Ber.*, 1884, 17, 366.

Jacobson *et al.*, *Ann.*, 1895, 287, 147.

4'-Hydroxy-2-methylazobenzene (o-Tolueneazo-p-phenol).

Red needles from C₆H₆-ligroin. M.p. 107–8°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. ligroin. Sol. alkalis.

B.HCl: m.p. 141° decomp.

Me ether: o-tolueneazo-p-anisole. C₁₄H₁₄ON₂. MW, 226. Brown needles. M.p. 59°.

Et ether: o-tolueneazo-p-phenetole. C₁₅H₁₆ON₂. MW, 240. Orange plates. M.p. 53°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆. Spar. sol. H₂O.

Acetyl: red leaflets. M.p. 68°.

Noelting, Werner, *Ber.*, 1890, 23, 3257.

Grandmougin, Freimann, *J. prakt. Chem.*, 1908, 78, 388.

Farmer, Hantzsch, *Ber.*, 1899, 32, 3097.

4-Hydroxy-3-methylazobenzene (5-Benzeneazo-o-cresol).

Yellow needles from EtOH. M.p. 128–30°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆, dil. alkalis. Spar. sol. hot H₂O.

Et ether: C₁₅H₁₆ON₂. MW, 240. Orange needles from EtOH. M.p. 60°. Sol. EtOH, Et₂O, C₆H₆.

Acetyl: yellow plates. M.p. 81–2°.

Benzoyl: yellow needles. M.p. 110°.

Liebermann, Kostanecki, *Ber.*, 1884, 17, 877.

Noelting, Kohn, *Ber.*, 1884, 17, 363.

6-Hydroxy-3-methylazobenzene (3-Benzeneazo-p-cresol).

Golden leaflets from C_6H_6 . M.p. 108–9°. Sol. EtOH, Et_2O , $CHCl_3$. Sol. conc. H_2SO_4 to brown sol. Sol. dil. alkalis. Sublimes. Volatile in steam.

Cu salt: brown cryst. M.p. 230°.

Ni salt: black cryst. powder with green reflex. M.p. 216°.

Co salt: black cryst. from Me_2CO . M.p. 202°.

Et ether: $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 48°. Sol. EtOH, Et_2O , C_6H_6 .

Acetyl: orange-red needles. M.p. 67–8°. Sol. EtOH, Et_2O , Me_2CO , $CHCl_3$. Insol. dil. alkalis.

Benzoyl: yellow needles. M.p. 113°.

Liebermann, Kostanecki, *Ber.*, 1884, 17, 131.

Noelting, Kohn, *Ber.*, 1884, 17, 352.

Puxeddu, Maccioni, *Gazz. chim. ital.*, 1907, 37, 82.

Noelting, Werner, *Ber.*, 1890, 23, 3262.

4'-Hydroxy-3-methylazobenzene (m-Tolueneazo-p-phenol).

Dark yellow prisms from C_6H_6 -ligroin. M.p. 144–5°.

B, HCl: m.p. 160–72°.

Et ether: *m*-tolueneazo-*p*-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Orange-red prisms from EtOH. M.p. 65°. Sol. EtOH, Et_2O , C_6H_6 .

Paganini, *Ber.*, 1891, 24, 368.

Jacobson *et al.*, *Ann.*, 1895, 287, 161.

2-Hydroxy-4-methylazobenzene (4-Benzeneazo-m-cresol).

Red needles. M.p. 122°. Sol. EtOH, Me_2CO , $CHCl_3$, C_6H_6 . Spar. sol. alkalis.

McPherson, Boord, *J. Am. Chem. Soc.*, 1911, 33, 1530.

2'-Hydroxy-4-methylazobenzene (p-Tolueneazo-o-phenol).

Yellow plates from EtOH. M.p. 100°. Sol. most org. solvents. Volatile in steam.

Et ether: *p*-tolueneazo-*o*-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red prisms from ligroin. M.p. 92–3°. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Spar. sol. pet. ether.

Bamberger, *Ber.*, 1900, 33, 3191.

Jacobson, Huber, *Ann.*, 1909, 369, 7.

4'-Hydroxy-4-methylazobenzene (p-Tolueneazo-p-phenol).

Orange-red prisms. M.p. 152°. Sol. EtOH, Et_2O , C_6H_6 , alkalis. Spar. sol. H_2O .

B, HCl: m.p. 176° decomp.

B, 2HNO₃: m.p. 54°.

Me ether: *p*-tolueneazo-*p*-anisole. $C_{14}H_{14}ON_2$. MW, 226. Red prisms from EtOH. M.p. 110–11°. Sol. most org. solvents.

Et ether: *p*-tolueneazo-*p*-phenetole. $C_{15}H_{16}ON_2$. MW, 240. Red leaflets from EtOH. M.p. 121–2°. B.p. 251°/47 mm. Sol. EtOH, $CHCl_3$.

Acetyl: orange needles from C_6H_6 . M.p. 98°.

Benzoyl: orange-red prisms from C_6H_6 . M.p. 178°.

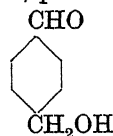
Grandmougin, Freimann, *J. prakt. Chem.*, 1908, 78, 392.

McPherson, Stratton, *J. Am. Chem. Soc.*, 1915, 37, 911.

Jacobson *et al.*, *Ann.*, 1895, 287, 162.

Hantzsch, Glover, *Ber.*, 1906, 39, 4163.

p-Hydroxymethyl-benzaldehyde (ω-Hydroxy-p-toluic aldehyde, p-aldehydobenzyl alcohol)



$C_8H_8O_2$

MW, 136

Oil. B.p. above 200°.

Me ether: $C_9H_{10}O_2$. MW, 150. B.p. 125°/16 mm. D^{25}_4 1.071. n^{25}_D 1.535. Semicarbazone: cryst. from EtOH. M.p. 182°.

Et ether: $C_{10}H_{12}O_2$. MW, 164. Oil. B.p. 133–4°/14 mm. D^{25}_4 1.062. n^{25}_D 1.5264. *Di-Et acetal*: oil. B.p. 148–50°/18 mm. Semicarbazone: m.p. 183°. Phenylhydrazone: cryst. M.p. 86°. 2:4-Dinitrophenylhydrazone: m.p. 183°.

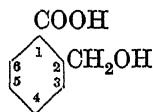
Allain-Le Canu, *Compt. rend.*, 1894, 118, 535.

Quelet, *Compt. rend.*, 1931, 193, 939;

Bull. soc. chim., 1933, 53, 230.

Sabetay, *Compt. rend.*, 1931, 193, 1194.

o-Hydroxymethyl-benzoic Acid (ω-Hydroxy-o-toluic acid, benzyl alcohol 2-carboxylic acid, 2-carboxyphenylethyl alcohol)



$C_8H_8O_3$

MW, 152

Needles. M.p. 128° (118–20°). Sol. H_2O , EtOH, Et_2O . Heat of comb. C_p 887.8 Cal. $k = 1.51 \times 10^{-4}$ at 25°.

Me ether: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 93–4°. B.p. 121–5°/0.5 mm. *Me ester*: $C_{10}H_{12}O_3$. MW, 180. B.p. 124–5°/15 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Nitrile: $C_{10}H_{11}ON$. MW, 161. B.p. 242°.

Phenyl ether: $C_{14}H_{12}O_3$. MW, 228. Needles from EtOH. M.p. 126°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. H_2O . *Me ester*: $C_{15}H_{14}O_3$. MW, 242. Needles from EtOH. M.p. 52–5°.

B.p. 204°/13 mm. Nitrile: $C_{14}H_{11}ON$. MW, 209. Needles from ligroin. M.p. 63–5°.

Hydrazide: needles from EtOH. M.p. 128°.

Lactone: see Phthalide.

Cassirer, *Ber.*, 1892, 25, 3019.

Zincke, Fries, *Ann.*, 1904, 334, 359.

Staudinger, Mächling, *Ber.*, 1916, 49, 1976.

v. Braun, Anton, Weissbach, *Ber.*, 1930, 63, 2861.

Gilman *et al.*, *J. Am. Chem. Soc.*, 1940, 62, 977.

m-Hydroxymethyl-benzoic Acid (ω -Hydroxy-m-toluic acid, benzyl alcohol 3-carboxylic acid, 3-carboxyphenylethyl alcohol).

Cryst. powder. M.p. 115°. B.p. 190°/11 mm.

Nitrile: 3-cyanobenzyl alcohol. C_8H_7ON . MW, 133. B.p. 165°/16 mm.

Langgruth, *Ber.*, 1905, 38, 2063.

p-Hydroxymethyl-benzoic Acid (ω -Hydroxy-p-toluic acid, benzyl alcohol 4-carboxylic acid, 4-carboxyphenylethyl alcohol).

Plates or needles from H_2O . M.p. 181°. Sol. Et_2O . Sublimes in needles.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 161–3°/5 mm. *Benzoyl*: oil. B.p. 203–7°/3 mm. *p-Nitrobenzoyl*: yellow cryst. from EtOH. M.p. 86°. *p-Aminobenzoyl*: cryst. from C_6H_6 -pet. ether. M.p. 95°. Sol. EtOH. Insol. H_2O . *Urethane*: cryst. from C_6H_6 -pet. ether. M.p. 119°. Sol. EtOH. Insol. H_2O . *Phenylurethane*: cryst. from C_6H_6 -pet. ether. M.p. 107°. Sol. EtOH. Insol. H_2O .

Propyl ester: $C_{11}H_{14}O_3$. MW, 194. B.p. 164–5°/4 mm.

Butyl ester: $C_{12}H_{16}O_3$. MW, 208. B.p. 174°/3 mm.

Benzyl ester: $C_{15}H_{14}O_3$. MW, 242. Cryst. from Et_2O -pet. ether. M.p. 63°.

Me ether: $C_9H_{10}O_3$. MW, 166. Leaflets from H_2O . M.p. 123°. *Chloride*: $C_9H_9O_2Cl$. MW, 184.5. B.p. 136–8°/8 mm.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Plates from H_2O . M.p. 87° (78–9°). Sol. usual solvents. *Et ester*: $C_{12}H_{16}O_3$. MW, 208. B.p. 277–278.5°, 163–5°/18 mm. *Chloride*: $C_{10}H_{11}O_2Cl$. MW, 198.5. B.p. 136–8°/8 mm. *Amide*: $C_{10}H_{13}O_3N$. MW, 179. Needles from H_2O . M.p. 112°.

Nitrile: 4-cyanobenzyl alcohol. C_8H_7ON . MW, 133. Leaflets from AcOEt. M.p. 133–4°. Sol. H_2O . Insol. C_6H_6 , $CHCl_3$, ligroin. *Acetyl*: m.p. 71–2°. *Benzoyl*: m.p. 123°.

Einhorn, Ladisch, *Ann.*, 1900, 310, 203.

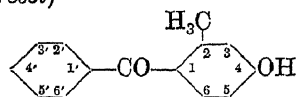
Friedländer, Moszczyca, *Ber.*, 1895, 28, 1144.

Salkind, *J. Russ. Phys.-Chem. Soc.*, 1914, 46, 509.

Case, *J. Am. Chem. Soc.*, 1925, 47, 1144, 3004.

Quelet, *Bull. soc. chim.*, 1933, 53, 234.

4-Hydroxy-2-methylbenzophenone (5-Benzo-m-cresol)



$C_{14}H_{12}O_2$ MW, 212

Colourless cryst. from C_6H_6 -pet. ether. M.p. 129°. Non-volatile in steam.

Hamada, *Chem. Abstracts*, 1933, 27, 3928.

4-Hydroxy-3-methylbenzophenone (5-Benzo-o-cresol).

Yellow needles from C_6H_6 . M.p. 174–5° (172–3°). Non-volatile in steam.

Hamada, *Chem. Abstracts*, 1933, 27, 3928.

Chardonens, Schlappbach, *Helv. Chim. Acta*, 1946, 29, 1413.

6-Hydroxy-3-methylbenzophenone (3-Benzo-p-cresol).

Yellow cryst. from EtOH. M.p. 83–4° (87°). Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 , to yellow sols. Colourless sol. in ligroin.

Me ether: yellow oil. B.p. 190°/4 mm.

Et ether: $C_{16}H_{16}O_2$. MW, 240. Pale yellow needles from EtOH. M.p. 68°.

Acetyl: m.p. 102–3°.

Oxime: needles from AcOH. M.p. 126–9°.

Azine: yellow cryst. from AcOH. M.p. 260°.

Auwers, Betteridge, *Ber.*, 1903, 36, 3891.

Auwers, Czerny, *Ber.*, 1898, 31, 2694.

2-Hydroxy-4-methylbenzophenone (4-Benzo-m-cresol).

Yellow cryst. from EtOH.Aq. M.p. 60°. $FeCl_3 \rightarrow$ blood-red col.

Hamada, *Chem. Abstracts*, 1933, 27, 3928.

2'-Hydroxy-4-methylbenzophenone (2-p-Toluyphenol).

Cryst. from EtOH.Aq. M.p. 61.5°. Sol. EtOH, C_6H_6 . Spar. sol. H_2O , ligroin. Ox. \rightarrow terephthalic acid.

Oxime: m.p. 175°.

Benzoyl: cryst. from EtOH. M.p. 80°.

Phenylhydrazine: yellow cryst. from C_6H_6 . M.p. 145°.

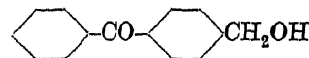
Ullmann, Goldberg, *Ber.*, 1902, 35, 2812.

4'-Hydroxy-4-methylbenzophenone (4-p-Toluyphenol).

Needles from H_2O . M.p. 160°. Spar. sol. CS_2 .

Limpricht, Samietz, *Ann.*, 1895, 286, 328.

4-Hydroxymethyl-benzophenone (p-Benzoylbenzyl alcohol, phenyl ω -hydroxy-p-tolyl ketone)



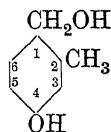
$C_{14}H_{12}O_2$ MW, 212

Leaflets from H_2O . M.p. 48.3° . Sol. EtOH, Et_2O , CHCl_3 , Me_2CO . Spar. sol. H_2O .

Acetyl: needles from Et_2O . M.p. 36° .

Bourcet, *Bull. soc. chim.*, 1896, 15, 947.

4-Hydroxy-2-methylbenzyl Alcohol (1- ω -Hydroxy-o-4-xyleneol)



$\text{C}_8\text{H}_{10}\text{O}_2$ MW, 138

Cryst. from AcOEt. M.p. 122° . FeCl_3 on EtOH sol. \rightarrow green col.

Bayer, D.R.P., 85,588.

4-Hydroxy-3-methylbenzyl Alcohol (1- ω -Hydroxy-m-4-xyleneol).

Cryst. from CHCl_3 . M.p. 87° .

Bayer, D.R.P., 85,588.

Hydroxy-methylbenzyl Alcohol.

See Methylsaligenin.

2-Hydroxy-5-methylbenzyl Alcohol.

See Homosaligenin.

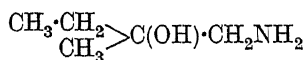
α -Hydroxy-N-methylbenzylamine.

See α -Methylaminobenzyl Alcohol.

Hydroxy-methylbutenyl - α - naphtho-quinone.

See Lapachol and Isolapachol.

2-Hydroxy-2-methyl-n-butylamine (2-Hydroxy-1-aminoisopentane)



$\text{C}_5\text{H}_{13}\text{ON}$ MW, 103

B.p. 170° , $75-80^\circ/30$ mm. Misc. with H_2O , Et_2O .

B.HCl : leaflets from Me_2CO . M.p. 90° .

B.HNO_3 : m.p. 45° .

Fourneau, *J. pharm. chim.*, 1910, 2, 56, (*Chem. Zentr.*, 1910, II, 1366).

α -Hydroxy- α -methylbutylbenzene.

See Methyl-ethylbenzylcarbinol.

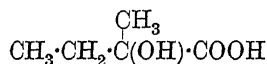
Hydroxymethyl butyl Ketone.

See 1-Hexanolone-2.

3-Hydroxy-3-methyl-1-butyne.

See Dimethylethynylcarbinol.

1-Hydroxy-1-methylbutyric Acid (Methyl-ethylglycollic acid, 1-ethyl-lactic acid)



$\text{C}_5\text{H}_{10}\text{O}_3$ MW, 118

Cryst. M.p. $72-3^\circ$ (68°). B.p. $133-4^\circ/16$ mm. Very sol. EtOH, H_2O , Et_2O . Sublimes in needles at 90° . $\text{CrO}_3 \rightarrow$ methyl ethyl ketone.

Me ester: $\text{C}_6\text{H}_{12}\text{O}_3$. MW, 132. B.p. $151.6-152^\circ$.

Et ester: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 165.5° (162°). D^{13}_D 0.9768. Very sol. H_2O , EtOH, Et_2O .

Amide: $\text{C}_5\text{H}_{11}\text{O}_2\text{N}$. MW, 117. Cryst. M.p. 160° .

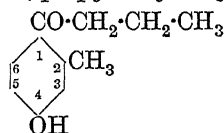
Nitrile: methyl ethyl ketone cyanhydrin. $\text{C}_5\text{H}_9\text{ON}$. MW, 99. B.p. $180^\circ/762$ mm., $91^\circ/20.5$ mm. Sol. H_2O , EtOH, Et_2O . D^{24}_D 0.9212 (D^{19}_D 0.9303). *Acetyl*: b.p. $195^\circ/764$ mm. Sol. EtOH, Et_2O . Insol. H_2O . D^{24}_D 0.9629.

Meerwein, *Ann.*, 1913, 396, 255.

Henry, *Chem. Zentr.*, 1899, I, 194.

Fischer, Grävenitz, *Ann.*, 1914, 406, 10.

4-Hydroxy-2-methylbutyrophenone (6-Butyryl-m-cresol, propyl 5-hydroxy-o-tolyl ketone)



$\text{C}_{11}\text{H}_{14}\text{O}_2$ MW, 178

Plates from C_6H_6 . M.p. $97-8^\circ$.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-3-methylbutyrophenone (3-Butyryl-o-cresol, propyl 2-hydroxy-m-tolyl ketone).

B.p. $143^\circ/11$ mm.

Oxime: needles from EtOH. M.p. $87-8^\circ$.

Phenylhydrazone: yellow needles from EtOH. M.p. $157-8^\circ$.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

4-Hydroxy-3-methylbutyrophenone (5-Butyryl-o-cresol, propyl 6-hydroxy-m-tolyl ketone).

Prisms from C_6H_6 . M.p. $132-3^\circ$. B.p. $195-200^\circ/15$ mm.

Phenylhydrazone: yellow plates from EtOH. M.p. 110° .

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 286.

6-Hydroxy-3-methylbutyrophenone (3-Butyryl-p-cresol, propyl 4-hydroxy-m-tolyl ketone).

Prisms from MeOH. M.p. $33-4^\circ$. B.p. $132-3^\circ/15$ mm. D^{56}_D 1.0188. n^{56}_D 1.51778. $\text{FeCl}_3 \rightarrow$ bluish-violet col. Na salt spar. sol. alkalis.

Oxime: needles from pet. ether. M.p. $96-7^\circ$. *Semicarbazone*: needles from EtOH. M.p. $188-9^\circ$.

Phenylhydrazone: prisms from EtOH. M.p. $141-2^\circ$.

p-Nitrophenylhydrazone: red prisms from EtOH. M.p. $184-6^\circ$.

Auwers, Lammerhirt, *Ber.*, 1920, 53, 437.

Auwers, Meissner, *Ann.*, 1924, 439, 146.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 287.

2-Hydroxy-4-methylbutyrophenone (4-Butyryl-m-cresol, propyl 3-hydroxy-p-tolyl ketone).
M.p. 17°. B.p. 142-4°/15 mm.
Oxime: needles from pet. ether. M.p. 74-5°.
Phenylhydrazine: yellowish leaflets from EtOH. M.p. 95-7°.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

2-Hydroxy-2-methylcamphane.

See Homoborneol.

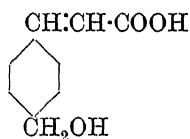
2-Hydroxy-3-methylcinchoninic Acid.

See 2-Hydroxy-3-methylquinoline-4-carboxylic Acid.

Hydroxy-methylcinnamic Acid.

See Methylcoumaric Acid and Methylcoumarinic Acid.

4-Hydroxymethyl-cinnamic Acid



$\text{C}_{10}\text{H}_{10}\text{O}_3$

MW, 178

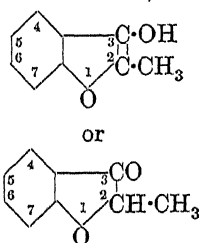
Needles from Me_2CO . M.p. 200-1°. Sol. EtOH, Me_2CO . Spar. sol. H_2O , C_6H_6 , CHCl_3 . Insol. ligroin.

Einhorn, Göttler, *Ber.*, 1909, 42, 4845.

Hydroxymethylcoumarin.

See Homoubbelliferone and 4-Methylumbelliferone.

3-Hydroxy-2-methylcoumarone (Enol form of 2-methylcoumaranone)



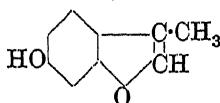
$\text{C}_9\text{H}_8\text{O}_2$

MW, 148

Oil. B.p. 163-5°/40 mm., 119°/15 mm. D_4^{20} 1.153. n_D^{20} 1.5631. Reduces Fehling's and NH_3AgNO_3 .

Stoermer, Atenstädt, *Ber.*, 1902, 35, 3565.
Auwers, *Ber.*, 1919, 52, 121.

6-Hydroxy-3-methylcoumarone



$\text{C}_9\text{H}_8\text{O}_2$

MW, 148

Needles from H_2O . M.p. 103° (97°). Sol. EtOH, Et_2O . Mod. sol. H_2O . Sol. alkalis with blue fluor. Alc. $\text{FeCl}_3 \rightarrow$ bluish-red col. Volatile in steam. Sublimes.

Me ether: $\text{C}_{10}\text{H}_{10}\text{O}_2$. MW, 162. Plates. M.p. 58°. B.p. 246°/105 mm. Volatile in steam. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ violet col.

Et ether: $\text{C}_{11}\text{H}_{12}\text{O}_2$. MW, 176. Plates from EtOH.Aq. M.p. 51-2°. Volatile in steam.

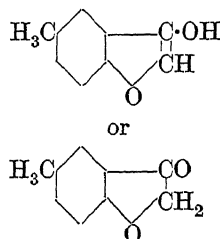
Acetyl: m.p. 58°.

Hantzsch, *Ber.*, 1886, 19, 2929.

v. Pechmann, Hanke, *Ber.*, 1901, 34, 361.

Kostanecki, Tambor, *Ber.*, 1909, 42, 905.

3-Hydroxy-5-methylcoumarone (Enol form of 5-methylcoumaranone)



$\text{C}_9\text{H}_8\text{O}_2$

MW, 148

Needles from pet. ether. M.p. 54° (51-2°). Sol. EtOH, Et_2O , C_6H_6 , AcOH. Spar. sol. pet. ether. Aq. sol. shows blue fluor. D_4^{20} 1.1506. n_D^{20} 1.56521. Reduces Fehling's and NH_3AgNO_3 .

Me ether: b.p. 149°/36 mm.

Et ether: b.p. 133°/15.5 mm.

Oxime: m.p. 144°.

Semicarbazone: m.p. 231°.

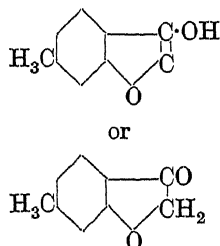
Stoermer, Bartsch, *Ber.*, 1900, 33, 3181.

Auwers, *Ber.*, 1919, 52, 121.

Auwers, Auffenberg, *Ber.*, 1919, 52, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, 117, 1541.

3-Hydroxy-6-methylcoumarone (Enol form of 6-methylcoumaranone)



$\text{C}_9\text{H}_8\text{O}_2$

MW, 148

Yellow needles from EtOH. M.p. 85°. Sol. EtOH, AcOH. Volatile in steam.

Oxime: m.p. 156° (165°).

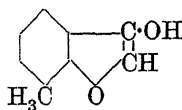
Semicarbazone: m.p. 208°.

Stoermer, Bartsch, *Ber.*, 1900, 33, 3180.

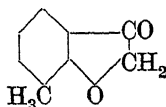
Fries, Finck, *Ber.*, 1908, 41, 4279.

Auwers, Auffenberg, *Ber.*, 1919, 52, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, 117, 1541.

3-Hydroxy-7-methylcoumarone (*Enol form of 7-methylcoumaranone*)

or

 $C_9H_8O_2$

MW, 148

Yellow cryst. M.p. 88° (102°). Sol. H_2O and usual org. solvents. Volatile in steam.

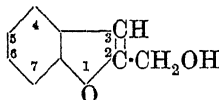
Oxime: m.p. 148°.

Semicarbazone: m.p. 237°.

Stoermer, Bartsch, *Ber.*, 1900, **33**, 3179.

Auwers, Auffenberg, *Ber.*, 1919, **52**, 94.

Higginbottom, Stephen, *J. Chem. Soc.*, 1920, **117**, 1542.

2-Hydroxymethylcoumarone $C_9H_8O_2$

MW, 148

B.p. 149–50°/14 mm. D_{16}^{25} 1.178. n_D^{25} 1.5874.

Acetyl: b.p. 149–50°/14 mm. D_{16}^{25} 1.185.

n_D^{25} 1.5550.

p-Nitrobenzoyl: m.p. 145–6°.

Phenylurethane: cryst. from C_6H_6 -pet. ether. M.p. 111°.

Normant, *Chem. Abstracts*, 1946, **40**, 2444.

5-Hydroxymethylcoumarone.

Cryst. M.p. 26–7°. B.p. about 147–50°/12 mm.

Stoermer, Oetker, *Ber.*, 1904, **37**, 200.

Hydroxy-methylcyclohexylacetic Acid.

See Methylcyclohexanol-acetic Acid.

Hydroxymethylcyclo-octane.

See Cyclo-octylcarbinol.

Hydroxy-methylcyclopentylacetic Acid.

See Methylcyclopentanol-acetic Acid.

 α -Hydroxymethyl-dibenzyl.

See 3-Hydroxy-1:2-diphenylpropane.

 α -Hydroxy- α -methyldibenzyl.

See 2-Hydroxy-1:2-diphenylpropane.

 β -Hydroxy- α -methyldibenzyl.

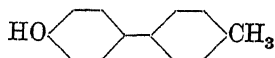
See 1-Hydroxy-1:2-diphenylpropane.

Hydroxymethyl dihydroxyethyl Ketone.

See Erythrulose.

4-Hydroxymethyl-dimethylaniline.

See *p*-Dimethylaminobenzyl Alcohol.

4'-Hydroxy-4-methyldiphenyl (4-*p*-Tolylphenol) $C_{13}H_{12}O$

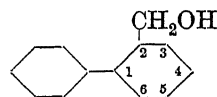
MW, 184

Cryst. M.p. 155° (152–3°). B.p. 330°.

Hirsch, D.R.P., 58,001.

Bickley, Gardner, *J. Org. Chem.*, 1940, **5**, 126.

Colbert, Lacy, *J. Am. Chem. Soc.*, 1946, **68**, 270.

2-Hydroxymethyldiphenyl (*o*-Phenylbenzyl alcohol, *o*-diphenylcarbinol, *o*-xenylcarbinol) $C_{13}H_{12}O$

MW, 184

Oil. B.p. 181°/8 mm. Sol. EtOH, Et_2O , C_6H_6 . Insol. H_2O .

Acetyl: oil. B.p. 182°/20 mm. Sol. EtOH, Et_2O . Insol. H_2O .

Fanto, *Monatsh.*, 1898, **19**, 591.

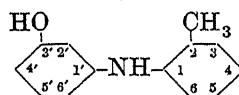
3-Hydroxymethyldiphenyl (*m*-Phenylbenzyl alcohol, *m*-diphenylcarbinol, *m*-xenylcarbinol).

Liq. Slowly solidifies. Sol. EtOH, Et_2O , $CHCl_3$, CS_2 . Spar. sol. ligroin.

Me ether: $C_{14}H_{14}O$. MW, 198. Liq. Volatile in steam.

Et ether: $C_{15}H_{16}O$. MW, 212. Liq. Sol. Et_2O . Volatile in steam.

Adam, *Ann. chim. phys.*, 1888, **15**, 243.

3'-Hydroxy-2-methyldiphenylamine (3-*o*-Toluidinophenol, *o*-tolyl-*m*-aminophenol) $C_{13}H_{13}ON$

MW, 199

Oil. B.p. 370–5°. Sol. EtOH, Et_2O , C_6H_6 , AcOH. Zn dust dist. \rightarrow 2-methyldiphenylamine.

Me ether: *o*-tolyl-*m*-anisidine. $C_{14}H_{15}ON$. MW, 213. Oil.

Et ether: *o*-tolyl-*m*-phenetidine. $C_{15}H_{17}ON$. MW, 227. Oil.

Badische, D.R.Ps, 46,869, 63,260.

Philip, *J. prakt. Chem.*, 1886, **34**, 70.

4'-Hydroxy-2-methyldiphenylamine (4-*o*-Toluidinophenol, *o*-tolyl-*p*-aminophenol).

Plates from C_6H_6 -pet. ether. M.p. 90°. B.p. 366–8°. Sol. EtOH, Et_2O . Spar. sol. pet. ether. Zn dust dist. \rightarrow acridine. Hot HCl \rightarrow *o*-toluidine + hydroquinone.

Et ether: *o*-tolyl-*p*-phenetidine. $C_{15}H_{17}ON$. MW, 227. Cryst. from ligroin. M.p. 81–2°. B.p. 354°.

Philip, *J. prakt. Chem.*, 1886, **34**, 57.

Jacobson, Henrich, *Ann.*, 1895, **287**, 175.

5-Hydroxy-3-methyldiphenylamine (3-*Anilino-p*-cresol).

Needles from EtOH. M.p. 79°. B.p. 345°. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Spar. sol. pet.

ether. Zn dust dist. \rightarrow 3-methyldiphenylamine.

Zega, Buch, *J. prakt. Chem.*, 1886, 33, 539.

3'-Hydroxy-4-methyldiphenylamine (3-p-Toluidinophenol, p-tolyl-m-aminophenol).

Needles or prisms from C_6H_6 -pet. ether. M.p. 92°. B.p. 350°. Sol. EtOH, Et₂O, Me₂CO, C_6H_6 . Spar. sol. hot H₂O, pet. ether. Zn dust dist. \rightarrow 4-methyldiphenylamine.

N-Acetyl: m.p. 213°.

Me ether: p-tolyl-m-anisidine. $C_{14}H_{15}ON$. MW, 213. Cryst. from C_6H_6 . B.p. about 360°.

Et ether: p-tolyl-m-phenetidine. $C_{15}H_{17}ON$. MW, 227. Cryst. M.p. about 30°. N-Acetyl: m.p. 61°.

Badische, D.R.Ps. 46,869, 62,539.

Hatschek, Zega, *J. prakt. Chem.*, 1886, 33, 209.

Gnehm, Veillon, *J. prakt. Chem.*, 1902, 65, 49.

4'-Hydroxy-4-methyldiphenylamine (4-p-Toluidinophenol, p-tolyl-p-aminophenol).

Plates from C_6H_6 . M.p. 122°. B.p. 350-60°. Sol. EtOH, C_6H_6 . Zn dust dist. \rightarrow 4-methyldiphenylamine. $FeCl_3 \rightarrow$ green col. \rightarrow brownish red with excess $FeCl_3$.

O : N-Diacetyl: m.p. 101°.

O : N-Dibenzoyl: m.p. 169°.

Hatschek, Zega, *J. prakt. Chem.*, 1886, 33, 224.

Bamberger, *Ann.*, 1912, 390, 189.

Heller, *Ann.*, 1919, 418, 264.

α -Hydroxy-methyldiphenylmethane.

See Methylbenzhydrol.

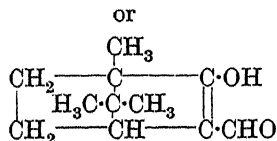
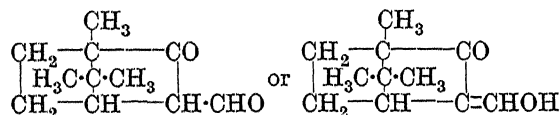
Hydroxymethylene-acetophenone.

See Benzoylactaldehyde.

Hydroxymethylene-butyrophenone.

See 1-Benzoylbutyraldehyde.

3-Hydroxymethylenecamphor (3-Formylcamphor, 3-aldehydocamphor, "camphoraldehyde")



$C_{11}H_{16}O_2$

MW, 180

d.

Plates from 30% AcOH. Prisms from pet. ether. M.p. 81-2°. B.p. 251°, 105°/11 mm. Sol. EtOH, Et₂O, C_6H_6 , $CHCl_3$, CS_2 , hot H₂O, dil. alkalis, aq. NH_3 , alkali carbonates. $[\alpha]_D^{20} + 198^\circ \rightarrow + 187^\circ$ in EtOH, after 20 hours. Volatile in steam. Alc. $FeCl_3 \rightarrow$ reddish violet

col. Excess alc. $FeCl_3 \rightarrow$ bluish violet \rightarrow blue \rightarrow green col. Alk. $KMnO_4 \rightarrow$ camphoric acid. CrO_3 -AcOH \rightarrow camphorquinone.

Cu deriv.: $Cu(C_{11}H_{15}O_2)_2 + 2C_{11}H_{16}O_2$. Yellowish green needles from ligroin. M.p. 126°.

$Cu(C_{11}H_{15}O_2)_2$: olive green needles. M.p. 166-7°.

Me ether: $C_{12}H_{18}O_2$. MW, 194. Prisms. M.p. 40°. B.p. 262°, 141°/12 mm.

Et ether: $C_{14}H_{20}O_2$. MW, 208. B.p. 269-70°, 147-8°/17 mm.

Phenyl ether: b.p. 214-15°/13 mm.

Benzyl ether: cryst. M.p. 45-6°. B.p. 222-4°/16 mm.

Acetyl: cryst. from pet. ether. M.p. 63-4°.

Imino comp.: $C_{11}H_{17}ON$. MW, 179. Plates from $CHCl_3$ -pet. ether. M.p. 164-5°.

Semicarbazone: cryst. from AcOH. M.p. 217-18°.

l.

Plates from petrol. M.p. 81-2°. $[\alpha]_D^{20} - 195^\circ \rightarrow - 185^\circ$ in EtOH, after 20 hours.

dl.

Cryst. from pet. ether. M.p. 80-1°.

Rupe, Sieberth, Kussmaul, *Helv. Chim. Acta*, 1920, 3, 54.

Bishop, Claisen, Sinclair, *Ann.*, 1894, 281, 331.

Pope, Read, *J. Chem. Soc.*, 1913, 103, 446.

Palmén, *Chem. Abstracts*, 1930, 24, 1636.

Hydroxymethylene-malonic Acid.

See Aldehydomalonic Acid.

β -Hydroxymethylene-propiophenone.

See 1-Benzoylpropionaldehyde.

Hydroxymethylene-succinic Acid.

See Aldehydosuccinic Acid.

Hydroxymethyl-ethylbenzene.

See Ethylbenzyl Alcohol.

Hydroxymethylethylene oxide.

See Glycide.

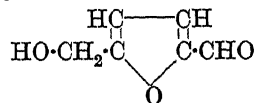
2-Hydroxymethyl-1-ethylglutaric Acid.

See Homopilomalic Acid.

2-Hydroxymethylfuran.

See Furfuryl Alcohol.

5-Hydroxymethylfurfural



$C_6H_6O_3$

MW, 126

Needles. M.p. 35-35.5° (31.5°). B.p. 114-16°, 72°/0.002 mm. n_D^{20} 1.5105. Sol. H₂O, EtOH, AcOEt. Spar. sol. Et₂O. Volatile in steam. Reduces Fehling's. Conc. HCl \rightarrow red col. Dil. acids \rightarrow levulinic + formic acids. Hydrazine \rightarrow 5-methylfurfuryl alcohol.

Oxime: syn., m.p. 77-8°; anti-, m.p. 108°.

Semicarbazone: m.p. 192° (166-7°).

Phenylhydrazone: m.p. 140°.

p-Nitrophenylhydrazone: m.p. 185°.

2 : 4-Dinitrophenylhydrazones : m.p. 184°.
 α -(2 : 4-Dinitrophenyl)- α -methylhydrazones : m.p. 100°.
 2 : 4 : 6-Trinitrophenylhydrazones : m.p. 216°.
 α -(2 : 4 : 6-Trinitrophenyl)- α -methylhydrazones : m.p. 196°.

Teunissen, *Rec. trav. chim.*, 1930, **49**, 784.
 Reichstein, Zschokke, *Helv. Chim. Acta*, 1932, **15**, 250.

Haworth, Jones, *J. Chem. Soc.*, 1944, 667.

4-Hydroxymethyl-glyoxaline.

See 4-Iminazolylicarbinol.

6-Hydroxy-4-methylhemimellitic Acid.

See Cochenillic Acid.

Hydroxy-methyl-hydrocinnamic Acid.

See Hydroxy-phenyl-butyric Acid and Hydroxy-phenyl-isobutyric Acid.

3-Hydroxy-2-methyl-5-hydroxymethyl-isonicotinic Aldehyde.

See Pyridoxal.

Hydroxymethyl-indene.

See Indenylcarbinol.

3-Hydroxy-2-methylindole.

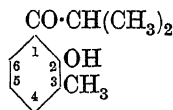
See 2-Methylindoxyl.

Hydroxymethyl-indole.

See Indolylcarbinol.

2-Hydroxy-3-methylisobutyrophenone

(3-Isobutyryl-o-cresol, isopropyl 2-hydroxy-m-tolyl ketone)



$\text{C}_{11}\text{H}_{14}\text{O}_2$

MW, 178

Greenish-yellow oil. D_4^{20} 1.047. n_D^{20} 1.5368. $\text{FeCl}_3 \rightarrow$ violet col.

Acetyl: oil. B.p. 152-4°/12 mm. D_4^{20} 1.074. n_D^{20} 1.5136.

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, **115**, 94.

4-Hydroxy-3-methylisobutyrophenone

(5-Isobutyryl-o-cresol, isopropyl 6-hydroxy-m-tolyl ketone).

Plates from C_6H_6 . M.p. 122°. B.p. 182°/12 mm. Sol. EtOH, Et_2O . Spar. sol. hot H_2O . No col. with FeCl_3 .

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, **115**, 94.

6-Hydroxy-3-methylisobutyrophenone

(3-Isobutyryl-p-cresol, isopropyl 4-hydroxy-m-tolyl ketone).

B.p. 250.5-251.5°/763 mm., 125-125.3°/11 mm. $D_4^{16.6}$ 1.0460. $n_D^{16.6}$ 1.538. $\text{FeCl}_3 \rightarrow$ violet col.

Me ether: $\text{C}_{12}\text{H}_{16}\text{O}_2$. MW, 192. B.p. 136-137.5°/10 mm., 155°/25 mm. $D_4^{14.2}$ 1.0213. $n_D^{13.7}$ 1.521.

Oxime: cryst. from MeOH.Aq. or C_6H_6 . M.p. 149-50°.

Phenylhydrazones: plates from C_6H_6 -pet. ether. M.p. 126.5-127.5°. Sol. EtOH, AcOH. Spar. sol. Et_2O , C_6H_6 .

Semicarbazone: needles from AcOEt. M.p. 193-4°.

Auwers, *Ann.*, 1915, **408**, 251.

Auwers, Baum, Lorenz, *J. prakt. Chem.*, 1927, **115**, 98.

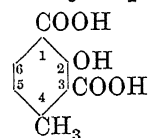
2-Hydroxy-4-methylisobutyrophenone

(4-Isobutyryl-m-cresol, isopropyl 3-hydroxy-p-tolyl ketone).

B.p. 120-1°/11 mm. D_4^{20} 1.042. n_D^{20} 1.5401. $\text{FeCl}_3 \rightarrow$ violet col.

Auwers, Koch, *Ann.*, 1924, **439**, 166.

2-Hydroxy-4-methylisophthalic Acid



$\text{C}_9\text{H}_8\text{O}_5$

MW, 196

Prisms. M.p. 228°.

Di-Et ester: b.p. 120-5°/0.2 mm.

Prelog *et al.*, *Helv. Chim. Acta*, 1947, **30**, 675.

5-Hydroxy-4-methylisophthalic Acid.

Needles from H_2O . M.p. 270° decomp. No col. with FeCl_3 .

Jacobsen, *Ber.*, 1881, **14**, 2114.

6-Hydroxy-4-methylisophthalic Acid.

See α -Coccinic Acid.

2-Hydroxy-5-methylisophthalic Acid (2-Hydroxyuvitic acid).

Needles from H_2O . M.p. 235° decomp. Sol. EtOH, Et_2O . Mod. sol. CHCl_3 . Spar. sol. H_2O . Insol. C_6H_6 , pet. ether. $\text{FeCl}_3 \rightarrow$ intense red col.

Me ether: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Cryst. from C_6H_6 . M.p. 180°. Sol. hot H_2O , Et_2O , EtOH, AcOH. Spar. sol. C_6H_6 , ligroin. Warm $\text{KMnO}_4 \rightarrow$ methoxytrimesic acid.

Di-Me ester: $\text{C}_{11}\text{H}_{12}\text{O}_5$. MW, 224. Needles from EtOH. M.p. 79°. Insol. H_2O . Volatile in steam.

Jacobsen, *Ann.*, 1879, **195**, 274, 285; 1881, **206**, 201.

Ullmann, Brittner, *Ber.*, 1909, **42**, 2542.

4-Hydroxy-5-methylisophthalic Acid (4-Hydroxyuvitic acid).

Needles from EtOH. M.p. 294-5° decomp. Sol. EtOH, Et_2O . Spar. sol. H_2O . Insol. C_6H_6 , CHCl_3 , pet. ether. $\text{FeCl}_3 \rightarrow$ red col.

Mono-Me ester: m.p. 241°.

Di-Me ester: needles from MeOH. M.p. 132° (129-30°). Volatile in steam.

Di-Et ester: $\text{C}_{13}\text{H}_{16}\text{O}_5$. MW, 252. Needles from ligroin. M.p. 62°.

Dichloride: $C_9H_6O_3Cl_2$. MW, 233. Needles from C_6H_6 . M.p. 67–8°.

Jacobsen, *Ann.*, 1881, 206, 188.

Böttger, *Ber.*, 1880, 13, 1934.

Anschütz, Robitsek, *Ann.*, 1906, 346, 358.

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Hydroxymethylisopropylbenzaldehyde.

See Thymotinic Aldehyde.

Hydroxymethylisopropylbenzene.

See Carvacrol, Thymol and Isopropylresol.

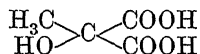
Hydroxy-1-methylisovaleric Acid.

See Hydroxy-1:2-dimethylbutyric Acid.

2-Hydroxymethyl-isovaleric Acid.

See 3-Hydroxy-2:2-dimethylbutyric Acid.

Hydroxy-methylmalonic Acid (*Isomalic acid*, *methyltartronic acid*, *α-hydroxyisosuccinic acid*)



$C_4H_6O_5$ MW, 134

Cryst. M.p. 142° decomp. Sol. H_2O , EtOH, Et_2O . Heat at 170° → lactic acid.

Di-butyl ester: b.p. 146°/14 mm. D^{20}_D 1.020. n^{20}_D 1.4300.

Me ether: distills at 1 mm. Decomp. on standing.

Et ether: $C_6H_{10}O_5$. MW, 162. Needles from H_2O or Et_2O . M.p. 110–12°. *Di-Me ester*: b.p. 110°/16 mm.

Dinitrile: 1:1-dicyanoethyl alcohol. $C_4H_4ON_2$. MW, 96. *Acetyl*: m.p. 69°. B.p. 210°.

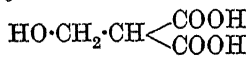
Diamide: $C_4H_8O_3N_2$. MW, 132. Cryst. M.p. 203.5°. Spar. sol. H_2O , EtOH, Et_2O . *Acetyl*: m.p. 192°.

Tanatar, *Ann.*, 1893, 273, 41.

Denis, *J. Am. Chem. Soc.*, 1908, 38, 589.

Bardroff, *Monatsh.*, 1912, 33, 861.

Hydroxymethyl-malonic Acid (*β-Isomalic acid*, *β-hydroxyisosuccinic acid*)



$C_4H_6O_5$ MW, 134

Syrup. Heat above 113° → acrylic acid.

Cu salt: blue powder from EtOH.Aq.

Ca salt: white amorph. powder. Sol. cold H_2O . Insol. boiling H_2O , EtOH.

Me ether: $C_5H_8O_5$. MW, 148. *Di-Et ester*: $C_9H_{16}O_5$. MW, 204. Oil. B.p. 121–2°/15 mm.

Et ether: $C_6H_{10}O_5$. MW, 162. Syrup. Sol. H_2O .

Tanatar, *Ann.*, 1893, 273, 45.

Coops, *Rec. trav. chim.*, 1904, 23, 355.

Simonsen, *J. Chem. Soc.*, 1908, 93, 1780.

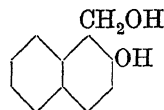
Hydroxy-methylnaphthalene.

See Methylnaphthol.

Hydroxymethyl-naphthalene.

See Naphthylcarbinol.

1-Hydroxymethyl-2-naphthol (*ω*: 2-*Di-hydroxy-1-methylnaphthalene*, 2-hydroxy-1-naphthylcarbinol, 1-methylol-2-naphthol)



$C_{11}H_{10}O_2$ MW, 174

Needles from $CHCl_3$. M.p. 188–9° decomp. Sol. EtOH. Alc. $FeCl_3$ → bluish green → brown col.

2-Me ether: $C_{12}H_{12}O_2$. MW, 188. Plates from H_2O . M.p. 100–1°.

Betti, Mundici, *Gazz. chim. ital.*, 1906, 36, II, 659.

Jacobs, Heidelberger, *J. Biol. Chem.*, 1915, 20, 671.

Clutterbuck, Cohen, *J. Chem. Soc.*, 1923, 123, 2510.

3-Hydroxy-2-methyl-1:4-naphtho-quinone.

See Phthiocol.

3-Hydroxy-2-methyloctane.

See Isopropyl-*n*-amylcarbinol.

1-Hydroxymethyl-pelargonic Acid.

See 1-*n*-Heptylhydracrylic Acid.

2-Hydroxymethyl-pentane-1:3-dicarboxylic Acid.

See Homopilomalic Acid.

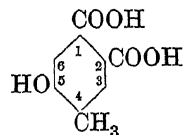
5-Hydroxy-2-methyl-5-phenylpentane.

See Isoamylphenylcarbinol.

5-Hydroxy-3-methylphthalic Acid.

See β-Coccinic Acid.

5-Hydroxy-4-methylphthalic Acid (4-Hydroxy-5-methylphthalic acid)



$C_9H_8O_5$ MW, 196

Cryst. from H_2O . M.p. 244–5°.

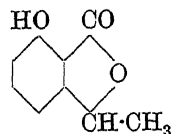
Ba salt: insol. H_2O .

Meldrum, Kapadia, *J. Indian Chem. Soc.*, 1932, 9, 490.

6-Hydroxy-4-methylphthalic Acid (3-Hydroxy-5-methylphthalic Acid).

See γ-Coccinic Acid.

7-Hydroxy-3-methylphthalide



$C_9H_8O_2$ MW, 148

Degradation product of terramycin. Cryst. + $1H_2O$. M.p. 110–12°.

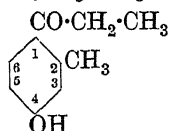
Me ether: $C_{10}H_{10}O_2$. MW, 162. Cryst. M.p. 73–4°.

Pasternak *et al.*, *J. Am. Chem. Soc.*, 1951, 73, 2400, 5008.

Hydroxymethylpiperidine.

See Piperidylcarbinol.

4-Hydroxy-2-methylpropionophenone (6-Propionyl-m-cresol, ethyl 5-hydroxy-o-tolyl ketone)



$C_{10}H_{12}O_2$ MW, 164

Needles from pet. ether. M.p. 114–15°. Sol. EtOH, Me_2CO , AcOH. Mod. sol. C_6H_6 . Spar. sol. pet. ether. No col. with FeCl_3 .

Me ether: $C_{11}H_{14}O_2$. MW, 178. Cryst. from EtOH. M.p. 43°. B.p. 149–50°/14 mm. *Oxime*: cryst. from EtOH.Aq. M.p. 94–5°.

Phenylhydrazine: plates from EtOH. M.p. 152.5–153.5°. Spar. sol. pet. ether.

Klages, *Ber.*, 1904, 37, 3993.

Auwers, Koch, *Ann.*, 1924, 439, 174.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1684.

6-Hydroxy-2-methylpropionophenone (2-Propionyl-m-cresol, ethyl 3-hydroxy-m-tolyl ketone).

Prisms from Et_2O . M.p. 28.5° (25–7°). B.p. 140°/5 mm. Sol. H_2O . $\text{FeCl}_3 \rightarrow$ brownish-violet col.

Me ether: m.p. about 8°. B.p. 137°/16 mm. *Semicarbazone*: needles from C_6H_6 -ligroin. M.p. 145°.

p-Nitrophenylhydrazine: yellowish-red needles from EtOH.Aq. M.p. 154–6°.

Simonis, *Ber.*, 1917, 50, 782.

Auwers, Koch, *Ann.*, 1924, 439, 167.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1684.

2-Hydroxy-3-methylpropionophenone (3-Propionyl-o-cresol, ethyl 2-hydroxy-m-tolyl ketone).

Yellow plates from pet. ether. M.p. 22–3°. B.p. 127–9°/15 mm. $\text{FeCl}_3 \rightarrow$ violet col.

Semicarbazone: cryst. from EtOH. M.p. 202°.

Auwers, Wittig, *Ber.*, 1924, 57, 1274.

4-Hydroxy-3-methylpropionophenone (5-Propionyl-o-cresol, ethyl 6-hydroxy-m-tolyl ketone).

Needles from EtOH.Aq. M.p. 83.5–84°. Sol. EtOH, AcOH. Mod. sol. C_6H_6 . Spar. sol. pet. ether.

Me ether: $C_{11}H_{14}O_2$. MW, 178. Cryst. M.p. 41°. B.p. 169–71°/25 mm. *Oxime*: plates from EtOH.Aq. M.p. 99°.

Auwers, Wittig, *Ber.*, 1924, 57, 1274.

Klages, *Ber.*, 1904, 37, 3991.

6-Hydroxy-3-methylpropionophenone (3-Propionyl-p-cresol, ethyl 4-hydroxy-m-tolyl ketone).

Cryst. F.p. 2°. B.p. 153°/40 mm., 123–4°/11 mm. D_4^{20} 1.0841. n_D^{20} 1.549.

Me ether: oil. B.p. 149–51°/17 mm., 133–5–6°/10 mm. D_4^{20} 1.0514. n_D^{20} 1.533. *Oxime*: plates. M.p. 92°.

Et ether: $C_{12}H_{16}O_2$. MW, 192. Prisms from MeOH.Aq. M.p. 50–1°.

Benzyl ether: m.p. 43°. B.p. 176–9°/3 mm.

Acetyl: needles from pet. ether. M.p. 58°. Sol. EtOH, Et_2O , C_6H_6 , AcOH.

Benzoyl: prisms from EtOH. M.p. 97°. Sol. C_6H_6 , AcOH, hot ligroin. Mod. sol. Et_2O .

Oxime: prisms from MeOH. M.p. 134–5°.

Semicarbazone: needles from EtOH. M.p. 211–12°.

Phenylhydrazine: needles or plates from EtOH or ligroin. M.p. 146°.

p-Nitrophenylhydrazine: m.p. 188–9°.

Klages, *Ber.*, 1904, 37, 3994.

Auwers, *Ber.*, 1918, 51, 1123.

Hill, Graf, *J. Am. Chem. Soc.*, 1916, 37, 1844.

Auwers, Hilliger, Wulf, *Ann.*, 1922, 429, 217.

Auwers, Lechner, Bundesmann, *Ber.*, 1925, 58, 45.

2-Hydroxy-4-methylpropionophenone (4-Propionyl-m-cresol, ethyl 3-hydroxy-p-tolyl ketone).

Leaflets from pet. ether. M.p. 41.5–42.5°. B.p. 115–20°/10 mm. $\text{FeCl}_3 \rightarrow$ deep violet col.

Oxime: needles from pet. ether. M.p. 103–4°.

Semicarbazone: needles from EtOH. M.p. 206–8°. Sol. hot EtOH, MeOH, AcOH. Mod. sol. Me_2CO . Insol. C_6H_6 .

Phenylhydrazine: yellow plates from EtOH. M.p. 137–8°.

Auwers, Koch, *Ann.*, 1924, 439, 174.

Robertson, Waters, Jones, *J. Chem. Soc.*, 1932, 1688.

Coulthard, Marshall, Pyman, *J. Chem. Soc.*, 1930, 288.

Hydroxymethyl-pyridine.

See Pyridylcarbinol.

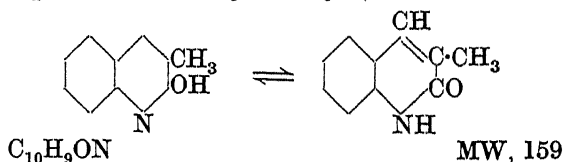
3-Hydroxy-2-methyl- γ -pyrone.

See Maltol.

Hydroxy-2-methylquinoline.

See Hydroxyquinaldine.

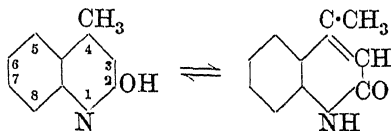
2-Hydroxy-3-methylquinoline (3-Methyl-2-quinolinol, 4-methylcarbostyryl)



Yellow needles from dil. EtOH. M.p. 234–5°. Sublimes.

Orstein, *Ber.*, 1907, 40, 1095.

2-Hydroxy-4-methylquinoline (2-Hydroxylepidine, 4-methyl-2-quinolinol, 4-methyl-carbostyryl, lepidone)



$C_{10}H_9ON$

MW, 159

Needles from H_2O . M.p. 245° (223–7°). B.p. 270°/17 mm. Sol. hot H_2O . Spar. sol. cold H_2O , Et_2O , $CHCl_3$, C_6H_6 , ligroin. $P_2S_5 \rightarrow$ thiolepidine. Red. \rightarrow tetrahydrolepidine.

Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 275–6°. B_2, H_2PtCl_6 : decomp. at 214°.

Knorr, *Ann.*, 1886, 238, 100.

Reissert, *Ber.*, 1891, 24, 855.

Tröger, Dunker, *J. prakt. Chem.*, 1925, 109, 88.

Lauer, Kaslow, *Organic Syntheses*, 1944, XXIV, 68.

6-Hydroxy-4-methylquinoline (6-Hydroxylepidine, 4-methyl-6-quinolinol).

Needles from 50% EtOH. M.p. 222–4° (216–18°). Sol. hot EtOH, $CHCl_3$.

Me ether: needles from dil. EtOH. M.p. 50–2°. B_2, H_2PtCl_6 : m.p. 236–7°.

Hydroxyethyl ether: m.p. 88–9°. B, HCl : m.p. 236–8°.

Königs, *Ber.*, 1890, 23, 2673, 2684.

Clapp, Tipson, *J. Am. Chem. Soc.*, 1946, 68, 1332.

8-Hydroxy-5-methylquinoline (5-Methyl-8-quinolinol).

Needles from dil. EtOH. M.p. 122–4°.

Nölting, Trautmann, *Ber.*, 1890, 23, 3666.

7-Hydroxy-6-methylquinoline (6-Methyl-7-quinolinol).

Needles from EtOH. M.p. 244°. B.p. 240°/22 mm., 210°/11 mm.

Edinger, Bühler, *Ber.*, 1909, 42, 4316.

8-Hydroxy-6-methylquinoline (6-Methyl-8-quinolinol).

Needles from $CHCl_3$. M.p. 95–6°. Sublimes. Sol. EtOH, hot NaOH. Spar. sol. H_2O . Volatile in steam. $FeCl_3 \rightarrow$ green col.

Herzfeld, *Ber.*, 1884, 17, 1552.

8-Hydroxy-7-methylquinoline (7-Methyl-8-quinolinol).

Needles from dil. EtOH. M.p. 72–4°. $FeCl_3 \rightarrow$ dark green col.

Nölting, Trautmann, *Ber.*, 1890, 23, 3663.

5-Hydroxy-8-methylquinoline (8-Methyl-5-quinolinol).

M.p. 262–3°. Spar. sol. $CHCl_3$. Sublimes in needles. $FeCl_3 \rightarrow$ reddish-brown col.

Me ether: $C_{11}H_{11}ON$. MW, 173. B.p. 225–30°.

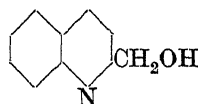
Herzfeld, *Ber.*, 1884, 17, 905, 1551.

6-Hydroxy-8-methylquinoline (8-Methyl-6-quinolinol).

Needles. M.p. 200°. $FeCl_3 \rightarrow$ brownish-red col.

Herzfeld, *Ber.*, 1884, 17, 903.

2-Hydroxymethyl-quinoline (α -Hydroxy-quinaldine, 2-quinoline-carbinol, α -quinolylcarbinol)



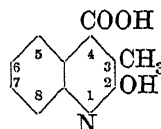
$C_{10}H_9ON$

MW, 159

Needles from ligroin or EtOH. M.p. 64°. Volatile in steam. $CrO_3 \rightarrow$ 2-aldehydoquinoline.

Hammick, *J. Chem. Soc.*, 1926, 1303.

2-Hydroxy-3-methylquinoline-4-carboxylic Acid (2-Hydroxy-3-methylcinchoninic acid)



$C_{11}H_9O_3N$

MW, 203

Needles + H_2O from hot H_2O . M.p. 311–12° (315–17°).

Me ester: $C_{13}H_{11}O_3N$. MW, 217. Needles from MeOH. M.p. 174–5°.

Et ester: $C_{13}H_{13}O_3N$. MW, 231. Needles from dil. EtOH. M.p. 167°.

Amide: $C_{11}H_{10}O_2N_2$. MW, 202. M.p. 353–4°.

Anilide: m.p. 314–15°.

Ornstein, *Ber.*, 1907, 40, 1091, 1094.

Meyer, *Monatsh.*, 1905, 26, 1322; 1907, 28, 38.

2-Hydroxy-4-methylquinoline-3-carboxylic Acid (2-Hydroxylepidine-3-carboxylic acid).

Needles from EtOH. M.p. 254–5° decomp. Spar. sol. EtOH. Insol. H_2O , Et_2O , $CHCl_3$, C_6H_6 . Heat \rightarrow 2-hydroxy-4-methylquinoline. $Zn \rightarrow$ 4-methylquinoline.

Et ester: $C_{13}H_{13}O_3N$. MW, 231. M.p. 251–2°.

Nitrile: $C_{11}H_8ON_2$. MW, 184. M.p. 320°.

Me ether: colourless needles from MeOH. M.p. 120–1°.

Camps, *Arch. Pharm.*, 1902, 240, 142.

2-Hydroxy-4-methylquinoline-8-carboxylic Acid

796

2-Hydroxy-4-methylquinoline-8-carboxylic Acid (*2-Hydroxyepidine-8-carboxylic acid*).

Needles from dil. EtOH. M.p. 312° decomp. Mod. sol. EtOH, AcOH. Spar. sol. hot H₂O. Prac. insol. Et₂O, CHCl₃, C₆H₆, ligroin.

Reissert, *Ber.*, 1891, 24, 853.

4-Hydroxymethyl-γ-resorcylic Aldehyde.

See Barbatol.

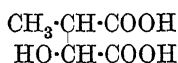
Hydroxymethyl-succinic Acid.

See Itamalic Acid.

1-Hydroxy-1-methylsuccinic Acid.

See Citramalic Acid.

2-Hydroxy-1-methylsuccinic Acid (*2-Hydroxypyrotartaric acid, 2-methylmalic acid*)



C₅H₈O₅

MW, 148

Prisms from AcOEt. M.p. 123° (119–20°).

Mono-Et ester: C₇H₁₂O₅. MW, 176. *Na salt*: needles from EtOH. M.p. 166–7°. Sol. H₂O.

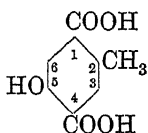
Di-Et ester: C₉H₁₆O₅. MW, 204. B.p. 250°/745 mm., 138°/17 mm.

Monoamide: C₅H₉O₄N. MW, 147. Cryst. M.p. 145–7°. Sol. H₂O. Mod. sol. EtOH.

Wislicenus, *Ber.*, 1892, 25, 199.

Lutz, *J. Russ. Phys. Chem. Soc.*, 1909, 41, 1534.

5-Hydroxy-2-methylterephthalic Acid (*p-Cresol-2 : 5-dicarboxylic acid*)



C₉H₈O₅

MW, 196

Prisms from EtOH.Aq. M.p. 285–90° decomp. Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ → intense red col.

Jacobson, Meyer, *Ber.*, 1883, 16, 191.

6-Hydroxy-2-methylterephthalic Acid (*m-Cresol-2 : 5-dicarboxylic acid*).

Needles from MeOH. M.p. 280–3°. Alc. FeCl₃ → intense reddish-violet col.

Me ether: C₁₀H₁₀O₅. MW, 210. Cryst. from H₂O. M.p. 267°. Spar. sol. H₂O. FeCl₃ → yellow ppt.

Perkin, *J. Chem. Soc.*, 1899, 75, 194.

6-Hydroxy-2-methyltetrahydropyran.

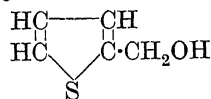
See 4-Hydroxy-*n*-caproic Aldehyde.

8-Hydroxy-N-methyl-1 : 2 : 3 : 4-tetrahydroquinoline.

See Kairine.

4-Hydroxy-2-methyltrimelic Acid

2-Hydroxymethylthiophene (*2-Methylthiophene, thenyl alcohol, thienylmethyl alcohol*)



C₅H₆OS

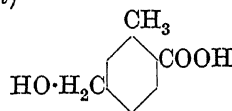
MW, 126

Liq. B.p. 94.5–96°/12 mm., 86°/10 mm. D₄¹⁵ 1.2147. n_D¹⁵ 1.5657.

Putokhin, Egorova, *Chem. Abstracts*, 1941, 35, 4377.

Steinkopf, Bokor, *Ann.*, 1939, 540, 14.

5-Hydroxymethyl-*o*-toluic Acid (*4-α-Hydroxy-2 : 4-dimethylbenzoic acid, 2-methyl-4-hydroxymethylbenzoic acid, 3-methyl-4-carboxybenzyl alcohol*)



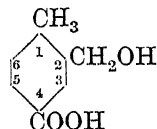
C₉H₁₀O₃

MW, 166

Plates from H₂O. M.p. 141–2°.

Perkin, Stone, *J. Chem. Soc.*, 1925, 127, 2286.

2-Hydroxymethyl-*p*-toluic Acid (*3-α-Hydroxy-3 : 4-dimethylbenzoic acid, 4-methyl-3-hydroxymethylbenzoic acid, 2-methyl-5-carboxybenzyl alcohol*)



C₉H₁₀O₃

MW, 166

Cryst. from H₂O. M.p. 165°. Sol. usual org. solvents except Et₂O.

de Diesbach *et al.*, *Helv. Chim. Acta*, 1940, 23, 1232.

3-Hydroxymethyl-*p*-toluic Acid (*2-α-Hydroxy-2 : 4-dimethylbenzoic acid, 4-methyl-2-hydroxymethylbenzoic acid, 3-methyl-6-carboxybenzyl alcohol*).

Needles from H₂O. M.p. 132–3°.

Perkin, Stone, *J. Chem. Soc.*, 1925, 127, 2285.

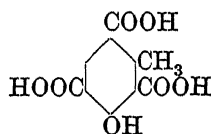
Hydroxymethyl *p*-tolyl Ketone.

See *p*-Methylphenacyl Alcohol.

3-Hydroxy-5-methyltrimellitic Acid.

See Isocochenillic Acid.

4-Hydroxy-2-methyltrimelic Acid (*m-Cresol-2 : 4 : 6-tricarboxylic acid, 2 : 4 : 6-tricarboxy-m-cresol*)



C₁₀H₈O₇

MW, 240

Needles + 2H₂O from H₂O. Loses H₂O at 257°. M.p. anhyd. 280°. Sol. EtOH. Spar. sol. H₂O, AcOH. Insol. Et₂O, CHCl₃. FeCl₃ \rightarrow reddish-violet col.

Mono-Et ester: C₁₂H₁₂O₇. MW, 268. Needles + 1H₂O from H₂O. M.p. anhyd. 224° decomp. Sol. EtOH, Et₂O. Mod. sol. toluene. FeCl₃ \rightarrow reddish-violet col.

Di-Et ester: C₁₄H₁₆O₇. MW, 296. Prisms from EtOH. M.p. 137–8°. Sol. EtOH, Et₂O. Spar. sol. ligroin. Insol. H₂O. FeCl₃ \rightarrow reddish-violet col.

Tri-Et ester: C₁₆H₂₀O₇. MW, 324. Prisms from EtOH. M.p. 47°. Sol. EtOH, Et₂O, C₆H₆. Spar. sol. ligroin. Insol. H₂O.

Et ether: C₁₂H₁₂O₇. MW, 268. Needles from EtOH. M.p. 242–3° decomp. *Mono-Et ester*: C₁₄H₁₆O₇. MW, 296. Prisms from H₂O. M.p. 195°. FeCl₃ \rightarrow brown ppt. *Tri-Et ester*: C₁₈H₂₄O₇. MW, 352. Oil. B.p. about 365° decomp.

Errera, *Ber.*, 1899, 32, 2781; *Gazz. chim. ital.*, 1901, 31, 145.

α -Hydroxymethyl-triphenylmethane.

See 2-Hydroxy-1:1:1-triphenylethane.

Hydroxymethylurea.

See Methylolurea.

Hydroxymethylvinylacetylene.

See 4-Penten-2-yn-1-ol.

1-Hydroxymyristic Acid

CH₃·[CH₂]₁₁·CH(OH)·COOH
C₁₄H₂₈O₃ MW, 244

Plates from CHCl₃. M.p. 81–2°. Sol. EtOH, Et₂O, Me₂CO. Spar. sol. CHCl₃, pet. ether.

Phenacyl ester: m.p. 69–9.5°.

p-Bromophenacyl ester: m.p. 95–5.4°.

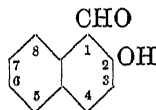
p-Nitrobenzyl ester: m.p. 67–8°.

Amide: C₁₄H₂₉O₂N. MW, 243. Plates from EtOH. M.p. 150°. Insol. Et₂O, C₆H₆, CHCl₃, pet. ether.

Nitrile: C₁₄H₂₇ON. MW, 225. Plates from pet. ether. M.p. 44–5°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃.

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1904.

2-Hydroxy-1-naphthaldehyde (1-Aldehyde-2-naphthol)



C₁₁H₈O₂ MW, 172

Prisms from EtOH or needles from AcOEt. M.p. 82°. B.p. 192°/27 mm. Sol. EtOH, Et₂O, pet. ether. Insol. H₂O. Sol. aq. alkalis. Sol. conc. H₂SO₄ to yellow sol. Spar. volatile in steam. FeCl₃ \rightarrow brown col. Reduces NH₃·AgNO₃ but not Fehling's. Ac₂O + CH₃·COONa at 180° \rightarrow benzcoumarin. Malonic acid + AcOH \rightarrow benzcoumarin-carboxylic

acid. CH₃COCl \rightarrow anhydro-di-2-hydroxy-1-naphthaldehyde, cryst. from AcOH, m.p. 241°.

Me ether: C₁₂H₁₀O₂. MW, 186. Needles from EtOH. M.p. 84°. B.p. 200–1°/11 mm. Sol. C₆H₆, AcOH. Ox. \rightarrow 2-methoxy-1-naphthoic acid. *Azine*: yellow prisms from PhNO₂. M.p. 255–6°.

Et ether: C₁₃H₁₂O₂. MW, 200. Needles from EtOH. M.p. 115° (109°). *Semicarbazone*: yellow needles from EtOH. M.p. 214–15°. *Phenylhydrazine*: m.p. 91°. *Azine*: yellow cryst. from PhNO₂-EtOH. M.p. 184°.

2-Acetyl: cryst. from EtOH. M.p. 87°. Sol. most org. solvents.

Triacetyl deriv.: leaflets from EtOH. M.p. 124°. Sol. EtOH, AcOH.

Oxime: needles. M.p. 157°. Sol. alkalis. *Acetyl*: m.p. 124°.

Semicarbazone: yellow needles from MeOH. M.p. 240° decomp.

p-Thiocyanophenylhydrazine: yellow needles. M.p. 207–8°.

Azine: yellow needles from PhNO₂. M.p. above 290°. Spar. sol. most org. solvents.

Picrate: m.p. 120°.

C₁₁H₈O₂, C₆H₃(NO₂)₃-1:3:5: m.p. 137°.

Gattermann, v. Horlacher, *Ber.*, 1899, 32, 285.

Fosse, *Bull. soc. chim.*, 1901, 25, 373.

Kauffmann, *Ber.*, 1883, 16, 383.

Gattermann, *Ann.*, 1907, 357, 366.

Rousset, *Bull. soc. chim.*, 1897, 17, 312.

Torrey, Brewster, *J. Am. Chem. Soc.*, 1913, 35, 439.

Fieser et al., *Organic Syntheses*, 1940, XX, 11; 1942, XXII, 63.

3-Hydroxy-1-naphthaldehyde (4-Aldehyde-2-naphthol).

Me ether: plates from pet. ether. M.p. 60°. *Semicarbazone*: needles from EtOH.Aq. M.p. 200°. *Oxime*: needles from EtOH.Aq. M.p. 102°. *p*-Nitrophenylhydrazine: red needles from AcOH. M.p. 197°. 2:4-Dinitrophenylhydrazine: red needles. M.p. 258°.

Shoesmith, Rubli, *J. Chem. Soc.*, 1927, 3101.

4-Hydroxy-1-naphthaldehyde (4-Aldehyde-1-naphthol).

Yellowish needles from H₂O. M.p. 181°. Sol. EtOH, Et₂O. Insol. cold H₂O.

Me ether: white powder. M.p. 34°. B.p. 212°/40 mm., 200°/11 mm. Ox. \rightarrow 4-methoxy-1-naphthoic acid. *Phenylhydrazine*: m.p. 113°. *Azine*: yellow needles from EtOH. M.p. 185°.

Et ether: yellowish cryst. from AcOEt. M.p. 72°. *Hydrazine*: dark red needles. M.p. 160–82° decomp. *Azine*: yellow needles from PhNO₂. M.p. 209°.

4-Acetyl: m.p. 110°.

Semicarbazone: m.p. 224°.

Hydrazone: dark red ppt. M.p. 220–36°.

Azine: yellow needles from PhNO_2 . M.p. 236°.

Kamm, McCluggage, Landstrom, *J. Am. Chem. Soc.*, 1917, **39**, 1247.

Gattermann, v. Horlacher, *Ber.*, 1899, **32**, 285.

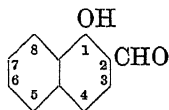
Rousset, *Bull. soc. chim.*, 1897, **17**, 312.

5-Hydroxy-1-naphthaldehyde (5-Aldehyde-1-naphthol).

Me ether: yellow plates from pet. ether. M.p. 66°. *Semicarbazone*: needles from AcOH.Aq. M.p. 246°. *Oxime*: needles from H_2O . M.p. 104°. *p-Nitrophenylhydrazones*: red needles from AcOH.Aq. M.p. 246°.

Shoesmith, Rubli, *J. Chem. Soc.*, 1926, 3242.

1-Hydroxy-2-naphthaldehyde (2-Aldehyde-1-naphthol)



$\text{C}_{11}\text{H}_8\text{O}_2$ MW, 172

Greenish-yellow needles from EtOH.Aq. M.p. 59–60°. Spar. sol. cold H_2O . Yellow sols. in alkalis. Spar. volatile in steam. Reduces NH_3AgNO_3 . $\text{FeCl}_3 \rightarrow$ green col.

Me ether: $\text{C}_{12}\text{H}_{10}\text{O}_2$. MW, 186. Prisms from EtOH. M.p. 47°. Sol. most org. solvents.

Oxime: needles from C_6H_6 . M.p. 145°.

Bezdzik, Friedländer, *Monatsh.*, 1909, **30**, 278.

Friedländer, *Ber.*, 1908, **41**, 1037.

Weil, *Ber.*, 1911, **44**, 3058.

3-Hydroxy-2-naphthaldehyde (Iso-β-naphthaldehyde, 3-aldehyde-2-naphthol).

Yellow plates from AcOH.Aq. M.p. 99–100°.

Acetyl: cryst. from C_6H_6 . M.p. 100–1°.

Anhydride: m.p. 156°. *Semicarbazone*: m.p. 211–12°.

Oxime: m.p. 202–3°.

Oxime: m.p. 207° decomp.

Phenylhydrazones: m.p. 246–8°.

Semicarbazone: cryst. from MeOH. M.p. above 270°.

Anil: m.p. 158–9°.

Boehm, Profft, *Arch. Pharm.*, 1931, **269**, 25.

4-Hydroxy-2-naphthaldehyde (3-Aldehyde-2-naphthol).

Buff cryst. M.p. 169.5–170°.

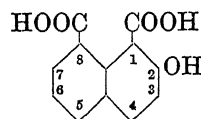
Acetyl: m.p. 113–14°. *Semicarbazone*: m.p. 230° decomp.

Cason, *J. Am. Chem. Soc.*, 1941, **63**, 828.

Hydroxynaphthalene.

See Naphthol.

2-Hydroxynaphthalic Acid



$\text{C}_{12}\text{H}_8\text{O}_5$

MW, 232

Free acid exists only in solution.

Anhydride: $\text{C}_{12}\text{H}_6\text{O}_4$. MW, 214. Needles. M.p. 245–6°.

Me ether: free acid not isolated. *Anhydride*: $\text{C}_{13}\text{H}_8\text{O}_4$. MW, 228. M.p. 255°.

Dziewoński, Kocwa, *Geschwindówna, Chem. Zentr.*, 1929, **I**, 650.

3-Hydroxynaphthalic Acid.

Free acid exists only in solution.

Anhydride: yellow needles from EtOH. M.p. 287°. Sol. EtOH. AcOH. Insol. H_2O , C_6H_6 . Sol. alkalis. *Acetyl*: leaflets from AcOEt. M.p. 216°. Sol. C_6H_6 . Spar. sol. EtOH. Insol. H_2O .

Me ether: free acid not isolated. *Anhydride*: yellow needles from AcOEt. M.p. 244°. Sol. AcOH. C_6H_6 . Spar. sol. EtOH. Insol. H_2O .

Anselm, Zuckmayer, *Ber.*, 1899, **32**, 3288.

Dziewoński, Galitzerowna, Kocwa, *Chem. Zentr.*, 1926, **II**, 2816.

4-Hydroxynaphthalic Acid.

Free acid exists only in solution.

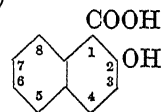
Anhydride: light yellow cryst. M.p. 350–1°. Brown sols. in alkalis. NaOH fusion \rightarrow 5-hydroxy-1-naphthoic acid. Resorcinol \rightarrow 4-hydroxynaphthofluorescein. *Acetyl*: m.p. 188–9°. *Benzoyl*: m.p. 235–6°.

Me ether: free acid not isolated. *Anhydride*: yellow cryst. M.p. 256–8°.

Dziewoński, Kocwa, *Geschwindówna, Chem. Zentr.*, 1929, **I**, 650.

Dziewoński, Galitzerowna, Kocwa, *Chem. Zentr.*, 1926, **II**, 2816.

2-Hydroxy-1-naphthoic Acid (2-Naphthol-1-carboxylic acid)



$\text{C}_{11}\text{H}_8\text{O}_3$

MW, 188

Needles from EtOH.Aq. M.p. 156–7°. Very sol. EtOH. Sol. Et_2O , CHCl_3 , ligroin, C_6H_6 . Spar. sol. H_2O . Loses CO_2 readily at m.p.

Me ester: $\text{C}_{12}\text{H}_{10}\text{O}_3$. MW, 202. M.p. 76° (80°).

Et ester: $\text{C}_{13}\text{H}_{12}\text{O}_3$. MW, 216. M.p. 55°.

Me ether: $\text{C}_{12}\text{H}_{10}\text{O}_3$. MW, 202. Prisms from EtOH. M.p. 176° decomp. Sol. Et_2O , CHCl_3 , CS_2 , Me_2CO , C_6H_6 . Insol. ligroin. *Me ester*: $\text{C}_{13}\text{H}_{12}\text{O}_3$. MW, 216. Cryst. from EtOH. M.p. 52°.

Et ether: $\text{C}_{13}\text{H}_{12}\text{O}_3$. MW, 216. Plates from

EtOH.Aq. M.p. 142°. Sol. Et₂O, Me₂CO, CHCl₃, CS₂, C₆H₆. Insol. ligroin.

Acetyl: needles from H₂O. M.p. 130-5-131.5°. Sol. most org. solvents with exception of ligroin and CCl₄. *Chloride*: needles from CHCl₃. M.p. 140-1°.

Tijmstra Bz, Eggink, *Ber.*, 1906, 39, 14.

Bodroux, *Compt. rend.*, 1904, 31, 32.

Werner, Seybold, *Ber.*, 1904, 37, 3661.

Zetzsche, Flüttsch, Enderlin, Loosli, *Helv. Chim. Acta*, 1926, 9, 184.

Rodionov, *Chem. Abstracts*, 1941, 35, 5101.

3-Hydroxy-1-naphthoic Acid (2-Naphthol-4-carboxylic acid).

Needles from H₂O. M.p. 248-9° (242-3°). FeCl₃ → reddish-brown col.

Me ester: needles from CCl₄. M.p. 91-2°.

Amide: C₁₁H₉O₂N. MW, 187. Prisms from H₂O. M.p. 209-11°.

Anilide: needles from MeOH. M.p. 112-13°.

Me ether: prismatic needles from AcOH.Aq. M.p. 159°.

Acetyl: needles from EtOH.Aq. M.p. 169-70° (173-4°). *Chloride*: cryst. from pet. ether. M.p. 96-7°. *Amide*: needles from MeOH. M.p. 180-1°. *Anilide*: needles from AcOH.Aq. M.p. 178-9°.

Benzoyl: cryst. from xylene. M.p. 222-3°.

Lesser, Gad, *Ber.*, 1925, 58, 2553.

4-Hydroxy-1-naphthoic Acid (1-Naphthol-4-carboxylic acid).

Needles from Et₂O-ligroin. M.p. 183-4° decomp. Very sol. EtOH, Me₂CO, Et₂O. Spar. sol. CHCl₃, C₆H₆. Insol. ligroin.

Me ester: cryst. from MeOH. M.p. 178°.

Et ester: cryst. M.p. 134°.

Acetyl: needles from toluene. M.p. 178-9°. Very sol. EtOH, Me₂CO. Sol. CHCl₃, Et₂O.

α-Naphthoyl: m.p. 229.9-30.4°. *Me ester*: m.p. 132.8-134°.

Me ether: needles from EtOH. M.p. 232°. *Amide*: C₁₂H₁₁O₂N. MW, 201. Needles from EtOH. M.p. 234°.

Et ether: needles from EtOH. M.p. 214°. *Amide*: C₁₃H₁₃O₂N. MW, 215. Needles from EtOH. M.p. 244°.

Heller, *Ber.*, 1912, 45, 675.

Gattermann, Hess, *Ann.*, 1888, 244, 73.

Montmollin, Spielev, U.S.P., 1,474,928, (*Chem. Abstracts*, 1924, 18, 693).

5-Hydroxy-1-naphthoic Acid (1-Naphthol-5-carboxylic acid).

Needles from H₂O. M.p. 235-6°. Very sol. EtOH. Sol. Et₂O, AcOH. Spar. sol. H₂O. Sublimes. FeCl₃ → violet ppt.

Me ester: m.p. 130-1.5°.

Et ester: C₁₃H₁₃O₃. MW, 216. M.p. 73°.

Acetyl: m.p. 202-3°.

Benzoyl: m.p. 241°.

Me ether: C₁₂H₁₀O₃. MW, 202. Plates from MeOH. M.p. 227-228.5°.

Fuson, *J. Am. Chem. Soc.*, 1924, 46, 2787.
Dziewoński, Kocwa, *Chem. Abstracts*, 1929, 23, 2435.

6-Hydroxy-1-naphthoic Acid (2-Naphthol-5-carboxylic acid).

Needles from H₂O. M.p. 212.5-13° (208-9°). Sol. EtOH, Et₂O, Me₂CO, warm AcOH. Spar. sol. CHCl₃, C₆H₆. FeCl₃ → dark brown col.

Me ester: m.p. 112-13°.

Et ester: m.p. 105-7°.

Me ether: m.p. 182-2.5° (180-0.5°). *Amide*: m.p. 201-3°.

Acetyl: needles from AcOH.Aq. or toluene. M.p. 209-10°.

Anilide: needles from AcOH. M.p. 193-4°. Insol. most org. solvents.

Royle, Schedler, *J. Chem. Soc.*, 1923, 123, 1645.

Long, Burger, *J. Org. Chem.*, 1941, 6, 852.

7-Hydroxy-1-naphthoic Acid (2-Naphthol-8-carboxylic acid).

Needles from H₂O. M.p. 253-4°. Very sol. EtOH. Sol. hot H₂O. Spar. sol. cold H₂O. FeCl₃ → dark brown col.

Me ester: m.p. 124-6°.

Acetyl: needles from EtOH.Aq. M.p. 221-2°.

Benzoyl: m.p. 194°.

Anilide: needles from AcOH. M.p. 209-10°.

Me ether: colourless needles. M.p. 167-8°.

Davies, Heilbron, Irving, *J. Chem. Soc.*, 1932, 2715.

Dziewoński, Galitzewowna, Kocwa, *Chem. Abstracts*, 1928, 22, 1154.

Royle, Schedler, *J. Chem. Soc.*, 1923, 123, 1645.

8-Hydroxy-1-naphthoic Acid (1-Naphthol-8-carboxylic acid).

Needles from Et₂O. M.p. 169°. Very sol. hot H₂O, EtOH, Et₂O. Passes readily into its lactone.

Me ether: C₁₂H₁₀O₃. MW, 202. Needles from C₆H₆. M.p. 162-3°. *Me ester*: C₁₃H₁₂O₃. MW, 216. Plates from pet. ether. M.p. 51-2°.

Et ether: C₁₃H₁₂O₃. MW, 216. Needles from C₆H₆. M.p. 210-11°.

Propyl ether: C₁₄H₁₄O₃. MW, 230. Cryst. from C₆H₆. M.p. 176-7°.

Butyl ether: C₁₅H₁₆O₃. MW 244. Needles from C₆H₆. M.p. 154-5°.

Phenyl ether: 1-phenoxy-naphthalene-8-carboxylic acid. C₁₇H₁₂O₃. MW, 264. Needles. M.p. 139-40°.

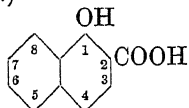
Benzyl ether: C₁₈H₁₄O₃. MW, 278. Cryst. from ligroin. M.p. 125-6°.

Lactone: naphtholactone. C₁₁H₈O₂. MW, 170. Needles from EtOH.Aq. M.p. 108°.

Very sol. EtOH, Et₂O, CS₂. Sublimes in needles.

Rule, Barnett, *J. Chem. Soc.*, 1932, 2732.
Ekstrand, *J. prakt. Chem.*, 1888, **38**, 278.

1-Hydroxy-2-naphthoic Acid (1-Naphthol-2-carboxylic acid)



C₁₁H₈O₃ MW, 188

Needles from EtOH or Et₂O. M.p. 195° (191-2°, 188°). Very sol. EtOH, Et₂O. Sol. hot H₂O. Spar. sol. cold H₂O.

Me ester: C₁₂H₁₀O₃. MW, 202. Plates or needles from EtOH. M.p. 78° (76-7°).

Et ester: C₁₃H₁₂O₃. MW, 216. Cryst. from EtOH. M.p. 49°.

Chloride: C₁₁H₇O₂Cl. MW, 206.5. Needles from pet. ether. M.p. 85-6°.

Amide: C₁₁H₉O₂N. MW, 187. Cryst. from amyl alcohol. M.p. 202°.

Anilide: cryst. M.p. 154°.

Acetyl: m.p. 158°.

Me ether: C₁₂H₁₀O₃. MW, 202. Needles from EtOH.Aq. M.p. 127°.

Me ester: C₁₃H₁₂O₃. MW, 216. B.p. 193-5°/17 mm.

Et ester: C₁₄H₁₄O₃. MW, 230. B.p. 184-5°/14 mm.

Schmitt, Burkard, *Ber.*, 1887, **20**, 2699.

Cohen, Dudley, *J. Chem. Soc.*, 1910, **97**, 1747.

Weber, Runkel, *Ann.*, 1906, **346**, 361.

3-Hydroxy-2-naphthoic Acid (2:3-Hydroxynaphthoic acid, β-hydroxynaphthoic acid, β-oxynaphthoic acid, 2-naphthol-3-carboxylic acid).

Yellow cryst. from H₂O or AcOH. M.p. 222-3°. Very sol. EtOH, Et₂O. Sol. CHCl₃, C₆H₆. Spar. sol. H₂O. FeCl₃ → blue col. The arylamides are widely used as coupling components for the so-called "azoic" or "ice" colours.

Me ester: C₁₂H₁₀O₃. MW, 202. Needles from EtOH. M.p. 75-6°.

Et ester: C₁₃H₁₂O₃. MW, 216. Needles from AcOH. M.p. 85°. B.p. 290-1°.

Chloride: C₁₁H₇O₂Cl. MW, 206.5. Needles from ligroin. M.p. 95-6°.

Amide: C₁₁H₉O₂N. MW, 187. Yellow needles from EtOH or AcOH. M.p. 217-18°.

Nitrile: C₁₁H₇ON. MW, 169. Cryst. from EtOH. M.p. 188-9°.

Anilide: plates from chlorobenzene. M.p. 243-4°. Sol. hot AcOH, PhNO₂. Spar. sol. EtOH, AcOEt, xylene. *N-Et*: plates from AcOEt. M.p. 153-4°.

o-Chloroanilide: needles from EtOH. M.p. 225-6°.

m-Chloroanilide: cryst. from chlorobenzene. M.p. 241-2°.

p-Chloroanilide: leaflets from *o*-dichlorobenzene. M.p. 258-9°.

2:5-Dichloroanilide: needles from EtOH. M.p. 246-7°.

o-Nitroanilide: yellow cryst. from xylene. M.p. 192-3°.

m-Nitroanilide: yellow cryst. from AcOH. M.p. 246-7°.

p-Nitroanilide: yellow cryst. from *o*-dichlorobenzene. M.p. 258-9°.

2:4-Dinitroanilide: yellow cryst. from chlorobenzene. M.p. 256-7°.

4-Chloro-o-nitroanilide: yellow leaflets from xylene. M.p. 221-2°.

o-Hydroxyanilide: cryst. from solvent naphtha. M.p. 214-15° decomp.

o-Anisidide: needles from EtOH. M.p. 167-8°.

p-Anisidide: leaflets from EtOH. M.p. 230°.

o-Toluidide: leaflets from solvent naphtha. M.p. 195-6°.

p-Toluidide: needles from solvent naphtha. M.p. 221-2°.

α-Naphthalide: cryst. from xylene. M.p. 222-3°.

β-Naphthalide: needles from chlorobenzene. M.p. 243-4°.

Me ether: C₁₂H₁₀O₃. MW, 202. Cryst. from C₆H₆. M.p. 134-5°.

Me ester: C₁₃H₁₂O₃. MW, 216. Cryst. from C₆H₆. M.p. 134-5°.

Amide: C₁₂H₁₁O₂N. MW, 201. Cryst. from Me₂CO. M.p. 172-3°.

Nitrile: C₁₂H₉ON. MW, 183. Plates from MeOH. M.p. 132-3°.

Et ether: C₁₃H₁₂O₃. MW, 216. Needles from EtOH. M.p. 124° decomp.

Et ester: C₁₅H₁₆O₃. MW, 244. Plates. M.p. 60°. B.p. 300-3°/325 mm., 152°/80 mm.

Amide: C₁₃H₁₃O₂N. MW, 215. Needles from EtOH. M.p. 178°.

Acetyl: needles from EtOH. M.p. 184-6°.

Me ester: needles. M.p. 101°.

Et ester: prisms. M.p. 82-3°.

Amide: needles from Me₂CO. M.p. 185°.

Chloride: cryst. from ligroin. M.p. 89°.

Nitrile: plates from MeOH.Aq. M.p. 118°.

Lesser, Kranepuhl, Gad, *Ber.*, 1925, **58**, 2115.

D.R.P., 294,799, (*Chem. Zentr.*, 1916, II, 1095).

Griesheim, D.R.P., 293,897, (*Chem. Zentr.*, 1916, II, 617).

4-Hydroxy-2-naphthoic Acid (1-Naphthol-3-carboxylic acid).

Needles from H₂O. M.p. 182-3°. FeCl₃ → golden turbidity.

Me ether: m.p. 202-2.5°.

Acetyl: needles from EtOH.Aq. M.p. 167-8°.

Butler, Royle, *J. Chem. Soc.*, 1923, **123**, 1653.

5-Hydroxy-2-naphthoic Acid (1-Naphthol-6-carboxylic acid).

Needles from H_2O or $EtOH.Aq.$ M.p. 210–11°. $FeCl_3 \rightarrow$ red ppt. which turns yellow then black.

Et ester: $C_{13}H_{12}O_3$. MW, 216. Needles from $EtOH.Aq.$ or $AcOH.Aq.$ M.p. 150–1°.

Acetyl: needles from $EtOH.Aq.$ M.p. 214–15°.

Anilide: needles from $AcOH.Aq.$ M.p. 163–4°.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1653.

6-Hydroxy-2-naphthoic Acid (2-Naphthol-6-carboxylic acid).

Needles from H_2O . M.p. 245–8° (240–1°). $FeCl_3 \rightarrow$ orange col.

Et ester: needles from $EtOH.Aq.$ M.p. 111–12°.

Acetyl: needles from H_2O . M.p. 221–3°.

Anilide: needles from $AcOH.Aq.$ M.p. 197–8°.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1654.

7-Hydroxy-2-naphthoic Acid (2-Naphthol-7-carboxylic acid).

Needles from $EtOH.Aq.$ M.p. 269–70°. $FeCl_3 \rightarrow$ orange col.

Acetyl: needles from $EtOH.Aq.$ M.p. 209–10°.

Anilide: needles from $EtOH.Aq.$ or $AcOH.Aq.$ M.p. 219–20°.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1654.

8-Hydroxy-2-naphthoic Acid (1-Naphthol-7-carboxylic acid).

Needles from H_2O . M.p. 228–9° (210°). $FeCl_3 \rightarrow$ red ppt. changing to violet then black.

Me ester: m.p. 151–2·5°.

Et ester: needles from $EtOH.Aq.$ M.p. 135–7°.

Acetyl: needles from $EtOH.Aq.$ M.p. 176–7°.

Anilide: needles from $AcOH.Aq.$ M.p. 239–40°.

Me ether: $C_{12}H_{10}O_3$. MW, 202. Cryst. from Et_2O . M.p. 214°. *Me ester*: $C_{13}H_{12}O_3$. MW, 216. Cryst. from $EtOH.Aq.$ M.p. 72°.

Girardet, *Helv. Chim. Acta*, 1931, 14, 516.

Butler, Royle, *J. Chem. Soc.*, 1923, 123, 1654.

5-Hydroxy-1 : 4-naphthoquinone.

See Juglone.

2-Hydroxy- α -naphthoquinonimine.

See 4-Amino-1 : 2-naphthoquinone.

 ω -Hydroxy- ω -2-naphthylacetone.

See Naphthoin.

Hydroxynaphthylamine.

See Aminonaphthol.

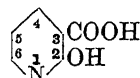
2-Hydroxy-1-naphthylcarbinol.

See 1-Hydroxymethyl-2-naphthol.

Hydroxynaphthylenediamine.

See Diaminonaphthol.

Dict. of Org. Comp.—II.

2-Hydroxynicotinic Acid (2-Hydroxypyridine-3-carboxylic acid)

$C_6H_5O_3N$

MW, 139

Needles from H_2O . M.p. 256° decomp. Spar. sol. cold H_2O . No col. with $FeCl_3$. $FeSO_4 \rightarrow$ yellow col. Dist. \rightarrow 2-hydroxypyridine.

Et ester: m.p. 139°.

Amide: m.p. 266–7°.

Anilide: m.p. 261°.

Weidel, Strache, *Monatsh.*, 1886, 7, 295.

Philips, *Ann.*, 1895, 238, 264.

Sucharda, *Chem. Abstracts*, 1925, 19, 72.

4-Hydroxynicotinic Acid (4-Hydroxypyridine-3-carboxylic acid).

Needles. M.p. 250° decomp. \rightarrow 4-hydroxypyridine.

Kirpal, *Monatsh.*, 1902, 23, 936.

6-Hydroxynicotinic Acid (6-Hydroxypyridine-3-carboxylic acid).

Needles from H_2O . M.p. 304° (301–2°) decomp. Insol. $EtOH$, Et_2O , C_6H_6 , $CHCl_3$. $FeCl_3 \rightarrow$ yellow col. Does not combine with acids. Sublimes.

Me ester: $C_6H_{10}O_3N$. MW, 144. Leaflets from Me_2CO . M.p. 164°.

Et ester: $C_7H_{12}O_3N$. MW, 158. Cryst. from Me_2CO . Sol. $EtOH$, $CHCl_3$. Mod. sol. Et_2O , Me_2CO . Insol. H_2O .

Me ether: $C_6H_{10}O_3N$. MW, 144. Needles from H_2O . M.p. 237–8°. Sol. $EtOH$, Et_2O , $AcOH$. Insol. C_6H_6 , $CHCl_3$. *Et ester*: $C_8H_{14}O_3N$. MW, 172. Prisms from $EtOH$. M.p. 71°. B.p. 135°/0·25 mm.

Et ether: $C_7H_{12}O_3N$. MW, 158. Cryst. from $EtOH$. M.p. 183°.

Propyl ether: m.p. 116–17°.

Reissert, *Ber.*, 1895, 28, 122.

Meyer, *Monatsh.*, 1901, 22, 440.

Ruzicka, *Helv. Chim. Acta*, 1921, 4, 504.

Tschitschibabin, Kirssanow, *Ber.*, 1924, 57, 1162.

Räth, Schiffmann, *Ann.*, 1931, 487, 130.

3-Hydroxynonane.

See Ethyl-*n*-hexylcarbinol.

3-Hydroxyoctadecane.

See Ethylpentadecylcarbinol.

Hydroxyoctane.

See *n*-Octyl Alcohol, *sec*-*n*-Octyl Alcohol, Ethyl-*n*-amylcarbinol and Propylbutylcarbinol.

5-Hydroxyoctanone-4.

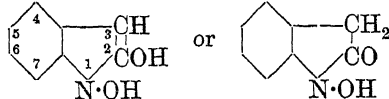
See Butyrol.

Hydroxyoctene.

See Octenol.

Hydroxyoctyne.

See Octynol.

N-Hydroxyoxindole (1 : 2-Dihydroxyindole) $C_8H_7O_2N$

MW, 149

Cryst. from H_2O . Mod. sol. AcOH, Me_2CO , hot EtOH. Spar. sol. Et_2O , C_6H_6 . Sol. alkalis. $FeCl_3 \rightarrow$ blue col.

1-*Me ether*: $C_9H_9O_2N$. MW, 163. Cryst. from H_2O . M.p. 88.5° .

1-*Acetyl*: needles from EtOH.Aq. M.p. 101° .

1-*Benzoyl*: cryst. from EtOH. M.p. 124.5° .

Reissert, *Ber.*, 1908, 41, 3926.

1-Hydroxypalmitic Acid $C_{16}H_{32}O_3$

MW, 272

dl.

Needles from $CHCl_3$. M.p. $86-7^\circ$ ($82-3^\circ$). Sol. EtOH, Et_2O . Insol. pet. ether. Ox. \rightarrow pentadecylic acid. Dist. \rightarrow pentadecyl aldehyde.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from Me_2CO . M.p. $59-60^\circ$.

Et ester: $C_{18}H_{36}O_3$. MW, 300. Cryst. from EtOH. M.p. $55.5-56.5^\circ$.

Phenacyl ester: m.p. $69.7-70.1^\circ$.

p-Bromophenacyl ester: m.p. $96-96.5^\circ$.

p-Nitrobenzyl ester: m.p. $69.5-70.5^\circ$.

Amide: $C_{16}H_{33}O_2N$. MW, 271. Plates from EtOH. M.p. 150° . Insol. most cold org. solvents.

Nitrile: pentadecyl aldehyde cyanhydrin. $C_{16}H_{31}ON$. MW, 253. Needles from pet. ether. M.p. $52.5-53.5^\circ$. Sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Hot HCl.Aq. \rightarrow amide.

Et ether: $C_{18}H_{36}O_3$. MW, 300. M.p. 45° .

l.

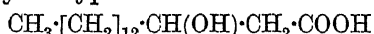
Occurs in wool fat. Needles. M.p. $86-87^\circ$. $[\alpha]_D -1^\circ$ in EtOH.

Me ester: m.p. $45-6^\circ$. B.p. $250-1^\circ/5$ mm. $[\alpha]_D -1.5^\circ$ in EtOH.

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1895.

Levene, West, *J. Biol. Chem.*, 1914, 18, 466.

Kuwata, *J. Am. Chem. Soc.*, 1938, 60, 559.

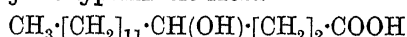
2-Hydroxypalmitic Acid $C_{16}H_{32}O_3$

MW, 272

Leaflets from $CHCl_3$. M.p. $83-83.5^\circ$.

Acetyl: m.p. 58° .

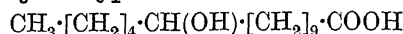
Robinet, *Bull. soc. chim. Belg.*, 1931, 40, 710.

3-Hydroxypalmitic Acid $C_{16}H_{32}O_3$

MW, 272

M.p. $79-9.6^\circ$. Conc. HCl or heat \rightarrow lactone. γ -Lactone: m.p. $40.7-41.3^\circ$.

Houston, *J. Am. Chem. Soc.*, 1947, 69, 517.

10-Hydroxypalmitic Acid $C_{16}H_{32}O_3$

MW, 272

dl.

Cryst. from AcOEt. M.p. $68-9^\circ$.

Me ester: $C_{17}H_{34}O_3$. MW, 286. Cryst. from pet. ether. M.p. $40.5-41.5^\circ$. B.p. $183-6^\circ/3$ mm.

d.

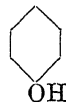
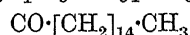
See Jalapinolic Acid.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1753.

15-Hydroxypalmitic Acid.

See Juniperic Acid.

p-Hydroxypalmitophenone (*p*-Palmityl-phenol, pentadecyl *p*-hydroxyphenyl ketone)

 $C_{22}H_{36}O_2$

MW, 332

Needles from ligroin. M.p. $84.5-85^\circ$ (78°). Sol. usual org. solvents.

Me ether: *p*-palmitylanisole. $C_{23}H_{38}O_2$. MW, 346. Cryst. M.p. 70.5° . B.p. $279-80^\circ$. $D_{20}^{60.5} 0.8981$. $n_D^{60.5} 1.47605$. Hot. dil. HCl \rightarrow anisic acid.

Et ether: *p*-palmitylphenetole. $C_{24}H_{40}O_2$. MW, 360. Plates from EtOH. M.p. 69° . B.p. $288-9^\circ/15$ mm. Spar. sol. cold EtOH. Dil. $HNO_3 \rightarrow$ *p*-ethoxybenzoic acid.

Hydrazone: m.p. $141-2^\circ$.

Krafft, *Ber.*, 1888, 21, 2269.

Auwers, *Ber.*, 1903, 36, 3891.

Eijkman, Bergema, Henrard, *Chem. Zentr.*, 1905, I, 816.

Ralston, Bauer, *J. Org. Chem.*, 1940, 5, 165.

1-Hydroxypelargonic Acid $C_9H_{18}O_3$

MW, 174

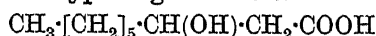
Plates. M.p. 70° .

Et ester: $C_{11}H_{22}O_3$. MW, 202. Needles. M.p. $23-4^\circ$.

Anilide: m.p. $69-70^\circ$.

Acetyl: b.p. $171-4^\circ/10$ mm.

Blaise, *Bull. soc. chim.*, 1904, 31, 491; *Compt. rend.*, 1904, 138, 698.

2-Hydroxypelargonic Acid $C_9H_{18}O_3$

MW, 174

d-.

Plates from pet. ether. M.p. 47–8°. $[\alpha]_D^{20}$ 2° 26' in EtOH. Sol. EtOH, Et₂O, hot pet. ether. Insol. H₂O.

dl-.

Needles. M.p. 61° (57–9°). Sol. EtOH, C₆H₆, AcOH, CHCl₃, AcOEt.

Et ester: C₁₁H₂₂O₃. MW, 202. B.p. 145°/13 mm.

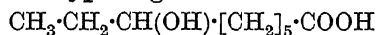
Haller, Brochet, *Compt. rend.*, 1910, 150, 500.

Harding, Weizmann, *J. Chem. Soc.*, 1910, 97, 302.

Brooks, Humphrey, *J. Am. Chem. Soc.*, 1918, 40, 838.

Asano, *J. Pharm. Soc. Japan*, 1924, 504, 75, (*Chem. Abstracts*, 1924, 18, 1645).

Kuhn *et al.*, *Ber.*, 1938, 71, 1119.

6-Hydroxypelargonic Acid

C₉H₁₈O₃ MW, 174

B.p. 204°/25 mm.

Et ester: C₁₁H₂₂O₃. MW, 202. B.p. 151–2°/18 mm.

Blaise, Koehler, *Compt. rend.*, 1909, 148, 1773; *Bull. soc. chim.*, 1910, 7, 415.

8-Hydroxypelargonic Acid

C₉H₁₈O₃ MW, 174

Cryst. from AcOEt. M.p. 53–4°.

Me ester: C₁₀H₂₀O₃. MW, 188. B.p. 137–9°/3 mm. D₂₀²⁰ 0.9588. n_D²⁰ 1.4438. *Phenylurethane*: cryst. from pet. ether. M.p. 53–4°.

Acetyl: f.p. 1°. B.p. 192–3°/10 mm. D₂₀²⁰ 1.025.

Lycan, Adams, *J. Am. Chem. Soc.*, 1929, 51, 628.

Chuit, Hausser, *Helv. Chim. Acta*, 1929, 12, 467.

Hydroxypentadecenylbenzene.

See Ginkgol.

Hydroxypentadecenylbenzoic Acid.

See Ginkgolic Acid.

Hydroxypentadecylbenzene.

See Hydroginkgol.

Hydroxypentadecylbenzoic Acid.

See Hydroginkgolic Acid.

Hydroxypentadecylene.

See Pentadecenol.

1-Hydroxypentadecylic Acid (*1-Hydroxypentadecoic acid*, *1-hydroxytetradecane-1-carboxylic acid*)



C₁₅H₃₀O₃ MW, 258

Needles from CHCl₃. M.p. 84–5°. Sol. EtOH, Et₂O. Spar. sol. C₆H₆. Heat at 275° → myristic aldehyde.

Amide: C₁₅H₃₁O₂N. MW, 257. Plates from EtOH. M.p. 149–50°. Insol. H₂O, CHCl₃, C₆H₆, pet. ether.

Nitrile: myristic aldehyde cyanhydrin. C₁₅H₂₉ON. MW, 239. Plates from pet. ether. M.p. 50–5°. Sol. EtOH, Et₂O, CHCl₃, C₆H₆.

Le Sueur, *J. Chem. Soc.*, 1905, 87, 1899.

Asahina, Asano, *J. Pharm. Soc. Japan*, 1927, 539, 1.

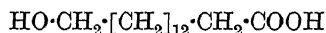
10-Hydroxypentadecylic Acid

C₁₅H₃₀O₃ MW, 258

Cryst. from AcOEt. M.p. 63.5–64°.

Me ester: C₁₆H₃₂O₃. MW, 272. M.p. 29–32°. B.p. 166°/2 mm.

Davies, Adams, *J. Am. Chem. Soc.*, 1928, 50, 1754.

15-Hydroxypentadecylic Acid

C₁₅H₃₀O₃ MW, 258

Obtained by saponification of musk-seed oil. Plates from Et₂O. M.p. 82–4°. Sol. EtOH, AcOEt, Me₂CO, C₆H₆. Spar. sol. pet. ether. Insol. H₂O. Ox. → tridecane-1:13-dicarboxylic acid.

Lactone: exaltolide. C₁₅H₂₈O₂. MW, 240. M.p. 31–2°. B.p. 176°/15 mm. D₄²¹ 0.9383. n_D²¹ 1.4633.

Acetyl: cryst. from pet. ether. M.p. 59°.

Ruzicka, Stoll, *Helv. Chim. Acta*, 1928, 11, 1167.

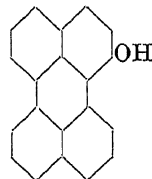
Kerschbaum, *Ber.*, 1927, 60, 908.

Hydroxypentadiene.

See Pentadienol.

Hydroxypentamethoxyisoflavone.

See under Iridenin.

Hydroxyperylene

C₂₀H₁₂O MW, 268

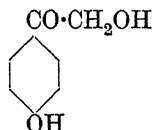
Yellow needles from EtOH.Aq. M.p. 197°. Sol. usual org. solvents. Insol. H₂O. Sols. are yellow with green fluor. Sol. alkalis. Yellow sol. in conc. H₂SO₄ → green on heating.

Me ether: C₂₁H₁₄O. MW, 282. Yellow needles from MeOH. M.p. 111°.

Benzoyl: m.p. 170–1°.

Weitzenböck, Seer, *Ber.*, 1913, 46, 1997.

p-Hydroxyphenacyl Alcohol (4: ω -Di-hydroxyacetophenone, p-hydroxybenzoylcarbinol, hydroxymethyl p-hydroxyphenyl ketone, p-glycollyl-phenol)

 $\text{C}_8\text{H}_8\text{O}_3$

MW, 152

4-*Me ether*: p-methoxybenzoylcarbinol, anisoylcarbinol. $\text{C}_9\text{H}_{10}\text{O}_3$. MW, 166. Plates. M.p. 104° (100°). *Acetyl*: cryst. M.p. 59° . *Phenyl ether*: phenyl p-methoxyphenacyl ether. $\text{C}_{15}\text{H}_{14}\text{O}_3$. MW, 242. Cryst. M.p. 67° . B.p. $230-3^\circ/20$ mm. Ox. \rightarrow anisic acid. *Oxime of phenyl ether*: needles from EtOH. M.p. 105° . 4-*Et ether*: p-ethoxybenzoylcarbinol. $\text{C}_{10}\text{H}_{12}\text{O}_3$. MW, 180. *Phenyl ether*: phenyl p-ethoxyphenacyl ether. $\text{C}_{16}\text{H}_{16}\text{O}_3$. MW, 256. Needles. M.p. 102° . B.p. $245-8^\circ/25$ mm. *Oxime of phenyl ether*: needles. M.p. 116° .

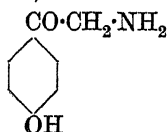
Stoermer, Atenstädt, *Ber.*, 1902, 35, 3565.

Tiffeneau, *Compt. rend.*, 1910, 150, 1182.

Boeseken, Hansen, Bertram, *Rec. trav. chim.*, 1916, 35, 312.

Kondo, Nakagawa, *J. Pharm. Soc. Japan*, 1930, 50, 928.

p-Hydroxyphenacylamine (p-Hydroxy- ω -aminoacetophenone)

 $\text{C}_8\text{H}_9\text{O}_2\text{N}$

MW, 151

Plates from EtOH. M.p. $190-3^\circ$ decomp. Spar. sol. H_2O , EtOH, AcOH. Insol. CHCl_3 , Et_2O . Sol. acids and alkalis.

Me ether: p-methoxyphenacylamine. $\text{C}_9\text{H}_{11}\text{O}_2\text{N}$. MW, 165. *B.HCl*: prisms from EtOH. M.p. 204° decomp. $\text{B}_2\text{H}_2\text{SO}_4$: m.p. 168° . $\text{B}_2\text{H}_2\text{PtCl}_6$: yellow plates. M.p. $225-8^\circ$ decomp. *Picrate*: m.p. 185° decomp. *N-Benzyl*: m.p. 118° . *N-Di-Me*: $\text{C}_{11}\text{H}_{15}\text{O}_2\text{N}$. MW, 193. Oil which slowly solidifies. M.p. about 30° .

Benzyl ether: hydrochloride, m.p. 226° .

N-Di-Me: $\text{C}_{10}\text{H}_{13}\text{O}_2\text{N}$. MW, 179. Prisms from Et_2O -ligroin. M.p. 142° . Spar. sol. Et_2O . *B.HI*: needles. M.p. 176° . *Hydrochloride*: m.p. $233-5^\circ$.

B.HCl: prisms from EtOH. M.p. 245° decomp. Sol. H_2O . Spar. sol. EtOH.

Picrate: needles. M.p. 192° .

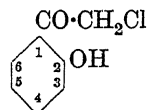
Tutin, *J. Chem. Soc.*, 1910, 97, 2520.

Mannich, Hahn, *Ber.*, 1911, 44, 1547.

Voswinckel, *Ber.*, 1912, 45, 1005; D.R.P., 248,385.

Thiele, *Arch. Pharm.*, 1915, 253, 193.

ω -Hydroxyphenacyl chloride (ω -Chloro-2-hydroxyacetophenone, 2-chloroacetylphenol, chloromethyl 2-hydroxyphenyl ketone)

 $\text{C}_8\text{H}_7\text{O}_2\text{Cl}$

MW, 170.5

Red needles from EtOH. M.p. $73-4^\circ$ (101°). Sol. most org. solvents. Volatile in steam. $\text{CH}_3\cdot\text{COONa}\cdot\text{Aq.} \rightarrow$ coumaranone.

Me ether: 2-chloroacetylanisole. $\text{C}_9\text{H}_9\text{O}_2\text{Cl}$. MW, 184.5. Plates from EtOH. M.p. $68-9^\circ$. Volatile in steam. Lachrymatory. KOH fusion \rightarrow salicylic acid.

Tutin, *J. Chem. Soc.*, 1910, 97, 2504.

Auwers, *Ber.*, 1926, 59, 2899.

Bredereck, *Ber.*, 1939, 72, 1414.

p-Hydroxyphenacyl chloride (ω -Chloro-4-hydroxyacetophenone, 4-chloroacetylphenol, chloromethyl 4-hydroxyphenyl ketone).

Yellowish-red leaflets from MeOH. M.p. 148° ($145-6^\circ$). Sol. EtOH, MeOH.

Me ether: 4-chloroacetylanisole. Needles from EtOH. M.p. 105° . Lachrymatory.

Et ether: 4-chloroacetylphenetole. $\text{C}_{10}\text{H}_{11}\text{O}_2\text{Cl}$. MW, 198.5. Red needles from EtOH. M.p. 107° . Sol. EtOH, Et_2O , CHCl_3 .

Benzyl ether: m.p. 115° .

Acetyl: prisms from EtOH. M.p. 111° (90°).

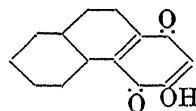
Tutin, Caton, Hann, *J. Chem. Soc.*, 1909, 95, 2117.

Auwers, *Ber.*, 1926, 59, 2899.

ω -p-Hydroxyphenacyltoluene.

See p-Hydroxy- γ -phenylpropioiphenone.

3-Hydroxy-1:4-phenanthraquinone

 $\text{C}_{14}\text{H}_8\text{O}_3$

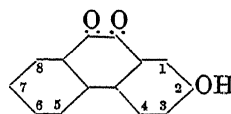
MW, 224

Orange-yellow needles from AcOH.Aq. Sinters at 200° , m.p. 230° . Sol. EtOH, AcOH, C_6H_6 . Spar. sol. H_2O . Sol. conc. H_2SO_4 to brownish-red sol. Red sols. in alkalis.

Me ether: $\text{C}_{15}\text{H}_{10}\text{O}_3$. MW, 238. Yellow needles from C_6H_6 -ligroin. M.p. 170° .

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 949.

2-Hydroxyphenanthraquinone

 $\text{C}_{14}\text{H}_8\text{O}_3$

MW, 224

Violet needles from AcOH. M.p. 280–3°. Sublimes. Sol. in a little KOH.Aq. → blue, in excess → deep green.

Me ether: $C_{15}H_{10}O_3$. MW, 238. Deep red needles from AcOH. M.p. 170–1°. Sol. EtOH, AcOH. Spar. sol. H_2O . Soda-lime dist. → 2-methoxyfluorene + 2-methoxyfluorenone.

Et ether: $C_{16}H_{12}O_3$. MW, 252. Red leaflets from AcOH. M.p. 160–1°. Sol. EtOH, AcOH. *Acetyl*: reddish-yellow needles from AcOH. M.p. 215–16°. Sol. EtOH, Et_2O , Me_2CO .

Benzoyl: red needles from C_6H_6 . M.p. 240–2°. Sol. EtOH, AcOH. Spar. sol. C_6H_6 .

Semicarbazone: brown cryst. from EtOH. M.p. 263–5° decomp.

Werner, *Ann.*, 1902, 322, 159.

Anschütz, Meyer, *Ber.*, 1885, 18, 1943.

3-Hydroxyphenanthraquinone.

Yellowish-red needles from MeOH. M.p. 330° decomp. Sublimes.

Me ether: orange-red needles from AcOH. M.p. 205° (208°).

Et ether: orange-yellow needles from EtOH. M.p. 207–8°. *Oxime*: yellowish-green leaflets from EtOH. M.p. 174°. Sol. $CHCl_3$. Spar. sol. EtOH, Et_2O .

Acetyl: golden-yellow needles from AcOH. M.p. 199–201° (206°). *Hydrazone*: red needles from AcOH. M.p. 207–9°. Sol. most org. solvents.

Benzoyl: yellowish-red needles from AcOH. M.p. 224–6°. Sol. EtOH, AcOEt, AcOH, Me_2CO , C_6H_6 . Spar. sol. Et_2O .

Hydrazone: red needles from AcOH. M.p. 237–8°. Sol. EtOH, Et_2O , AcOEt, AcOH, C_6H_6 .

Werner, *Ann.*, 1902, 322, 138.

Pschorr, *Ber.*, 1901, 34, 4007.

Henstock, *J. Chem. Soc.*, 1906, 89, 1530.

4-Hydroxyphenanthraquinone.

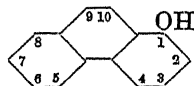
Red powder. M.p. 285°. Sol. AcOH, C_6H_6 . Spar. sol. MeOH, EtOH, Et_2O . Sol. conc. H_2SO_4 to brownish-green sol. Deep green sols. in alkalis. Reductive acetylation → 1:3:4-triacetoxyphenanthrene, m.p. 138°.

Acetyl: brown cryst. M.p. 188–9°.

Semicarbazone: brown cryst. from EtOH.Aq. M.p. 258° decomp.

Schmidt, Schairer, *Ber.*, 1911, 44, 744.

1-Hydroxyphenanthrene (1-Phenanthrol)



$C_{14}H_{10}O$

MW, 194

Needles from Et_2O . M.p. 156°. Red sol. in H_2SO_4 .

Acetyl: needles from EtOH or C_6H_6 . M.p. 135–6°.

Me ether: $C_{15}H_{12}O$. MW, 208. Needles from MeOH. M.p. 105°. *Picrate*: m.p. 154°.

Picrate: orange-red needles from MeOH. M.p. 182°.

Fieser, *J. Am. Chem. Soc.*, 1929, 51, 2464.

Mosettig et al., *J. Am. Chem. Soc.*, 1935, 57, 2189; 1937, 59, 367.

Bachmann, Boatner, *J. Am. Chem. Soc.*, 1936, 58, 2097.

2-Hydroxyphenanthrene (2-Phenanthrol).

Plates from EtOH or ligroin. M.p. 168°. Sol. EtOH, Et_2O , C_6H_6 . Spar. sol. ligroin.

Acetyl: cryst. M.p. 142–3°. Sol. EtOH, Et_2O , C_6H_6 , AcOH.

Benzoyl: cryst. from EtOH. M.p. 139–40°.

Me ether: plates from EtOH or Me_2CO . M.p. 99° (100–1°). Sol. Me_2CO , Et_2O , AcOH, EtOH, ligroin. Sols. fluoresce blue. *Picrate*: orange needles from EtOH. M.p. 124°.

Et ether: $C_{16}H_{14}O$. MW, 222. Plates from AcOH. M.p. 112°. Very sol. Et_2O , $CHCl_3$, C_6H_6 , pet. ether. Sol. EtOH, AcOH.

Picrate: red needles. M.p. 156°.

Werner, Reckner, *Ann.*, 1902, 321, 306.

Pschorr, Klein, *Ber.*, 1901, 34, 4003.

Henstock, *J. Chem. Soc.*, 1906, 89, 1528.

Ioffe, *Chem. Abstracts*, 1941, 35, 4010.

Zhal'kind, Kheifets, *Chem. Abstracts*, 1946, 40, 3748.

3-Hydroxyphenanthrene (3-Phenanthrol).

Needles from EtOH or ligroin. M.p. 122–3° (118–19°). Sol. EtOH, Et_2O , C_6H_6 , hot ligroin.

Acetyl: cryst. from EtOH.Aq. M.p. 114–15°. Sol. EtOH, Et_2O .

Me ether: plates from MeOH. M.p. 63° (59°). Sol. EtOH, Et_2O , ligroin, C_6H_6 . *Picrate*: red needles from EtOH. M.p. 124–5°.

Et ether: white cryst. from MeOH. M.p. 46°.

Benzyl ether: $C_{21}H_{16}O$. MW, 284. Plates from EtOH.Aq. M.p. 115–16°. Sol. EtOH, Et_2O .

Picrate: red needles from EtOH. M.p. 124–5°.

Pschorr, Klein, *Ber.*, 1901, 34, 4006.

Werner, *Ann.*, 1902, 321, 282.

Pschorr, Sumuleanu, *Ber.*, 1900, 33, 1821.

Werner, Kunz, *Ber.*, 1902, 35, 4423.

4-Hydroxyphenanthrene (4-Phenanthrol).

Cryst. from pet. ether. M.p. 112–13.5° (106–9°).

Acetyl: plates from EtOH. M.p. 58–9°.

Me ether: plates from MeOH. M.p. 68°. *Picrate*: red needles. M.p. 187–8°.

Pschorr, Jackel, *Ber.*, 1900, 33, 1827.

Behrend, Ludwig, *Ann.*, 1911, 379, 359.

9-Hydroxyphenanthrene (9-Phenanthrol).

Needles from ligroin or C_6H_6 . M.p. 153°. Very sol. EtOH, Et_2O , $CHCl_3$, C_6H_6 . Sol. ligroin. Spar. sol. H_2O . Oxidises in air.

Acetyl: needles from ligroin or EtOH.Aq. M.p. 77–8°.

Propionyl: needles from AcOH. M.p. 95°.

Benzoyl: m.p. 99–100°.

Salicyloyl: m.p. 142°.

Me ether: needles from MeOH. M.p. 96–7°.

Picrate: red needles. M.p. 157–8.5°.

Picrate: red needles. M.p. 185°.

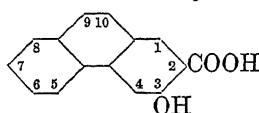
Japp, Findlay, *J. Chem. Soc.*, 1897, **71**, 1122.

Schmidt, Lumpp, *Ber.*, 1908, **41**, 4222.

Werner, Frey, *Ann.*, 1902, **321**, 299.

Sherwood, Short, Woodcock, *J. Am. Chem. Soc.*, 1936, **58**, 322.

3-Hydroxyphenanthrene-2-carboxylic Acid (3-Phenanthrol-2-carboxylic acid)



$C_{15}H_{10}O_3$ MW, 238

Yellow prisms from Me_2CO -xylene. M.p. 303° decomp. Sol. Me_2CO . Spar. sol. EtOH, xylene. Insol. ligroin.

Me ester: $C_{16}H_{12}O_3$. MW, 252. Yellow needles from EtOH. M.p. 171°. Sol. EtOH, C_6H_6 . Spar. sol. ligroin.

Acetyl: needles from EtOH or Me_2CO . M.p. 207–8°. Insol. xylene.

Werner, Kunz, *Ber.*, 1902, **35**, 4424.

2-Hydroxyphenanthrene-3-carboxylic Acid (2-Phenanthrol-3-carboxylic acid).

Yellow needles from Me_2CO - C_6H_6 . M.p. 277° decomp. Sol. Me_2CO . Mod. sol. EtOH, C_6H_6 . Spar. sol. hot H_2O , ligroin.

Me ester: $C_{16}H_{12}O_3$. MW, 252. Brown needles from EtOH, Et_2O , or Me_2CO . M.p. 126°. Spar. sol. ligroin.

Acetyl: brown needles from EtOH or Me_2CO . M.p. 210° decomp. Spar. sol. hot AcOH. Insol. ligroin.

Me ether: m.p. 213–14° (211–13°). *Me ester*: m.p. 94–5°.

Werner, Kunz, *Ber.*, 1902, **35**, 4425.

2-Hydroxyphenanthrene-9-carboxylic Acid (2-Phenanthrol-9-carboxylic acid).

Yellowish-brown cryst. from EtOH or AcOH. M.p. 278°.

Me ether: $C_{16}H_{12}O_3$. MW, 252. Prisms from EtOH. M.p. 228°. Sol. EtOH, MeOH, AcOH, AcOEt, $PhNO_2$. Mod. sol. C_6H_6 , $CHCl_3$. Spar. sol. ligroin.

Acetyl: plates from AcOH.Aq. M.p. 223°.

Pschorr, *Ber.*, 1906, **39**, 3123.

4-Hydroxyphenanthrene-9-carboxylic Acid (4-Phenanthrol-9-carboxylic acid).

Me ether: needles from toluene. M.p. 224°. Sol. Me_2CO . Spar. sol. EtOH, Et_2O , AcOH, toluene. Dist. in vacuo \rightarrow 4-methoxyphenanthrene.

Pschorr, Jaeckel, *Ber.*, 1900, **33**, 1827.

6-Hydroxyphenanthrene-9-carboxylic Acid (6-Phenanthrol-9-carboxylic acid, 3-phenanthrol-10-carboxylic acid).

Me ether: needles from EtOH. M.p. 239°.

Sol. AcOH. Mod. sol. EtOH.

Et ether: $C_{17}H_{14}O_3$. MW, 266. Plates from EtOH. M.p. 206°. CrO_3 in AcOH \rightarrow 3-ethoxyphenanthraquinone.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 174.

Werner, *Ann.*, 1902, **322**, 154.

8-Hydroxyphenanthrene-9-carboxylic Acid (8-Phenanthrol-9-carboxylic acid, 1-phenanthrol-10-carboxylic acid).

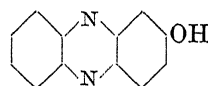
Me ether: yellow plates from EtOH. M.p. 215°. Sol. usual org. solvents. Spar. sol. pet. ether.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 169.

1-Hydroxyphenazine.

See Hemipyrocyanine.

2-Hydroxyphenazine (2-Phenazinol)



$C_{12}H_8ON_2$ MW, 196

Dark red cryst. + $1H_2O$ from EtOH. At 110° \rightarrow yellow anhyd. comp., m.p. 253–4° decomp. Yellowish-red sols. in alkalis. Conc. H_2SO_4 \rightarrow dichroic sol. which is olive-green in thin, and red in thick layers: addn. of H_2O \rightarrow golden-yellow col.

Me ether: $C_{13}H_{10}ON_2$. MW, 210. Yellow needles from H_2O . M.p. 126°. Spar. volatile in steam. $B_2H_2PtCl_6$: orange plates. Decomp. above 250°.

Acetyl: yellow cryst. from EtOH or C_6H_6 . M.p. 152°. Sol. AcOH. Insol. H_2O .

Kehrmann, Cherpillod, *Helv. Chim. Acta*, 1924, **7**, 974.

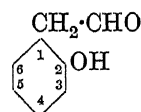
Kehrmann, Mermod, *Helv. Chim. Acta*, 1927, **10**, 65.

McCombie, Scarborough, Waters, *J. Chem. Soc.*, 1928, 356.

Hydroxyphenoxyacetophenone.

See Hydroxyphenyl phenacyl Ether.

o-Hydroxyphenylacetaldehyde (*o-Hydroxy- α -toluic aldehyde*, *homosalicylaldehyde*, *ω -aldehyde-o-cresol*)



$C_8H_8O_2$

MW, 136

Colourless liq. B.p. about 90° in vacuo. Yellow sol. in dil. NaOH.

Semicarbazone: cryst. from EtOH. M.p. 171°.

p-Nitrophenylhydrazone: cryst. from EtOH. M.p. 148°.

Me ether: o-methoxyphenylacetaldehyde. $C_9H_{10}O_2$. MW, 150. B.p. 115–17°/17 mm. Reduces $NH_3 \cdot AgNO_3$. Polymerises slowly in air. *Acetyl*: b.p. 238–5–9°/757 mm., 117–18°/15 mm. *Oxime*: needles. M.p. 94–5°. *Semicarbazone*: needles from EtOH. M.p. 158–9°.

Weerman, *Rec. trav. chim.*, 1917, 37, 7.

Rinkes, *Rec. trav. chim.*, 1926, 45, 823.

m-Hydroxyphenylacetaldehyde (m-Hydroxy- α -toluic aldehyde, ω -aldehydo-m-cresol).

Me ether: m-methoxyphenylacetaldehyde. *Oxime*: white needles from H_2O or ligroin. M.p. 92.5° (91°).

Benzyl ether: m.p. 54°. B.p. 215–18°/20 mm.

Gulland, Virden, *J. Chem. Soc.*, 1929, 1796.

p-Hydroxyphenylacetaldehyde (p-Hydroxy- α -toluic aldehyde, ω -aldehydo-p-cresol).

Cryst. Non-volatile in steam. Reduces Fehling's in the cold.

p-Nitrophenylhydrazone: yellow cryst. from EtOH. M.p. 158°.

2:4-Dinitrophenylhydrazone: m.p. 182–4° decomp.

Me ether: see Homoanisaldehyde.

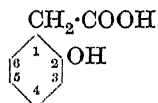
Langheld, *Ber.*, 1909, 42, 2372.

Tiffenau, *Ann. chim.*, 1907, 10, 350.

p-Hydroxyphenylacetamidoacetaldehyde.

See Penilloaldehyde-X.

o-Hydroxyphenylacetic Acid (2-Hydroxy- α -toluic acid)



$C_8H_8O_3$

MW, 152

Needles from Et_2O , prisms from $CHCl_3$. M.p. 145–7° (137°). B.p. 240–3° \rightarrow lactone. Sol. Et_2O . Spar. sol. H_2O , $CHCl_3$. $FeCl_3 \rightarrow$ violet col.

Me ether: o-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Needles from H_2O . M.p. 123–4°. Sol. EtOH, Et_2O , Me_2CO , AcOH, $CHCl_3$, hot C_6H_6 . *Et ester*: b.p. 135°/10 mm., 118°/3.5 mm. *Nitrile*: C_9H_9ON . MW, 147. Prisms from C_6H_6 -ligroin. M.p. 68. B.p. 141–3°/15 mm.

Et ether: o-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. Needles from ligroin. M.p. 103–4°. Spar. sol. H_2O . *Nitrile*: $C_{10}H_{11}ON$. MW, 161. B.p. 135–40°/16 mm.

Benzyl ether: m.p. 97–9°.

Lactone: see Isocoumaranone.

Amide: $C_8H_9O_2N$. MW, 151. Leaflets from $EtOH-CHCl_3$. M.p. 116–18°. *Benzoyl*: leaflets from EtOH. M.p. 162–4°. Sol. Et_2O , AcOH. Spar. sol. EtOH, C_6H_6 , ligroin. Insol. alkalis.

Nitrile: o-hydroxybenzyl cyanide. C_8H_7ON . MW, 133. Needles from C_6H_6 -ligroin. M.p. 117–19°. Sol. most org. solvents. *Benzoyl*: needles from ligroin. M.p. 50°.

Hydrazone: leaflets from $CHCl_3$. M.p. 154°.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 828.

Stoermer, *Ann.*, 1900, 313, 83.

Auwers, *Ber.*, 1907, 40, 3512.

Pschorr, Zeidler, *Ann.*, 1910, 373, 76.

m-Hydroxyphenylacetic Acid (3-Hydroxy- α -toluic acid).

Needles from C_6H_6 -ligroin. M.p. 129°. Sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ green col.

Me ether: m-methoxyphenylacetic acid. $C_9H_{10}O_3$. MW, 166. Leaflets from H_2O . M.p. 67°. *Et ester*: $C_{11}H_{14}O_3$. MW, 194. B.p. 146–7°/14 mm. *Nitrile*: b.p. 152°/17 mm.

Et ether: nitrile, b.p. 141°/8 mm.

Benzyl ether: m.p. 126°.

Nitrile: m-hydroxybenzyl cyanide. C_8H_7ON . MW, 133. Plates from H_2O . M.p. 52–3°. Sol. H_2O , EtOH, Et_2O . $FeCl_3 \rightarrow$ violet col.

Salkowski, *Ber.*, 1884, 17, 506.

v. Pechmann, Bauer, Obermiller, *Ber.*, 1904, 37, 2121.

Pschorr, *Ann.*, 1912, 391, 45.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 831.

p-Hydroxyphenylacetic Acid (4-Hydroxy- α -toluic acid).

Occurs in human and canine urine, dandelion roots, etc. Also produced by bacteriological putrefaction. Needles from H_2O . M.p. 148–50°. Sol. EtOH, Et_2O , hot H_2O . $FeCl_3 \rightarrow$ weak greenish-violet col. Ba and Ca salts spar. sol. H_2O . Dry dist. \rightarrow p-cresol.

Me ether: see Homoanisic Acid.

Et ether: p-ethoxyphenylacetic acid. $C_{10}H_{12}O_3$. MW, 180. Leaflets from H_2O . M.p. 88–9°. Spar. sol. cold H_2O . *Amide*: $C_{10}H_{13}O_2N$. MW, 179. Leaflets from H_2O . M.p. 184°. Sol. EtOH, Me_2CO , AcOH. Spar. sol. Et_2O , C_6H_6 , ligroin. *Nitrile*: $C_{10}H_{11}ON$. MW, 161. Leaflets from EtOH.Aq. M.p. 47°.

Me ester: $C_9H_9O_3$. MW, 166. B.p. 310°. D_4^{20} 1.1786. n_D^{15} 1.5338.

Et ester: $C_{11}H_{12}O_3$. MW, 180. B.p. 314°. D_4^{15-5} 1.2225. n_D^{20} 1.5183.

Amide: $C_8H_9O_2N$. MW, 151. Leaflets from H_2O . M.p. 175°.

Benzoyl: cryst. from EtOH. M.p. 167–9°.

Nitrile: p-hydroxybenzyl cyanide. C_8H_7ON . MW, 133. Needles from H_2O . M.p. 69–70°.

B.p. 330°. Sol. EtOH, Et₂O. Spar. sol. H₂O. FeCl₃ \rightarrow violet col. *Acetyl*: m.p. 49–50°.

Salkowski, *Ber.*, 1889, **22**, 2137.

Pschorr, Wolfes, Buckow, *Ber.*, 1900, **33**, 171.

Werner, *Ann.*, 1902, **322**, 148.

Cain, Simonsen, Smith, *J. Chem. Soc.*, 1913, **103**, 1036.

Hirai, *Biochem. Z.*, 1921, **114**, 71.

Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, **42**, 831.

α -Hydroxyphenylacetic Acid.

See Mandelic Acid.

3-Hydroxy-3-phenylallylene.

See Ethynylphenylcarbinol.

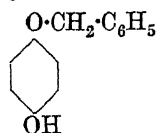
N-Hydroxyphenyl-anthranilic Acid.

See 2', 3', and 4'-Hydroxydiphenylamine-2 carboxylic Acids.

Hydroxyphenyl-benzoyl ethane.

See Hydroxyphenylpropiophenone.

p-Hydroxyphenyl benzyl Ether (*Hydroquinone monobenzyl ether*)



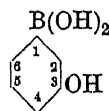
C₁₃H₁₂O₂ MW, 200
Plates from H₂O. M.p. 122–122.5°. Sol. EtOH, Et₂O, C₆H₆, hot H₂O. Spar. sol. cold H₂O.

Schiff, Pellizzari, *Ann.*, 1883, **221**, 370.

Hydroxyphenyl benzyl Ketone.

See Hydroxydeoxybenzoin.

3-Hydroxyphenylboric Acid



C₆H₇O₃B MW, 138

Cryst. from ethylene chloride-Me₂CO. M.p. 225° decomp. Sol. H₂O, EtOH, Et₂O, Me₂CO. Spar. sol. CHCl₃, ethylene chloride. FeCl₃ \rightarrow bluish-violet col.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4421.

4-Hydroxyphenylboric Acid.

Me ether: C₇H₉O₃B. MW, 152. Plates from H₂O. M.p. 208.5–209.5° (207°).

König, Scharnbeck, *J. prakt. Chem.*, 1930, **128**, 157.

Bean, Johnson, *J. Am. Chem. Soc.*, 1932, **54**, 4417.

3-*p*-Hydroxyphenyl-*n*-butyl Alcohol.

See Betuligenol.

4-Hydroxy-4-phenylbutylene-1.

See Allylphenylcarbinol.

1-Hydroxy-1-phenylbutyric Acid (*Propylphenylglycollic acid*)

C_6H_5
 $\text{CH}_3\text{-CH}_2\text{-C(OH)-COOH}$
C₁₀H₁₂O₃ MW, 180

*d*l.

M.p. 128–9°. [α]_D²⁰ +32.3° in H₂O.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 127°/17 mm. D₄²⁰ 1.103. [α]_D²⁰ +24.7° in H₂O.

l.

Amide: C₁₀H₁₃O₂N. MW, 179. M.p. 91.5–92°. [α]_D¹⁹ –15° in Me₂CO.

dl.

Needles from H₂O. M.p. 132.5°. Sol. EtOH, hot H₂O. Insol. ligroin.

Et ester: b.p. 143°/20 mm., 115–18°/6 mm.

Amide: m.p. 91–91.5°.

Quinine salt: m.p. 205–6° decomp.

Grignard, *Compt. rend.*, 1902, **135**, 629.

Smith, *J. prakt. Chem.*, 1911, **84**, 744.

2-Hydroxy-2-phenylbutyric Acid (β -Hydroxy- β -methylhydrocinnamic acid)

C_6H_5
 $\text{CH}_3\text{-C(OH)-CH}_2\text{-COOH}$
C₁₀H₁₂O₃ MW, 180

Needles. M.p. 50–3°.

Me ester: C₁₁H₁₄O₃. MW, 194. B.p. 135–40°/12 mm.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 146–7°/15 mm.

Lindenbaum, *Ber.*, 1917, **50**, 1271.

Auwers, *Ann.*, 1917, **413**, 272.

1-Hydroxy-3-phenylbutyric Acid (2-Benzyl-lactic acid)

$\text{C}_6\text{H}_5\text{-CH}_2\text{-CH}_2\text{-CH(OH)-COOH}$
C₁₀H₁₂O₃ MW, 180

*d*l.

Needles from C₆H₆. M.p. 114°. Sublimes. [α]_D +12.9°.

l.

M.p. 114–16°. [α]_D²⁷ –9.9°.

Me ester: C₁₁H₁₄O₃. MW, 194. B.p. 159°/17 mm. [α]_D²⁵ –22.3°.

1-*Menthyl ester*: C₂₀H₃₀O₃. MW, 318. M.p. 88°. [α]_D²³ –65.4°.

dl.

Plates from Et₂O–ligroin. M.p. 104.5–105°. Sol. Et₂O. Spar. sol. C₆H₆, CS₂. Insol. ligroin.

Me ester: b.p. 155°/13 mm.

Biquard, *Ann. chim.*, 1933, **20**, 143.

Knoop, Kertess, *Z. physiol. Chem.*, 1911, **71**, 256, 259.

Fittig, Petkov, *Ann.*, 1898, **299**, 32.

2-Hydroxy-3-phenylbutyric Acid (2-Benzylhydracrylic acid)

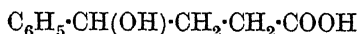
$\text{C}_6\text{H}_5\text{-CH}_2\text{-CH(OH)-CH}_2\text{-COOH}$
C₁₀H₁₂O₃ MW, 180

dl.

Plates from Et₂O. Sol. cold H₂O, CHCl₃. Spar. sol. C₆H₆, ligroin, CS₂.

Fittig, Luib, *Ann.*, 1894, **283**, 297, 302, 305.

3-Hydroxy-3-phenylbutyric Acid



C₁₀H₁₂O₃ MW, 180

dl.

Cryst. from EtOH or CS₂. M.p. 111–12°. Sol. EtOH, Et₂O, CS₂, NaOH. H₂O at 65–80° → lactone. Ox. → 2-benzoylpropionic acid. Red. → 3-phenylbutyric acid.

NH₄ salt: m.p. 155° decomp.

Et ester: C₁₂H₁₆O₃. MW, 208. B.p. 158–160°/17 mm., 152–3°/12 mm.

Amide: C₁₀H₁₃O₂N. MW, 179. Prisms from EtOH. M.p. 86°. Sol. EtOH, hot H₂O, CHCl₃. Spar. sol. Et₂O.

Lactone: 3-phenylbutyrolactone. C₁₀H₁₀O₂. MW, 162. Needles from EtOH. M.p. 38°. B.p. 306°, 123°/2 mm. Sol. EtOH, Et₂O, C₆H₆, AcOH. Spar. sol. hot H₂O. *n*_D²⁰ 1.5418. Volatile in steam.

l.

Occurs in urine.

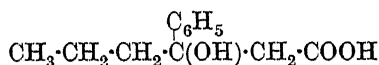
Na salt: [α]_D¹⁸ – 13.0 in H₂O.

Fittig, Jayne, *Ann.*, 1883, **216**, 105.

Findlay, Hickmans, *J. Chem. Soc.*, 1909, **95**, 1009.

v. Pechmann, *Ber.*, 1882, **15**, 890.

2-Hydroxy-2-phenyl-*n*-caproic Acid (β-Hydroxy-β-propylhydrocinnamic acid)

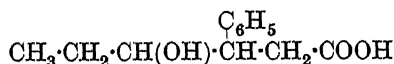


C₁₂H₁₆O₃ MW, 208

Cryst. from 60% EtOH or C₆H₆. M.p. 121–122°. Decomp. at 150°. Conc. H₂SO₄ → β-propylcinnamic acid.

Schroeter, *Ber.*, 1908, **41**, 11.

3-Hydroxy-2-phenyl-*n*-caproic Acid (β-1-Hydroxypropylhydrocinnamic acid)

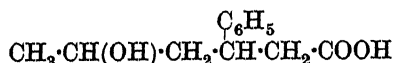


C₁₂H₁₆O₃ MW, 208

M.p. 155–6°.

Ivanoff, Nicoloff, *Bull. soc. chim.*, 1932, **51**, 1325.

4-Hydroxy-2-phenyl-*n*-caproic Acid (β-2-Hydroxypropylhydrocinnamic acid)



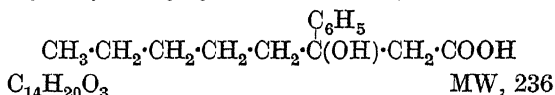
C₁₂H₁₆O₃ MW, 208

Lactone: 4-methyl-2-phenylbutyrolactone. C₁₂H₁₄O₂. MW, 190. Oil. B.p. 197–200°/19 mm. Sol. EtOH, hot H₂O.

Vorländer, Knötzsch, *Ann.*, 1897, **294**, 329.

Jacobs, Scott, *J. Biol. Chem.*, 1931, **93**, 139.

2-Hydroxy-2-phenylcaprylic Acid (β-Hydroxy-β-amylyhydrocinnamic acid)



C₁₄H₂₀O₃ MW, 236

Needles from pet. ether, dil. EtOH, or CS₂. M.p. 79–80.5°.

Schroeter, *Ber.*, 1907, **40**, 1603.

Hydroxyphenylcarbamic Acid.

Ethyl Ester. See Hydroxyphenylurethane.

4-Hydroxy-2-phenylchroman.

See Flavanol.

Hydroxyphenylcinchoninic Acid.

See Isaphenic Acid.

Hydroxy-phenylcinnamic Acid.

See Hydroxystilbene-α-carboxylic Acid.

Hydroxyphenylcrotonic Acid.

See β-Methyl-*p*-coumaric Acid.

1-*p*-Hydroxyphenyl-2-dimethylaminoethane.

See Hordenine.

Hydroxyphenylethyl Alcohol.

See Tyrosol.

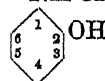
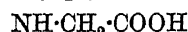
Hydroxyphenylethylamine.

See Hydroxyaminoethylbenzene and Tyramine.

Hydroxyphenylethylmethylamine.

See Methyl-hydroxyphenylethyl-amine.

o-Hydroxyphenylglycine



C₈H₉O₃N MW, 167

Plates + 1H₂O from H₂O. Heat at 100–5° → anhydride.

Me ether: C₉H₁₁O₃N. MW, 181. Needles from C₆H₆. M.p. 153°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Et ester: b.p. 177–8°/15 mm.

Amide: C₉H₁₂O₂N₂. MW, 180. M.p. 153–4°. Nitrile: C₉H₁₀ON₂. MW, 162. Prisms. M.p. 68°.

Et ether: C₁₀H₁₃O₃N. MW, 195. Cryst. M.p. 120°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Et ester: b.p. 183–4°/18 mm. Amide: C₁₀H₁₄O₂N₂. MW, 194. M.p. 161–2°.

Nitrile: C₈H₈ON₂. MW, 148. N-Acetyl: m.p. 167–8°. Diacetyl: m.p. 105–6°.

N-Acetyl: m.p. 201–2°.

Vater, *J. prakt. Chem.*, 1884, **29**, 289.

Shimo, *Bull. Chem. Soc. Japan*, 1926, **1**, 226.

p-Hydroxyphenylglycine.

Plates from H_2O . Decomp. at 200° without melting. Spar. sol. H_2O , EtOH. Insol. Et_2O . $\text{FeCl}_3 \rightarrow$ blue col. Newsprint or woodpulp + $\text{HCl} \rightarrow$ orange col.

Me ether: cryst. M.p. 200° decomp. Sol. EtOH. Spar. sol. cold H_2O , Et_2O . *Amide*: m.p. $145-6^\circ$.

Et ether: cryst. from H_2O . M.p. 163° . *Amide*: m.p. $145-6^\circ$.

Me ester: $\text{C}_9\text{H}_{11}\text{O}_3\text{N}$. MW, 181. M.p. $97-8^\circ$.

Et ester: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. Plates. M.p. 79° . Sol. EtOH, hot H_2O .

Amide: $\text{C}_8\text{H}_{10}\text{O}_2\text{N}_2$. MW, 166. M.p. $135-6^\circ$.

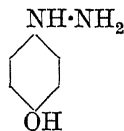
N-Acetyl: m.p. $203-4^\circ$.

Diacetyl: m.p. $174-5^\circ$.

Meldola, Foster, Brightman, *J. Chem. Soc.*, 1917, 111, 552.

Vater, *J. prakt. Chem.*, 1884, 29, 294.

Bischoff, Nastvogel, *Ber.*, 1889, 22, 1788.

p-Hydroxyphenylhydrazine (p-Hydrazinophenol)

$\text{C}_6\text{H}_8\text{ON}_2$ MW, 124

Me ether: p-hydrazinoanisole. $\text{C}_7\text{H}_{10}\text{ON}_2$. MW, 138. Cryst. M.p. 65° . *N-Acetyl*: m.p. $133-5^\circ$.

Et ether: p-hydrazinophenetole. $\text{C}_8\text{H}_{12}\text{ON}_2$. MW, 152. Plates from C_6H_6 . M.p. 74° . Sol. H_2O , EtOH. Spar. sol. Et_2O , ligroin.

Altschul, *J. prakt. Chem.*, 1898, 57, 202; *Ber.*, 1892, 25, 1849.

Takayanagi, *J. Chem. Soc. Japan*, 1936, 57, 64.

Hydroxyphenyl hydroxystyryl Ketone.

See Dihydroxychalkone.

Hydroxyphenyl hydroxytolyl Ketone.

See Dihydroxy-methylbenzophenone.

1-Hydroxy-1-phenylisobutane.

See Isopropylphenylcarbinol.

1-Hydroxy-2-phenylisobutyric Acid (1-Benzyl-lactic acid, methylbenzylglycollic acid, α -hydroxy- α -methylhydrocinnamic acid)

$\text{C}_6\text{H}_5 \cdot \text{CH}_2 \cdot \overset{\text{CH}_3}{\underset{\text{OH}}{\text{C}}} \cdot \text{COOH}$
 $\text{C}_{10}\text{H}_{12}\text{O}_3$ MW, 180
 Prisms from C_6H_6 . M.p. $97-9^\circ$. Sol. H_2O , C_6H_6 , EtOH.

Gabriel, Michael, *Ber.*, 1879, 12, 815.

2-Hydroxy-2-phenylisobutyric Acid (β -Hydroxy- α -methylhydrocinnamic acid, 1-methyl-2-phenylhydracrylic acid)

$\text{C}_6\text{H}_5 \cdot \text{CH}(\text{OH}) \cdot \overset{\text{CH}_3}{\underset{\text{COOH}}{\text{C}}}$
 $\text{C}_{10}\text{H}_{12}\text{O}_3$ MW, 180

Needles from C_6H_6 -ligroin or H_2O . M.p. $116-18^\circ$ (95°). Sol. EtOH, Et_2O , Me_2CO . Spar. sol. H_2O , CHCl_3 , CS_2 , ligroin. $k = 3.47 \times 10^{-5}$ at 25° . CH_3COCl or $\text{Ac}_2\text{O} \rightarrow \alpha$ -methylcinnamic acid.

Et ester: m.p. $120-1^\circ$. B.p. $120-5^\circ/6.5$ mm.

Perkin, Colman, *J. Chem. Soc.*, 1887, 49, 159.

Perkin, Stenhouse, *J. Chem. Soc.*, 1891, 59, 1010 (Footnote).

Posner, *Ann.*, 1912, 389, 75.

Dain, *J. Russ. Phys.-Chem. Soc.*, 1897, 29, 597.

2-Hydroxy-1-phenylisopentane.

See Methyl-ethylbenzylcarbinol.

Hydroxyphenyl-isopropyl Alcohol.

See 2-, and 3-, α -Hydroxyisopropylphenol.

1-p-Hydroxyphenylisopropylamine.

See Paredrine.

1-Hydroxy-phenylisoquinoline.

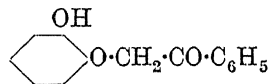
See Phenylisocarbostyryl.

1-[p-Hydroxyphenyl]-N-methylamino-ethyl Alcohol.

See Sympathol.

Hydroxy-phenylnaphthalene.

See Phenylnaphthol.

o-Hydroxyphenyl phenacyl Ether (o-Hydroxyphenoxyacetophenone, catechol phenacyl ether, phenacyl alcohol catechol ether)

$\text{C}_{14}\text{H}_{12}\text{O}_3$ MW, 228

Needles from C_6H_6 . M.p. 111° . Very sol. MeOH, EtOH, Et_2O , CHCl_3 . Sol. C_6H_6 . Spar. sol. ligroin, H_2O .

Me ether: guaiacol phenacyl ether. $\text{C}_{15}\text{H}_{14}\text{O}_3$. MW, 242. Needles from Et_2O . M.p. 101° .

Et ether: $\text{C}_{16}\text{H}_{16}\text{O}_3$. MW, 256. Plates from EtOH. M.p. 81° .

Benzoyl: plates. M.p. $136-7^\circ$.

Oxime: needles from MeOH.Aq. M.p. 109° .

Hydrazone: yellow needles. M.p. 91° .

Semicarbazone: cryst. M.p. $145-5^\circ$.

Lazennec, *Bull. soc. chim.*, 1909, 5, 501.

p-Hydroxyphenyl phenacyl Ether (p-Hydroxyphenoxyacetophenone, hydroquinone phenacyl ether, phenacyl alcohol hydroquinone ether).

M.p. $155-6^\circ$.

Me ether: m.p. $60-1^\circ$. B.p. $233^\circ/16$ mm. 2:4-Dinitrophenylhydrazone: crimson. M.p. 171° .

Walker, *J. Chem. Soc.*, 1942, 347.

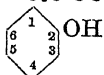
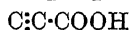
2-Hydroxy-1-phenylpropane

See Methylbenzylcarbinol.

2-Hydroxy-2-phenylpropane

See Dimethyl-phenylcarbinol.

2-Hydroxyphenylpropionic Acid

C₉H₈O₃

MW, 162

Me ether: C₁₀H₈O₃. MW, 176. Needles from CS₂. M.p. 124–6° decomp. Sol. EtOH, Et₂O.

Et ether: C₁₁H₁₀O₃. MW, 190. Needles from H₂O. M.p. 115.5–116°. Sol. EtOH, Et₂O. Spar. sol. cold H₂O. H₂O at 140–50° → 2-ethoxyphenylacetylene + 2-ethoxyacetophenone.

Fittig, Claus, *Ann.*, 1892, 269, 7.

Michael, Lamb, *Am. Chem. J.*, 1906, 36, 565.

4-Hydroxyphenylpropionic Acid.

Me ether: needles. M.p. 132–9° decomp. Mod. sol. dil. EtOH. Spar. sol. H₂O.

Reychler, *Bull. soc. chim.*, 1897, 17, 512.

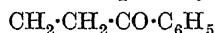
Hydroxyphenylpropionic Acid.

See Atrolactic Acid, Tropic Acid, Hydroxyhydrocinnamic Acid, and Hydroxyhydratropic Acid.

o-Hydroxy-2-phenylpropionic Acid.

See Melilotic Acid.

γ-[o-Hydroxyphenyl]-propionophenone (β-[o-Hydroxybenzyl]-acetophenone, 1-o-hydroxyphenyl-2-benzoylthane, ω-phenacyl-o-cresol)

C₁₅H₁₄O₂

MW, 226

Leaflets. M.p. 91–2°.

Me ether: C₁₆H₁₆O₂. MW, 240. B.p. 223°/20 mm.

Acetyl: needles. M.p. 65–6°.

Semicarbazone: needles from C₆H₆. M.p. 174–5°.

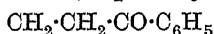
Borsche, Geyer, *Ber.*, 1914, 47, 1160.

Bargellini, Bini, *Gazz. chim. ital.*, 1911, 41, 441.

Feuerstein, Musculus, *Ber.*, 1901, 34, 410.

Feuerstein, Kostanecki, *Ber.*, 1898, 31, 718.

γ-[p-Hydroxyphenyl]-propionophenone (β-[p-Hydroxybenzyl]-acetophenone, 1-p-hydroxyphenyl-2-benzoylthane, ω-phenacyl-p-cresol)

C₁₅H₁₄O₂

MW, 226

Me ether: ω-anisylacetophenone. C₁₆H₁₆O₂. MW, 240. Needles from EtOH.Aq. M.p. 68°

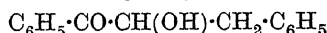
(59–60°). Sol. EtOH, Et₂O, C₆H₆. Spar. sol. H₂O, pet. ether. *Semicarbazone*: needles from EtOH.Aq. M.p. 118–20°.

Pfeiffer, Negreau, *Ber.*, 1917, 50, 1473.

Kohler, Conant, *J. Am. Chem. Soc.*, 1917, 39, 1709.

Bargellini, Bini, *Gazz. chim. ital.*, 1911, 41, 443.

β-Hydroxy-γ-phenylpropionophenone (*Benzylbenzoylcarbinol*, β-hydroxy-β-benzylacetophenone)

C₁₅H₁₄O₂

MW, 226

dl-.

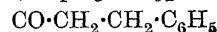
Needles from H₂O. M.p. 65–6°. Reduces Fehling's.

Active form:

Prisms from pet. ether. M.p. 75.5–76.5°. Sol. usual org. solvents. Spar. sol. H₂O. [α]_D^{17.5} + 12.6° in Me₂CO, [α]_D^{19.1} – 19.3° in EtOH. Reduces Fehling's. Racemised by NaOEt.

McKenzie, Martin, Rule, *J. Chem. Soc.*, 1914, 105, 1589.

p-Hydroxy-γ-phenylpropionophenone (p-Hydroxy-β-benzylacetophenone, 1-phenyl-2-p-hydroxybenzoylthane, ω-p-hydroxyphenacyltoluene)

C₁₅H₁₄O₂

MW, 226

Me ether: C₁₆H₁₆O₂. MW, 240. Plates from EtOH. M.p. 97°. Sol. Et₂O, AcOH. Insol. H₂O. *Oxime*: needles from EtOH.Aq. M.p. 114°.

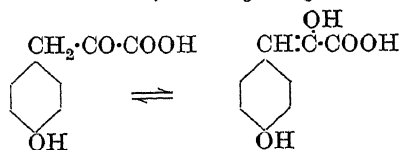
Jörlander, *Ber.*, 1917, 50, 411.

Pfeiffer, Negreau, *Ber.*, 1917, 50, 1474.

Hydroxyphenylpropyl Alcohol.

See Hydroxypropylphenol.

4-Hydroxyphenylpyruvic Acid (α-Hydroxy-p-coumaric acid, 4-α-dihydrooxycinnamic acid)

C₉H₈O₄

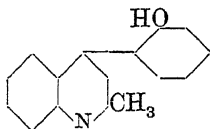
MW, 180

Plates from H₂O. M.p. 220°. Sol. EtOH, Et₂O, AcOEt. Spar. sol. H₂O, C₆H₆. Reduces Fehling's and NH₃.AgNO₃. FeCl₃ → green col.

Me ether: C₁₀H₁₀O₄. MW, 194. Yellow needles or prisms from AcOEt or EtOH. M.p. 184–6° decomp. Sol. EtOH, C₆H₆, CHCl₃. Spar. sol. ligroin. *Phenylhydrazone*: cryst. from C₆H₆-pet. ether. Two forms: m.p.s 150° and

158–9°. *Et ester*: $C_{12}H_{14}O_4$. MW, 222. B.p. 190°/15 mm. *Semicarbazone of Et ester*: cryst. M.p. 152–3°.

Neubauer, *Chem. Zentr.*, 1909, II, 50.
Erlenmeyer, Wittenberg, *Ann.*, 1904, 337, 299.
Cain, Simonsen, *J. Chem. Soc.*, 1913, 103, 1036.
Neubauer, Fromherz, *Z. physiol. Chem.*, 1910, 70, 339.

4-*o*-Hydroxyphenylquinaldine

$C_{16}H_{13}ON$

MW, 235

Needles from dil. EtOH. M.p. 187–8°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, 27, 3038.
M.L.B., D.R.P., 80,501.

4-*m*-Hydroxyphenylquinaldine.

M.p. 259–60°.

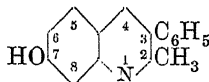
M.L.B., D.R.P., 80,501.

4-*p*-Hydroxyphenylquinaldine.

Cryst. from EtOH. M.p. 255°.

Besthorn, Jaeglé, *Ber.*, 1894, 27, 912.
M.L.B., D.R.P., 80,501.

7-Hydroxy-3-phenylquinaldine



$C_{16}H_{13}ON$

MW, 235

M.p. 258°.

Borsche *et al.*, *Ann.*, 1940, 544, 272.

6-Hydroxy-4-phenylquinaldine.

Cryst. from EtOH. M.p. 248°.

Me ether: $C_{17}H_{15}ON$. MW, 249. Plates from C_6H_6 . M.p. 76°.

Königs, Jaeglé, *Ber.*, 1895, 28, 1048.

7-Hydroxy-4-phenylquinaldine.

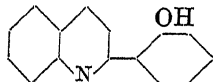
Yellow needles. M.p. 262°. Sol. alkalis.

Et ether: $C_{18}H_{17}ON$. MW, 263. Needles. M.p. 91°.

$B_2H_2PtCl_6$: m.p. 218–20°.

Picrate: m.p. 208°.

Bülow, Issler, *Ber.*, 1903, 36, 2453

2-*o*-Hydroxyphenylquinoline

$C_{15}H_{11}ON$

MW, 221

Yellow needles from EtOH. M.p. 115°. B.p. above 300°. Sol. acids and alkalis.

Picrate: yellow needles. M.p. 184°.

Döbner, *Ann.*, 1888, 249, 101.

2-*m*-Hydroxyphenylquinoline.

Needles from dil. EtOH. M.p. 156°. Sol. EtOH, Et_2O . $Zn \rightarrow$ 2-phenylquinoline.

$B, HCl, 1\frac{1}{2}H_2O$: m.p. 224°. Spar. sol. H_2O .

Murmann, *Monatsh.*, 1892, 13, 67.

Miller, Kinkelin, *Ber.*, 1885, 18, 1908.

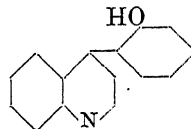
2-*p*-Hydroxyphenylquinoline.

Needles. M.p. 237–8°. Sol. hot EtOH, KOH, HCl. Insol. H_2O . $Zn \rightarrow$ 2-phenylquinoline.

Methiodide: yellow needles + $1H_2O$. M.p. 209–10°.

Murmann, *Monatsh.*, 1892, 13, 63.

Weidel, *Monatsh.*, 1887, 8, 127.

4-*o*-Hydroxyphenylquinoline

$C_{15}H_{11}ON$

MW, 221

M.p. 208°.

B, HCl : m.p. 260°.

$B_2H_2PtCl_6$: m.p. 274°.

Et ether: $C_{17}H_{15}ON$. MW, 249. M.p. 80–1°.

Picrate: m.p. 201–2°.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, 27, 3040.

Königs, *J. prakt. Chem.*, 1900, 61, 40.

4-*m*-Hydroxyphenylquinoline.

M.p. 235°. Spar. sol. EtOH, $CHCl_3$. Prac. insol. Et_2O . $CrO_3 \rightarrow$ cinchoninic acid.

Koenigs, Nef, *Ber.*, 1887, 20, 630.

Besthorn, Banzhaf, Jaeglé, *Ber.*, 1894, 27, 3041.

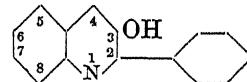
4-*p*-Hydroxyphenylquinoline.

Needles or prisms from dil. EtOH. M.p. 243°. Sol. EtOH, $CHCl_3$. Prac. insol. C_6H_6 , Et_2O . $CrO_3 \rightarrow$ cinchoninic acid.

Koenigs, Nef, *Ber.*, 1887, 20, 629.

Besthorn, Jaeglé, *Ber.*, 1894, 27, 913.

3-Hydroxy-2-phenylquinoline



$C_{15}H_{11}ON$

MW, 221

M.p. 218–20° (210–12°). Sol. alkalis.

B, HCl : m.p. 261° (243–5°).

Dilthey, Thelen, *Ber.*, 1925, 58, 1589.

Barginelli, Berlingozzi, *Gazz. chim. ital.*, 1923, 53, 3.

Propyl ether: $C_{10}H_{14}O_2N_2$. MW, 194. Plates

from H_2O . M.p. 147° . Sol. most org. solvents. Prac. insol. cold H_2O .

O-Acetyl: needles from EtOH. M.p. $201-202.5^\circ$. Sol. hot H_2O , EtOH. Prac. insol. hot C_6H_6 .

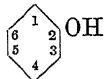
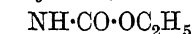
Diacetyl deriv.: needles from AcOEt. M.p. $213.5-214^\circ$. Sol. most org. solvents.

O-Benzoyl: yellowish-brown needles. M.p. 148° .

Dibenzoyl deriv.: cryst. M.p. $226-8^\circ$.

Kalckhoff, *Ber.*, 1883, 16, 376.

2-Hydroxyphenylurethane (o-Hydroxy-phenylcarbamic ethyl ester, N-carbethoxy-o-aminophenol)



$\text{C}_9\text{H}_{11}\text{O}_3\text{N}$ MW, 181

Prisms from EtOH-Et₂O. M.p. 86.5° . Sol. EtOH, Et₂O. Prac. insol. cold H_2O . KOH \rightarrow o-aminophenol. Heat \rightarrow benzoxazolone.

Me ether: $\text{C}_{10}\text{H}_{13}\text{O}_3\text{N}$. MW, 195. B.p. $180-2^\circ/26$ mm.

Benzoyl: cryst. from EtOH.Aq. M.p. 76.5° .

Ransom, *Ber.*, 1898, 31, 1061.

Groenvik, *Bull. soc. chim.*, 1876, 25, 177.

3-Hydroxyphenylurethane (m-Hydroxy-phenylcarbamic ethyl ester, N-carbethoxy-m-aminophenol).

Cryst. from C_6H_6 . M.p. 97° .

Benzoyl: plates from EtOH. M.p. $183-4^\circ$.

Bauer, *Ber.*, 1915, 48, 1580.

4-Hydroxyphenylurethane (p-Hydroxy-phenylcarbamic ethyl ester, N-carbethoxy-p-aminophenol).

Plates from EtOH-Et₂O or hot H_2O . M.p. 123° (120°). Sol. alkalis.

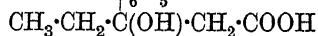
Me ether: needles from EtOH. M.p. 67° ($63-4^\circ$).

Et ether: $\text{C}_{11}\text{H}_{15}\text{O}_3\text{N}$. MW, 209. Needles or plates from EtOH. M.p. 94° .

Groenvik, *Bull. soc. chim.*, 1876, 25, 179.

Schönherr, *J. prakt. Chem.*, 1903, 67, 341.

2-Hydroxy-2-phenyl-n-valeric Acid (2-Ethyl-2-phenylhydracrylic acid, β -hydroxy- β -ethylhydrocinnamic acid)



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

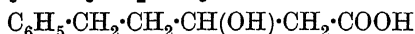
Needles from C_6H_6 . M.p. 125° (118°). Sol. H_2O , EtOH, Et₂O. Sol. conc. $\text{H}_2\text{SO}_4 \rightarrow \beta$ -ethylcinnamic acid.

Et ester: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. Cryst. from EtOH.Aq. M.p. 34.5° . B.p. $143^\circ/13$ mm. Sol. most org. solvents.

Schroeter, Wülfing, *Ber.*, 1907, 40, 1598.

Stoermer, Grimm, Laage, *Ber.*, 1917, 50, 970.

2-Hydroxy-4-phenyl-n-valeric Acid



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

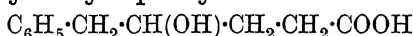
Prisms from H_2O . M.p. 131° . Sol. H_2O , Et₂O. Spar. sol. C_6H_6 . Insol. ligroin. Dist. \rightarrow 4-phenyl-1-butylene-1-carboxylic acid.

Et ester: $\text{C}_{13}\text{H}_{18}\text{O}_3$. MW, 222. B.p. $178-82^\circ/12$ mm.

Fittig, Hoffmann, *Ann.*, 1894, 283, 309, 315.

Farmer, Hose, *J. Chem. Soc.*, 1933, 966.

3-Hydroxy-4-phenyl-n-valeric Acid



$\text{C}_{11}\text{H}_{14}\text{O}_3$ MW, 194

Needles from H_2O . M.p. $101-2^\circ$ decomp. Sol. CHCl_3 , CS_2 . Spar. sol. H_2O , ligroin.

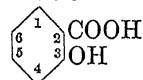
Lactone: 4-phenyl- γ -valerolactone. $\text{C}_{11}\text{H}_{12}\text{O}_3$. MW, 176. Needles from CHCl_3 . M.p. 33° . Sol. CHCl_3 , CS_2 . Spar. sol. H_2O , ligroin.

Fittig, Stern, *Ann.*, 1892, 268, 91, 96.

Hydroxyphenylvinylacetic Acid.

See Styrylglycollic Acid, p-Hydroxystyrylacetic Acid and 2-Benzoylpropionic Acid.

3-Hydroxyphthalic Acid



$\text{C}_8\text{H}_6\text{O}_5$ MW, 182

Needles or prisms from Et₂O-pet. ether or H_2O . M.p. about $150^\circ \rightarrow$ anhydride, m.p. $166-7^\circ$ (rapid heat.). Sublimes. Sol. H_2O , EtOH, Et₂O. Red col. with FeCl_3 .

Me ether: 3-methoxyphthalic acid. $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. Prisms from H_2O . M.p. $173-4^\circ \rightarrow$ anhydride. Sol. H_2O , EtOH, Et₂O. Di-Me

ester: $\text{C}_{11}\text{H}_{12}\text{O}_5$. MW, 224. M.p. $73-4^\circ$ (71°). Anhydride: $\text{C}_9\text{H}_6\text{O}_4$. MW, 178. M.p. $160-1^\circ$.

Anhydride: $\text{C}_8\text{H}_4\text{O}_4$. MW, 164. Orange yellow cryst. from xylene. M.p. $198-9^\circ$.

Acetyl: m.p. $113.5-115.5^\circ$. Benzoyl: m.p. $147.5-148^\circ$.

Imide: m.p. $255-6^\circ$. $\text{FeCl}_3 \rightarrow$ deep red col.

Bernthsen, Semper, *Ber.*, 1886, 19, 167; 1887, 20, 937.

Miller, *Ann.*, 1881, 208, 247.

Pratt, Perkins, *J. Am. Chem. Soc.*, 1918, 40, 227.

Corbellini, Rossi, *Gazz. chim. ital.*, 1931, 61, 281.

Gisvold, *J. Am. Pharm. Assocn.*, 1942, 31, 202.

4-Hydroxyphthalic Acid.

Cryst. from H_2O . M.p. $204-5^\circ \rightarrow$ anhydride. Sol. EtOH, Et₂O. Spar. sol. C_6H_6 , pet.

ether. Reddish-yellow col. with FeCl_3 . HCl at $180^\circ \rightarrow m$ -hydroxybenzoic acid.

1-*Me ester*: $\text{C}_9\text{H}_8\text{O}_5$. MW, 196. M.p. 159 – 60° decomp. Sol. H_2O , EtOH , Et_2O . Insol. C_6H_6 , pet. ether. $k = 1.54 \times 10^{-4}$ at 25° .

2-*Me ester*: needles from H_2O . M.p. 166° . Spar. sol. C_6H_6 . $k = 2.05 \times 10^{-4}$ at 25° .

Di-*Me ester*: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Plates from H_2O or toluene. M.p. 107 – 8° (104°). Sol. EtOH , Et_2O , C_6H_6 . Spar. sol. H_2O .

1-*Et ester*: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. M.p. 175° . $k = 7.3 \times 10^{-4}$ at 25° .

2-*Et ester*: m.p. 152° . $k = 2.2 \times 10^{-4}$ at 25° .

Me ether: 4-methoxyphthalic acid. M.p. 168 – $70^\circ \rightarrow$ anhydride. Sol. EtOH , Et_2O . Mod. sol. H_2O . Prac. insol. CHCl_3 , C_6H_6 . Yellow col. with FeCl_3 . Di-*Me ester*: b.p. 195 – $7^\circ/20$ mm. Anhydride: m.p. 97° (94° , 87°). Sol. EtOH , hot C_6H_6 . Sublimes.

Et ether: $\text{C}_{10}\text{H}_{10}\text{O}_5$. MW, 210. Cryst. + H_2O . Loses H_2O at 100° . M.p. anhyd. 163° .

Di-*Me ester*: $\text{C}_{12}\text{H}_{14}\text{O}_5$. MW, 238. Plates from ligroin. M.p. 44 – 5° . Anhydride: $\text{C}_{10}\text{H}_8\text{O}_4$. MW, 192. M.p. 118° .

Anhydride: $\text{C}_8\text{H}_4\text{O}_4$. MW, 164. M.p. 171 – 3° (165 – 6°). Sublimes. Sol. EtOH , Et_2O , Me_2CO . Prac. insol. CHCl_3 , C_6H_6 , CS_2 .

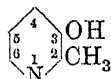
Imide: $\text{C}_8\text{H}_5\text{O}_3\text{N}$. MW, 163. M.p. 290° .

Bentley, Weizmann, *J. Chem. Soc.*, 1907, 91, 100.

Rée, *Ann.*, 1886, 233, 232.

Dimroth, Fick, *Ann.*, 1916, 411, 323.

3-Hydroxy- α -picoline (3-Hydroxy-2-methylpyridine)



$\text{C}_8\text{H}_7\text{ON}$ MW, 109

Cryst. M.p. 167 – 8° (164 – 6°). $\text{FeCl}_3 \rightarrow$ deep red col.

Picrate: yellow. M.p. 204° (192°) decomp.

I.G., D.R.P., 541,681, (*Chem. Abstracts*, 1932, 26, 2471); F.P., 685,583, (*Chem. Abstracts*, 1930, 24, 5766).

4-Hydroxy- α -picoline (4-Hydroxy-2-methylpyridine).

Et ether: $\text{C}_8\text{H}_{11}\text{ON}$. MW, 137. B.p. about 220° . $\text{B}_2\text{H}_2\text{PtCl}_6$: m.p. 207° .

Collie, Bishop, *J. Chem. Soc.*, 1925, 127, 963.

5-Hydroxy- α -picoline (5-Hydroxy-2-methylpyridine).

Cryst. from EtOH – Et_2O . M.p. 165 – 7° . Sol. H_2O , EtOH . Spar. sol. Et_2O .

Graf, *J. prakt. Chem.*, 1932, 133, 35.

Aso, *Chem. Abstracts*, 1940, 34, 3273.

6-Hydroxy- α -picoline (6-Hydroxy-2-methylpyridine).

Cryst. from C_6H_6 , m.p. 157° : needles + 4 – $5\text{H}_2\text{O}$ from H_2O .

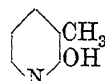
B, HCl: cryst. M.p. anhyd. above 150° .

Picrate: m.p. 149 – 5 – 50° .

Errera, *Ber.*, 1900, 33, 2971.

Ochiai, Ito, *Ber.*, 1941, 74, 1111.

2-Hydroxy- β -picoline (2-Hydroxy-3-methylpyridine)

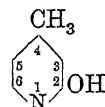


$\text{C}_8\text{H}_7\text{ON}$ MW, 109

Needles from CHCl_3 –ligroin. M.p. 140° . B.p. 288 – $90^\circ/752$ mm. Sol. H_2O , EtOH , hot C_6H_6 , CHCl_3 . Spar. sol. ligroin. $\text{FeCl}_3 \rightarrow$ reddish-brown col.

Seide, *Ber.*, 1924, 57, 1805.

2-Hydroxy- γ -picoline (2-Hydroxy-4-methylpyridine)



$\text{C}_8\text{H}_7\text{ON}$ MW, 109

Cryst. from C_6H_6 . M.p. 130° . B.p. 307 – 9° . Sol. H_2O , EtOH , hot C_6H_6 , CHCl_3 . Mod. sol. Et_2O . Spar. sol. ligroin. $\text{FeCl}_3 \rightarrow$ reddish-brown col.

Seide, *Ber.*, 1924, 57, 793.

3-Hydroxy- γ -picoline (3-Hydroxy-4-methylpyridine).

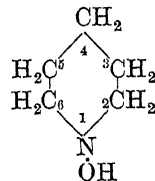
Cryst. M.p. 118 – 20° . B.p. 285 – 90° .

I.G., D.R.P., 563,373, (*Chem. Abstracts*, 1933, 27, 1002); F.P., 685,583, (*Chem. Abstracts*, 1930, 24, 5766).

ω -Hydroxypicoline.

See Pyridylcarbinol.

N-Hydroxypiperidine (1-Piperidinol, 1-hydroxypiperidine)



$\text{C}_5\text{H}_{11}\text{ON}$ MW, 101

Benzoyl: cryst. from pet. ether. M.p. 62° . Sol. most solvents. Reduces Fehling's.

Gambarajan, *Ber.*, 1925, 58, 1776.

2-Hydroxypiperidine (2-Piperidinol).

Needles from ligroin. M.p. 129° . $\text{FeCl}_3 \rightarrow$ violet col.

Wolffenstein, *Ber.*, 1892, 25, 2784.

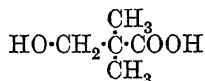
4-Hydroxypiperidine (4-Piperidinol).

N-Me: $C_6H_{13}ON$. MW, 115. Oil. F.p. 28°. B.p. 105°/18 mm. *B,HCl*: prisms from EtOH. M.p. 157–8°. Sol. H_2O , hot EtOH. *B,HBr*: needles from EtOH. M.p. 139–40°.

Mills, Parkin, Ward, *J. Chem. Soc.*, 1927, 2622.

Emmert, D.R.P., 292,846, (*Chem. Abstracts*, 1917, 11, 1884); D.R.P., 292,456, (*Chem. Abstracts*, 1917, 11, 1260).

Hydroxypivalic Acid (*Hydroxytrimethylacetic acid*, 1:1-dimethylhydracrylic acid, 2-hydroxy-1:1-dimethylpropionic acid)



$C_5H_{10}O_3$ MW, 118

Needles from Et_2O -pet. ether. M.p. 125° (124°). $k = 1.39 \times 10^{-5}$ at 25°. $KMnO_4 \rightarrow$ dimethylmalonic acid. $CrO_3 \rightarrow$ dimethylmalonic acid + isobutyraldehyde.

K salt: cryst. M.p. 234°.

Me ester: $C_6H_{12}O_4$. MW, 132. B.p. 177–8°/740 mm. D_4^{20} 1.0365.

Et ester: $C_7H_{14}O_4$. MW, 146. B.p. 188°/750 mm., 84–6°/16 mm. D_4^{20} 0.9985.

Et ether: $C_7H_{14}O_3$. MW, 146. B.p. 123°/22 mm. Insol. H_2O . *K salt*: cryst. from $MeOH-Me_2CO$. M.p. 255°. *Et ester*: $C_9H_{18}O_4$. MW, 174. B.p. 75°/22 mm.

Acetyl: cryst. from pet. ether. M.p. 56°.

Ca salt: cryst. M.p. 260° decomp. *Me ester*: b.p. 191–2°/737 mm. D_4^{20} 1.0338. *Et ester*: b.p. 94°/16 mm. D_4^{20} 1.0100. *Chloride*: b.p. 84°/12 mm. *Nitrile*: b.p. 91–5°/11 mm.

Nitrile: C_5H_9ON . MW, 99. Oil. B.p. 97°/11 mm.

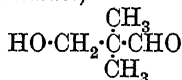
Wessely, *Monatsh.*, 1900, 21, 222; 1901, 22, 66.

Böhm, *Monatsh.*, 1906, 27, 949.

Blaise, *Compt. rend.*, 1902, 134, 552.

Marcilly, *Bull. soc. chim.*, 1904, 31, 122.

Hydroxypivalic Aldehyde (*Hydroxytrimethylacetaldehyde*, 2-hydroxy-1:1-dimethylpropionaldehyde, pentaldol)



$C_5H_{10}O_2$ MW, 102

Needles from H_2O . M.p. 89–90°. B.p. 172–3°/747 mm. decomp., 67–9°/14 mm. Sol. H_2O , EtOH. Spar. sol. most other solvents.

Oxime: cryst. M.p. 29.5°. B.p. 129°/18 mm.

Azine: cryst. M.p. 151°. Very sol. EtOH, Et_2O , C_6H_6 . Sol. H_2O . Spar. sol. pet. ether.

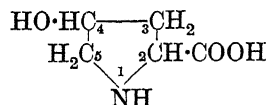
Wessely, *Monatsh.*, 1900, 21, 216.

König, *Monatsh.*, 1902, 23, 469.

21-Hydroxyprogesterone.

See Deoxycorticosterone.

4-Hydroxyproline (4-Hydroxypyrrolidine-2-carboxylic acid)



$C_5H_9O_3N$

MW, 131

Exists in two racemic forms. Isolated from hydrolysis of gelatin. Natural 4-hydroxyproline has $[\alpha]_D^{20} -81.04^\circ$ in H_2O . $HI + P \rightarrow$ proline. *Picrate*: m.p. 188°.

I.

d.

M.p. 274°. $[\alpha]_D^{21} +75.2^\circ$ in H_2O . Inispid taste. *Phenylisocyanate*: m.p. 175°.

l.

M.p. 274°. $[\alpha]_D^{26} -74.6^\circ$. Sweet taste.

dl.

M.p. 261°. Sol. H_2O . Spar. sol. EtOH. Sweet taste.

II.

d.

M.p. 237–41°. $[\alpha]_D^{18} +58.6^\circ$. Inispid taste.

l.

M.p. 238–41°. $[\alpha]_D^{18} -58.1^\circ$. Sweet taste.

dl.

M.p. 250°. Less sol. H_2O than *dl*-I. Inispid taste.

Fischer, *Ber.*, 1902, 35, 2660.

Klabunde, *J. Biol. Chem.*, 1931, 90, 293.

Traube, Johow, Tepohl, *Ber.*, 1923, 56, 1861.

Kapfhammer, Eck, *Z. physiol. Chem.*, 1927, 170, 294.

Leuchs, Bormann, *Ber.*, 1919, 52, 2086.

Leuchs, *Ber.*, 1905, 38, 1937.

5-Hydroxyproline (5-Hydroxypyrrolidine-2-carboxylic acid).

M.p. 204.5°.

Abderhalden, Schwab, *Z. physiol. Chem.*, 1926, 153, 88.

Hydroxypropane-tricarboxylic Acid.

See Citric Acid and Isocitric Acid.

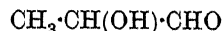
Hydroxypropenylacetylene.

See 2-Penten-4-yn-1-ol.

Hydroxypropenylfuran.

See 3- α -Furylallyl Alcohol.

1-Hydroxypropionaldehyde (*Lactic aldehyde*)



$C_3H_6O_2$

MW, 74

Needles from EtOH. M.p. 105° (sinters at 101°). Bimolecular. Dissociates into monomolecular form in aq. sol. Sol. AcOH. Mod.

sol. H_2O , EtOH , Me_2CO . Insol. Et_2O , CHCl_3 , C_6H_6 . Reduces cold Fehling's. Yellowish-brown col. on warming with alkali. $\text{C}_6\text{H}_5\text{NH}\cdot\text{NH}_2 \rightarrow$ lactic aldehyde phenylhydrazone + methylglyoxalosazone.

Acetyl deriv.: see 1-Acetoxypropionaldehyde.

Di-Et acetal: $\text{C}_7\text{H}_{16}\text{O}_3$. MW, 148. B.p. 169–70°/758 mm., 67°/12–13 mm.

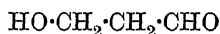
Phenylhydrazone: plates from C_6H_6 -pet. ether. M.p. 93°.

Phenylosazone: yellow needles from dil. EtOH . M.p. 154° (148°).

Wohl, *Ber.*, 1908, 41, 3602.

Wohl, Lange, *ibid.*, 3608.

2-Hydroxypropionaldehyde (*Hydracrylic aldehyde*)



$\text{C}_3\text{H}_6\text{O}_2$

MW, 74

B.p. 90°/18 mm., 75–8°/12 mm. Sol. EtOH , Et_2O , Me_2CO . Spar. sol. H_2O . Reduces NH_3 , AgNO_3 . Does not reduce Fehling's. $\text{KHSO}_4 \rightarrow$ acrolein. $\text{NO}_2 + \text{HCl} + \text{albumin} \rightarrow$ green col. in concentrations up to 1:1000, rose col. in more dil. sol.

Di-Et acetal: $\text{C}_7\text{H}_{16}\text{O}_3$. MW, 148. B.p. 98°/20 mm. $\text{KMnO}_4 \rightarrow$ 2:2-diethoxypropionic acid. $\text{O}_3 \rightarrow$ hydracrylic aldehyde + glyoxal.

Benzoyl: b.p. 139–45°/2 mm. 2:4-Dinitrophenylhydrazone: m.p. 150–1°.

Semicarbazone: cryst. from H_2O . M.p. 114°.

Wohl, *Ber.*, 1908, 41, 3603.

Nef, *Ann.*, 1904, 335, 219.

Harries, *Ann.*, 1910, 374, 320.

Pingert, *Organic Syntheses*, 1945, XXV, 1.

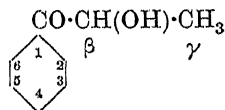
Hydroxy-propionaphthone.

See Ethyl hydroxynaphthyl Ketone.

Hydroxypropionic Acid.

See Lactic Acid and Hydracrylic Acid.

β -Hydroxypropiophenone (*1-Hydroxyethyl phenyl ketone*, methylbenzoylcarbinol, 1-benzoyl-ethyl alcohol)



$\text{C}_9\text{H}_{10}\text{O}_2$

MW, 150

Yellow oil. B.p. 250–2°, 125–6°/14 mm. D_4^{25} 1.1085. n_D^{25} 1.536.

Et ether: $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. *p*-Nitrophenylhydrazone: m.p. 40°. 2:4-Dinitrophenylhydrazone: orange. M.p. 158°.

Acetyl: yellow aromatic oil. B.p. 158–60°/20 mm. D_4^{20} 1.112. n_D^{20} 1.515. Sol. EtOH , Et_2O . Insol. H_2O .

Semicarbazone: needles from EtOH . M.p. 188–9° (194°).

Phenylhydrazone: yellow needles from MeOH . M.p. 179–80°.

Auwers, *Ber.*, 1917, 50, 1179.

Collet, *Compt. rend.*, 1897, 125, 354.

Zincke, *Zahn, Ber.*, 1910, 43, 855.

Kotchergine, *Bull. soc. chim.*, 1928, 43, 573.

γ -Hydroxypropiophenone (*2-Hydroxyethyl phenyl ketone*, 2-benzoyl-ethyl alcohol, phenacyl-carbinol).

Me ether: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. 125–6°/16 mm. D_4^{25} 1.020.

Et ether: m.p. 11–12°. B.p. 135°/18 mm.

Phenyl ether: m.p. 79–80°.

Acetyl: m.p. 53–4°.

Kohler, *Am. Chem. J.*, 1909, 42, 388.

Straus, Berkow, *Ann.*, 1913, 401, 144.

2-Hydroxypropiophenone (*Ethyl o-hydroxyphenyl ketone*, *o*-propionylphenol).

B.p. 150°/80 mm., 115°/15 mm. Sol. EtOH , Et_2O . Spar. sol. H_2O . Sol. alkalis. $\text{FeCl}_3 \rightarrow$ intense violet col. $\text{NaHg} \rightarrow$ ethyl-*o*-hydroxyphenylcarbinol.

Me ether: *o*-propionylanisole. $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. Pale yellow liq. B.p. 137°/16.5 mm. *Oxime*: m.p. 87°. *Semicarbazone*: m.p. 154°.

Benzoyl: b.p. 158°/1 mm. *Isonitroso deriv.*: m.p. 89°.

Oxime: m.p. 93–4°.

Semicarbazone: m.p. 213° (221°).

p-Thiocyanophenylhydrazone: m.p. 146–5–7.5°.

2:4-Dinitrophenylhydrazone: scarlet cryst. M.p. 189°.

Fischer, Slimmer, *Ber.*, 1903, 36, 2585.
Robertson, Sandroock, Hendry, *J. Chem. Soc.*, 1931, 2426.

Petschek, Simonis, *Ber.*, 1913, 46, 2017.
Böckmühl, Ehrhart, Stein, *D.R.P.*, 552,244, (*Chem. Abstracts*, 1932, 26, 4343).

4-Hydroxypropiophenone (*Ethyl p-hydroxyphenyl ketone*, *p*-propionylphenol).

Needles or prisms from H_2O . M.p. 148°. Sol. EtOH , Et_2O . Spar. sol. H_2O . Alk. $\text{H}_2\text{O}_2 \rightarrow$ hydroquinone. KOH fusion \rightarrow *p*-hydroxybenzoic acid + phenol.

Me ether: *p*-propionylanisole. Needles from Et_2O . M.p. 27–9°. B.p. 273–5°, 145–7°/14 mm. D_4^{20} 1.082. n_D^{25} 1.5477 (both these values are for supercooled state). *Oxime*: needles from EtOH . M.p. 67° (74°). *Hydrazone*: m.p. 74–6°. *Semicarbazone*: m.p. 172–3° (177°). *p*-Nitrophenylhydrazone: orange-red cryst. M.p. 149–50°.

Et ether: *p*-propionylphenetole. $\text{C}_{11}\text{H}_{14}\text{O}_2$. MW, 178. Prisms from Et_2O . M.p. 30°. B.p. 153–4°/14 mm. *Oxime*: needles from EtOH . Aq. M.p. 97°.

Isobutyl ether: $C_{13}H_{18}O_2$. MW, 206. Needles from EtOH. M.p. 52°. B.p. 172-4°/14 mm.
Oxime: cryst. from EtOH. M.p. 49°.

Phenyl ether: m.p. 38°.

Acetyl: cryst. from ligroin. M.p. 62°.

Benzoyl: m.p. 107-5°.

2:4-Dinitrophenylhydrazones: ruby-red cryst. M.p. 229°.

Wallach, Pond, *Ber.*, 1895, **28**, 2715.

Gattermann, Ehrhardt, Mais, *Ber.*, 1890, **23**, 1203.

Unger, *Ann.*, 1933, **504**, 280.

Klages, *Ber.*, 1902, **35**, 2262.

Goldzweig, Kaiser, *J. prakt. Chem.*, 1891, **43**, 86.

Auwers, *Ann.*, 1915, **408**, 248.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, **46**, 1892.

Crépieux, *Bull. soc. chim.*, 1891, **6**, 160.

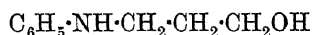
Hydroxypropylacetylene.

See Pentynol.

Hydroxypropylamine.

See Aminopropyl Alcohol and Aminoisopropyl Alcohol.

γ-Hydroxypropylaniline (N-Phenyl-γ-propanolamine, 3-anilino-n-propyl alcohol)



$C_9H_{13}ON$ MW, 151

B.p. 140°/0.4 mm.

Picrate: m.p. 113-14°.

Hromatka, *Ber.*, 1942, **75**, 379.

α-Hydroxypropylbenzene.

See Ethylphenylcarbinol.

β-Hydroxypropylbenzene.

See Methylbenzylcarbinol.

γ-Hydroxypropylbenzene.

See Hydrocinnamyl Alcohol.

2-Hydroxypropylene.

See Isopropenyl Alcohol.

3-Hydroxypropylene.

See Allyl Alcohol.

3-Hydroxypropylene oxide.

See Glycide.

4-Hydroxy-4-propylheptene-1.

See Dipropylallylcarbinol.

β-1-Hydroxypropylhydrocinnamic Acid.

See 3-Hydroxy-2-phenyl-n-caproic Acid.

β-2-Hydroxypropylhydrocinnamic Acid.

See 4-Hydroxy-2-phenyl-n-caproic Acid.

β-Hydroxy-β-propylhydrocinnamic Acid.

See 2-Hydroxy-2-phenyl-n-caproic Acid.

2-Hydroxypropylidene chloride.

See unsym.-Dichloroisopropyl Alcohol.

3-ω-Hydroxypropylindole.

See 3-[3-Indolyl]-propyl Alcohol.

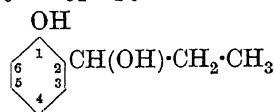
2-Hydroxypropyl isopropyl Ketone.

See 2-Methyl-5-hexanolone-3.

ω-Hydroxy-1-propylnaphthalene.

See 3-α-Naphthylpropyl Alcohol.

2-α-Hydroxypropylphenol (1-o-Hydroxyphenylpropyl alcohol, ethyl-o-hydroxyphenylcarbinol, α-2-dihydroxypropylbenzene)



$C_9H_{12}O_2$ MW, 152

Oil. B.p. 125-30°/0.25 mm. Spar. sol. H_2O . Reduces hot Fehling's.

1-Me ether: 2-α-hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. Oil. B.p. 251°/760 mm. 138°/22 mm. Phenylurethane: m.p. 102°.

2-Et ether: 2-α-hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 129-30°. D_4^{25} 1.0113. n_D 1.5232. Phenylurethane: needles. M.p. 95-6°.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.

Klages, *Ber.*, 1904, **37**, 3988.

Fischer, Stimmer, *Ber.*, 1903, **36**, 2586.

3-α-Hydroxypropylphenol (1-m-Hydroxyphenylpropyl alcohol, ethyl-m-hydroxyphenylcarbinol, α-3-dihydroxypropylbenzene).

Prisms from H_2O . Needles from C_6H_6 . M.p. 107°. B.p. 177°/13 mm. Sol. EtOH, Et_2O , H_2O . Spar. sol. C_6H_6 . $FeCl_3 \rightarrow$ bluish-violet col.

Auwers, *Ann.*, 1917, **413**, 306.

4-α-Hydroxypropylphenol (1-p-Hydroxyphenylpropyl alcohol, ethyl-p-hydroxyphenylcarbinol, α-4-dihydroxypropylbenzene).

Oil. B.p. 143°/20 mm., 141-2°/16 mm. Dil. $H_2SO_4 \rightarrow$ anethole.

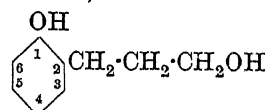
1-Me ether: 4-α-hydroxypropylanisole. $C_{10}H_{14}O_2$. MW, 166. B.p. 252-6°. Acetyl: b.p. 156°/20 mm. D^{16} 1.005. Phenylurethane: m.p. 74°.

1-Et ether: 4-α-hydroxypropylphenetole. $C_{11}H_{16}O_2$. MW, 180. Oil. B.p. 144.5-145.5°/10 mm. D_4^{20} 1.1022. Spar. sol. H_2O . Acetyl: b.p. 161°/17 mm.

Hell, Hofmann, *Ber.*, 1905, **38**, 1678.

Klages, *ibid.*, 2221.

2-γ-Hydroxypropylphenol (3-o-Hydroxyphenylpropyl alcohol)



$C_9H_{12}O_2$ MW, 152

Yellow oil. B.p. 177-9°/12 mm. D_4^{15} 1.1258. Spar. sol. H_2O . $FeCl_3 \rightarrow$ bluish-violet col.

Palmityl ester: m.p. 58-9°.

Stearyl ester: m.p. 64.5-5.5°.

Oleyl ester: 4'-iododiphenylurethane, m.p. 67-8°.

Auwers, *Ann.*, 1918, **415**, 152.

Lockett, Short, *J. Chem. Soc.*, 1939, 787.

4-γ-Hydroxypropylphenol (3-*p*-Hydroxyphenylpropyl alcohol).

Cryst. from Et₂O-pet. ether. M.p. 55°. Sol. H₂O. FeCl₃ → indigo blue col. Reduces NH₃. AgNO₃.

3 : 5-Dinitrobenzoyl ester : m.p. 149°.

1-Me ether : m.p. 25-6°. B.p. 149°/10 mm.

Dibenzoyl : m.p. 72°.

4'-Iododiphenylurethane : m.p. 178°.

v. Braun, Deutsch, Ber., 1912, 45, 2513.

Hydroxypropyl phenyl Ketone.

See β-Hydroxybutyrophenone and γ-Hydroxybutyrophenone.

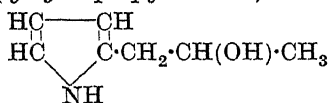
2-α-Hydroxypropylpiperidine.

See Conhydrine.

5-Hydroxy-2-propylpiperidine.

See ψ-Conhydrine.

2-β-Hydroxypropylpyrrole (Pyrryl-2-propanol, 1-pyrrylisopropyl alcohol)



C₇H₁₁ON MW, 125

Oil. B.p. 134-9°/14-15 mm. HI + AcOH → 2-propylpyrrole.

N-Me : C₈H₁₃ON. MW, 139. Oil. B.p. 116-17°/18 mm. Sol. H₂O and usual org. solvents.

Hess, Ber., 1913, 46, 3117.

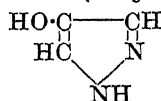
Hydroxypropyl-toluene.

See Ethyltolylcarbinol, Methylxylylcarbinol and Tolypropyl Alcohol.

6-Hydroxypurine.

See Hypoxanthine.

4-Hydroxypyrazole (4-Pyrazolol)



C₃H₄ON₂ MW, 84

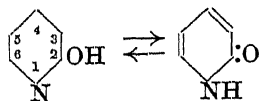
White plates from EtOH-CHCl₃. M.p. 118-18.5°. Very sol. H₂O, EtOH. Sol. Et₂O, hot AcOEt. Spar. sol. CHCl₃, C₆H₆. Reduces NH₃. AgNO₃. FeCl₃ → greenish-blue col.

Dibenzoyl : needles from EtOH. M.p. 109°. Very sol. CHCl₃, C₆H₆. Spar. sol. Et₂O, EtOH.

Picrate : yellow needles. M.p. 128-9°.

Wolff, Lüttringhaus, Ann., 1900, 313, 8.

2-Hydroxypyridine (α-Hydroxypyridine, α-pyridone)



C₅H₅ON MW, 95

Needles from C₆H₆. M.p. 106-7°. B.p. 280-1°. Sol. H₂O, EtOH, CHCl₃. Mod. sol.

Et₂O, C₆H₆. Spar. sol. ligroin. Aq. sol. reacts neutral. C₂H₅I + NaOH → *N*-ethyl-α-pyridone. Ag salt + C₂H₅I → 2-ethoxypyridine.

O-Benzyl : m.p. 42°. B.p. 183-6°/30 mm. Sol. most org. solvents.

Me ether : HgCl₂ comp., m.p. 199-200°.

Et ether : C₇H₉ON. MW, 123. B.p. 155-6°. HgCl₂ comp., m.p. 141-2°.

N-Me deriv. : C₆H₇ON. MW, 109. B.p. 250°. HgCl₂ comp., m.p. 127°. Misc. with H₂O.

N-Et deriv. : C₇H₉ON. MW, 123. B.p. 249-50°. HgCl₂ comp., m.p. 112-13°. Misc. with H₂O.

p-Toluenesulphonyl : m.p. 53°.

Königs, Feer, Ber., 1886, 19, 2433.

v. Pechmann, Baltzer, Ber., 1891, 24, 3145.

Weidel, Strache, Monatsch., 1886, 7, 297.

Räth A.-G., B.P. 288,628, (Chem. Abstracts, 1929, 23, 607).

3-Hydroxypyridine (β-Hydroxypyridine).

Needles. M.p. 129°. Sol. H₂O, EtOH. Red col. with FeCl₃. Zn → pyridine. Br water → dibromo-3-hydroxypyridine.

Et ether : B₂H₂PtCl₆, prisms. M.p. 192°.

Acetyl : b.p. 210°. Sol. H₂O.

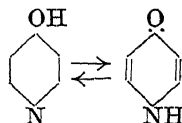
Oxalate : m.p. 177°.

Weidel, Murmann, Monatsch., 1895, 16, 753.

Fischer, Renouf, Ber., 1884, 17, 763.

Fischer, Yoshioka, Hartmann, Z. physiol. Chem., 1932, 212, 146.

4-Hydroxypyridine (γ-Hydroxypyridine, γ-pyridone)



C₅H₅ON MW, 95

Needles or prisms + H₂O from H₂O. M.p. anhyd. 148.5°. B.p. above 350°. Loses H₂O of cryst. over H₂SO₄ in vacuo. Sol. 1 part H₂O at 15°. Sol. EtOH. Prac. insol. Et₂O, C₆H₆. Zn → pyridine. PCl₃ → 4-chloropyridine.

Me ether : C₆H₇ON. MW, 109. B.p. 190-5-191°/738 mm. Misc. with H₂O. Gives alkaline reaction.

N-Me deriv. : deliquescent cryst. mass.

O-Acetyl : m.p. 140-50°.

O-Benzoyl : m.p. 81°.

Picrate : m.p. 240°.

Lerch, Monatsch., 1884, 5, 402.

Koenigs, Greiner, Ber., 1931, 64, 1055;

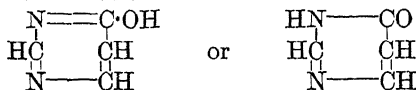
D.R.P., 554,702, (Chem. Abstracts,

1932, 26, 5966); (D.R.P., 566,693,

(Chem. Abstracts, 1933, 27, 2457).

4 - Hydroxypyridine - 2 : 6 - dicarboxylic Acid.

See Chelidamic Acid.

6-Hydroxypyrimidine

MW, 96

Needles from AcOEt or C_6H_6 . M.p. 164–5°. Very sol. H_2O , EtOH. Sol. AcOEt, C_6H_6 . Spar. sol. Et_2O . Insol. pet. ether.

$\text{B}, \text{HCl}, 1\text{H}_2\text{O}$: m.p. 100°, anhyd. 205–10°. Readily sol. H_2O .

$\text{B}_2, \text{H}_2\text{SO}_4$: m.p. 218° decomp. Readily sol. H_2O .

Acetyl deriv.: needles. M.p. 180° subsequently solidifying and remelting at 215–20° decomp.

Picrate: cryst. M.p. 190°.

Wheeler, *J. Biol. Chem.*, 1907, 3, 285.

Chervuliez, Stavritsch, *Helv. Chim. Acta*, 1922, 5, 281.

3-Hydroxy- γ -pyrone.

See Pyromeconic Acid.

6-Hydroxy- α -pyrone.

See under Glutaconic Acid.

5-Hydroxy- γ -pyrone-2-carboxylic Acid.

See Comenic Acid.

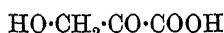
3-Hydroxy- γ -pyrone-2 : 6-dicarboxylic Acid.

See Meconic Acid.

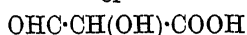
Hydroxypyrotartaric Acid.

See Itamalic Acid.

Hydroxypyruvic Acid (*Hydroxyaldehydeacetic acid, hydroxyformylacetic acid, formylglycollic acid*)



or



MW, 104

Cryst. from Et_2O -pet. ether. Hygroscopic. Reduces Fehling's and $\text{NH}_3\cdot\text{AgNO}_3$. Alk. sols. give violet col. with FeCl_3 .

Osazone: m.p. 213–15°.

p-Nitrophenylhydrazine: red cryst. M.p. 260°. Insol. most org. solvents.

2 : 4-Dinitrophenylhydrazine: m.p. 162°.

Semicarbazone-semicarbazide: cryst. from AcOH. M.p. 221°.

Berl, Smith, *Chem. Zentr.*, 1908, II, 686.

Berl, Fodor, *Chem. Zentr.*, 1910, II, 1039.

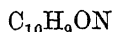
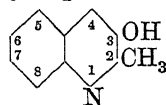
Fenton, Wilks, *J. Chem. Soc.*, 1912, 101, 1579.

Hydroxypyruvic Aldehyde.

See Glycerosone.

 α -Hydroxyquinaldine.

See 2-Hydroxymethylquinoline.

3-Hydroxyquinaldine (*3-Hydroxy-2-methylquinoline, 2-methyl-3-quinolol*)

MW, 159

Two compounds have been described.

(i) Needles from EtOH. M.p. 203–5°. Sol. EtOH, Et_2O , CHCl_3 . Spar. sol. H_2O . $\text{Zn} \rightarrow$ quinaldine.

$\text{B}_2, \text{H}_2\text{SO}_4, 2\text{H}_2\text{O}$: needles. M.p. 86–7°. Spar. sol. H_2O .

$\text{B}_2, \text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: orange-red needles from EtOH. M.p. anhyd. 225–8° decomp.

Picrate: needles from EtOH. M.p. 95–6°.

Kulisch, *Monatsh.*, 1895, 16, 355.

(ii) Turns yellow at 240°, sinters at 250°, m.p. 260°. Sol. EtOH, Me_2CO , AcOEt. Spar. sol. hot H_2O , Et_2O , C_6H_6 . Non-volatile in steam. Red col. with FeCl_3 in dil. EtOH.

B, HCl : needles from dil. HCl. M.p. 265°.

$\text{B}_2, \text{H}_2\text{SO}_4, 2\text{H}_2\text{O}$: loses H_2O at 140°. M.p. 192–3°.

$\text{B}_2, \text{H}_2\text{PtCl}_6, 2\text{H}_2\text{O}$: m.p. 210° decomp.

Picrate: needles from EtOH. M.p. 245–6° decomp.

Et ether: $\text{C}_{12}\text{H}_{13}\text{ON}$. MW, 187. Needles from dil. EtOH. M.p. anhyd. 69–70°. Blue fluor. in alkaline sol. Methiodide, $1\frac{1}{2}\text{H}_2\text{O}$: m.p. 207°.

Methiodide: m.p. 235–40°.

Königs, Stockhausen, *Ber.*, 1902, 35, 2556.

4-Hydroxyquinaldine (*2-Methyl-4-quinolol*).

Prisms from H_2O . Loses H_2O at 110°, m.p. anhyd. 232°. Sol. EtOH. 1 part sol. in 100 parts cold and 10 parts boiling H_2O . Prac. insol. Et_2O , C_6H_6 , ligroin. Non-volatile in steam. Bluish-red col. with FeCl_3 in H_2O . $\text{Zn} \rightarrow$ quinaldine. $\text{PCl}_3 \rightarrow$ 4-chloroquinaldine. $\text{P}_2\text{S}_5 \rightarrow$ 4-mercaptoquinaldine.

Me ether: $\text{C}_{11}\text{H}_{11}\text{ON}$. MW, 173. Needles from H_2O . M.p. 82°. B.p. 294–8°.

$\text{B}_2, \text{H}_2\text{PtCl}_6$: yellow needles. M.p. 215° decomp. Spar. sol. cold H_2O .

Picrate: yellow needles from H_2O . M.p. 200°.

Methiodide, $1\text{H}_2\text{O}$: loses H_2O at 100°. M.p. anhyd. 201°.

Limpach, *Ber.*, 1931, 64, 969.

Conrad, Limpach, *Ber.*, 1887, 20, 948; D.R.P., 42,276.

Knorr, *Ber.*, 1887, 20, 1398.

Backeberg, *J. Chem. Soc.*, 1931, 2816.

5-Hydroxyquinaldine (*2-Methyl-5-quinolol*).

Plates from EtOH. M.p. 246–7° (232–4°). Sol. Et_2O . Spar. sol. EtOH. Prac. insol. H_2O .

$\text{B}, \text{HCl}, 2\text{H}_2\text{O}$: yellow needles. Spar. sol. cold H_2O .

Me ether: picrate, m.p. 217° decomp.

Et ether: b.p. 307–8°/770 mm., 290–2°/760 mm., 174–5°/11 mm. *Ethiodide*: yellow prisms. M.p. 216–18° (166°). *Picrate*: yellow needles. M.p. 213° (206–7°).

Decker, Remfry, *Ber.*, 1905, 38, 2775.

Döbner, Miller, *Ber.*, 1884, 17, 1709.

Chemische Fabrik auf Actien, D.R.P., 29,819.

6-Hydroxyquinaldine (2-Methyl-6-quinolol).

M.p. 213°. Sol. EtOH, Et₂O. Spar. sol. H₂O. Non-volatile in steam.

Me ether: cryst. from pet. ether. M.p. 67–8.5°. B.p. 138–9°/5 mm. *Methiodide*: pale yellow. M.p. 238° decomp.

Et ether: plates. M.p. 71°. *Ethiodide*: yellow needles. M.p. 182°. *Picrate*: yellow needles. M.p. 192°.

Döbner, Miller, *Ber.*, 1884, 17, 1708.

Chemische Fabrik auf Actien, D.R.P.s 24,317, 29,819.

8-Hydroxyquinaldine (2-Methyl-8-quinolol).

Prisms from dil. EtOH. M.p. 74°. B.p. 266–7°. Sol. hot EtOH, Et₂O, C₆H₆. Spar. sol. H₂O. Sublimes at 100°. Volatile in steam.

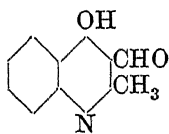
Me ether: cryst. from C₆H₆. M.p. 125°. B.p. 282°. Sol. EtOH, Et₂O, hot C₆H₆. Spar. sol. H₂O.

Döbner, Miller, *Ber.*, 1884, 17, 1706.

Wallach, Wüsten, *Ber.*, 1883, 16, 2010.

Chemische Fabrik auf Actien, D.R.P.s 24,317, 29,819.

4-Hydroxyquinaldine-3-aldehyde (4-Hydroxy-3-aldehydoquinaldine)



C₁₁H₉O₂N

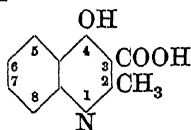
MW, 187

Yellow plates from MeOH. M.p. 273° decomp. Spar. sol. H₂O, Et₂O, C₆H₆. Sol. dil. alkalis and conc. acids.

B₂H₂PtCl₆: orange cryst. M.p. 215–20° decomp.

Conrad, Limpach, *Ber.*, 1888, 21, 1972.

4-Hydroxyquinaldine-3-carboxylic Acid



C₁₁H₉O₃N

MW, 203

Cryst. from EtOH. M.p. 247–8°. Prac. insol. H₂O, Et₂O, C₆H₆. Heat → 4-hydroxyquinaldine.

Et ester: m.p. 104–7°.

Conrad, Limpach, *Ber.*, 1888, 21, 1975.

Niementowski, *Ber.*, 1894, 27, 1400.

Camps, *Ber.*, 1901, 34, 2717.

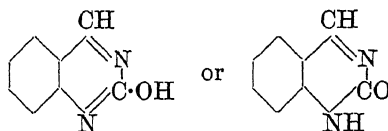
3-Hydroxyquinaldine-4-carboxylic Acid.

M.p. 242–4° decomp. Heated with conc. HCl → 3-hydroxyquinaldine.

Et ether: m.p. 243° decomp.

Cross, Henze, *J. Am. Chem. Soc.*, 1939, 61, 2730.

2-Hydroxyquinazoline (α-Hydroxyquinazoline, α-quinazolone)



C₈H₆ON₂

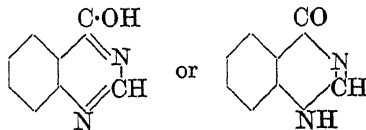
MW, 146

White micro-cryst. powder. Insol. H₂O, EtOH.

B, HCl: yellow prisms. M.p. above 300°.

Gabriel, Stelzer, *Ber.*, 1896, 29, 1313.

4-Hydroxyquinazoline (γ-Hydroxyquinazoline, γ-quinazolone)



C₈H₆ON₂

MW, 146

Needles from H₂O. M.p. 211–12°. Very sol. H₂O, EtOH. Spar. sol. Et₂O. Insol. ligroin.

B, HCl: m.p. 212–15°.

Me ether: hydrochloride, m.p. 129°.

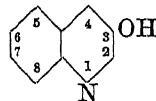
Niementowski, *J. prakt. Chem.*, 1895, 51, 565.

Knape, *J. prakt. Chem.*, 1891, 43, 214.

2-Hydroxyquinoline.

See Carbostyryl.

3-Hydroxyquinoline (β-Hydroxyquinoline)



C₉H₇ON

MW, 145

Cryst. from C₆H₆. M.p. 198°. Mod. sol. hot H₂O, EtOH. Spar. sol. Et₂O, CHCl₃. Prac. insol. cold H₂O. Sol. acids and alkalis. Faint fluor. in acid sol. Brownish-red col. with FeCl₃.

B₂H₂SO₄.2H₂O: m.p. 190–2° decomp. Spar. sol. H₂O.

Dodecyl ether: needles from EtOH. M.p. 42°. *Methosulphate*: flakes from AcOEt. M.p. 115–16°.

p-Toluenesulphonyl: m.p. 90°.

Picrate: m.p. 240–5°.

Bargellini, Settimi, *Gazz. chim. ital.*, 1923, **53**, 601.

Mills, Watson, *J. Chem. Soc.*, 1910, **97**, 743.

4-Hydroxyquinoline (γ -Hydroxyquinoline, *kynurine*. Keto form, *see* γ -Quinolone).

Needles + 3H₂O. Loses H₂O at 110°. M.p. anhyd. 201°. Sublimes with difficulty. Sol. EtOH. Spar. sol. Et₂O, C₆H₆, ligroin. 100 parts H₂O dissolve 0.477 parts at 15°. Shows alkaline reaction. Red col. with FeCl₃. Zn \rightarrow quinoline. KMnO₄ \rightarrow kynuric acid. PCl₅ \rightarrow 4-chloroquinoline. C₂H₅I + KOH \rightarrow two Et ethers, b.p. 295–300° and b.p. above 360°.

B₂HCl₂H₂O: loses H₂O at 110°. M.p. anhyd. 187°.

Skraup, *Monatsh.*, 1888, **9**, 821; 1889, **10**, 726.

Wenzel, *Monatsh.*, 1894, **15**, 465.

Camps, *Ber.*, 1901, **34**, 2709.

Bobrański, *Ber.*, 1936, **69**, 1113.

Price, Roberts, *J. Am. Chem. Soc.*, 1946, **68**, 1204.

5-Hydroxyquinoline.

Plates. M.p. 224°. Spar. sol. EtOH. Prac. insol. ligroin. Non-volatile in steam. Brownish-red col. with FeCl₃ in dil. EtOH. Br \rightarrow 6 : 8-dibromo deriv.

B₂HCl: m.p. 240°.

B₂H₂PtCl₆·4H₂O: m.p. 230° decomp.

Oxalate: buff col. M.p. 193°.

Picrate: m.p. 187°.

Methiodide: m.p. 224°.

p-Toluenesulphonyl: m.p. 85°.

Riemerschmied, *Ber.*, 1883, **16**, 721.

Tellmann, *Ber.*, 1887, **20**, 2174.

Claus, Howitz, *J. prakt. Chem.*, 1893, **47**, 432.

6-Hydroxyquinoline.

Prisms from EtOH or Et₂O. M.p. 193°. B.p. above 360°. Spar. sol. EtOH. Prac. insol. cold H₂O, CHCl₃, C₆H₆. Sol. acids and alkalis. Yellow col. with FeCl₃ in dil. EtOH. Br \rightarrow 5-bromo deriv.

B₂HCl₂H₂O: sol. H₂O. Spar. sol. hot EtOH.

Me ether: *p*-quinanisole. C₁₀H₉ON. MW, 159. M.p. 26.5°. B.p. 284°, 153°/12 mm. D₄²⁰ 1.665, D₄²⁰ 1.1542. Blue fluor. in acid sol. No col. with FeCl₃ in acid sol. Methiodide: m.p. 236° decomp.

Et ether: C₁₁H₁₁ON. MW, 173. B.p. 290–2°.

Dodecyl ether: red oil. B.p. 235°/2 mm. \rightarrow cryst. m.p. 45°. Green fluor. Hydrochloride: needles from AcOEt–EtOH. M.p. 150–1°.

Methosulphate: needles from AcOEt–Et₂O or H₂O. M.p. 70° decomp.

O-Acetyl: m.p. 36–8°. B.p. 298°. Sol. hot H₂O, EtOH, Et₂O.

O-Benzoyl: needles from AcOH. M.p. 230–1°. Prac. insol. H₂O, EtOH, Et₂O.

p-Toluenesulphonyl: m.p. 98°.

C₉H₇ON, C₆H₃(NO₂)₃·1 : 3 : 5: m.p. 193–5°.

Picrate: golden needles. M.p. 235–6°.

Skraup, *Monatsh.*, 1882, **3**, 545; 1883, **4**, 696; 1885, **6**, 762; D.R.P., 14,976.

Iwamiya, *J. Pharm. Soc. Japan*, 1929, **49**, 792.

Hargreaves, *J. Am. Pharm. Assocn.*, 1936, **25**, 975.

7-Hydroxyquinoline.

Prisms from EtOH. Turns brown at 200°. M.p. 235° decomp. (238–40°). Sol. EtOH. Spar. sol. H₂O. More sol. CHCl₃ than the 6-isomer. Sol. alkalis with green fluor. Sublimes on rapid heating. Brownish-red col. with FeCl₃ in dil. EtOH.

B₂HCl₂H₂O: prisms. Sol. H₂O.

B₂HNO₃: brown col. M.p. 151° decomp.

Oxalate: buff col. M.p. 164°.

Me ether: b.p. 275°/720 mm. part. decomp. Volatile in steam.

Methiodide: needles from dil. EtOH. M.p. 251° decomp.

O-Benzoyl: prisms. M.p. 88–9°. Sol. EtOH.

p-Toluenesulphonyl: m.p. 116°.

C₉H₇ON, C₆H₃(NO₂)₃·1 : 3 : 5: m.p. 199–200° decomp.

Picrate: prisms from EtOH. M.p. 244–5° decomp. Spar. sol. cold EtOH.

Fischer, *Ber.*, 1882, **15**, 1979.

Skraup, *Monatsh.*, 1882, **3**, 559.

Claus, Massau, *J. prakt. Chem.*, 1893, **48**, 176.

I.G., F.P., 727,528, (*Chem. Abstracts*, 1932, **26**, 5104).

8-Hydroxyquinoline (Quinophenol, oxine).

Needles from dil. EtOH. M.p. 75–6°. B.p. 266.6°/752 mm. Sol. EtOH, Me₂CO, CHCl₃, C₆H₆. Prac. insol. cold H₂O, Et₂O. Sol. acids and alkalis. Green col. with FeCl₃ in aq. sol. Sublimes. Mod. volatile in steam. KMnO₄ \rightarrow quinolinic acid. KOH fusion \rightarrow 2 : 8-dihydroxyquinoline. Reduces warm NH₃·AgNO₃. Br \rightarrow 5-bromo and 5 : 7-dibromo derivs. Used for estimation of Mg, Zn, Al, Cu, Cd, Bi, Fe, Mn, Ni, Co, Ti, and V, and for separation of Be from Al.

B₂HCl₂H₂O: yellow needles. Sol. H₂O, EtOH.

B₂H₂SO₄: quinosol, chinosol. Yellow cryst. Sol. H₂O. Antiseptic and disinfectant.

Sulphanilyl ester: cryst. from EtOH. M.p. 207–7.5°.

Me ether: *o*-quinanisole. M.p. 49–50° (46.5°). B.p. 282°/742 mm., 164°/14 mm. Spar. volatile in steam. *Picrate*: m.p. 143° decomp. *Methiodide*: m.p. 160° decomp.

Et ether: $C_{11}H_{11}ON$. MW, 173. Needles. B.p. 285–7°/713 mm. Spar. volatile in steam. *Methiodide*: yellow prisms from H_2O . M.p. 200°.

Dodecyl ether: m.p. 25°. B.p. 225°/3 mm. *Hydrochloride*: cryst. from dioxan– Et_2O . M.p. 73–80°. *Methosulphate*: plates from $AcOEt$ –pet. ether. M.p. 23°.

O-Acetyl: b.p. 280°. Sol. dil. HCl . Spar. sol. $AcOH$. Readily hyd. on standing.

O-Benzoyl: cryst. from $EtOH$. M.p. 118–20°. Sol. $EtOH$, Et_2O . Insol. H_2O .

O-p-Nitrobenzoyl: m.p. 174–5°.

p-Toluenesulphonyl: m.p. 115°.

$C_9H_7ON, C_6H_5(NO_2)_3 \cdot 1 : 3 : 5$: m.p. 123–5–124°.

Picrate: yellow prisms. M.p. 203–4°. Prac. insol. cold $EtOH$, C_6H_6 .

Methiodide, H_2O : yellow needles. M.p. 143° decomp. Spar. sol. $EtOH$. Insol. Et_2O .

Skraup, *Monatsh.*, 1882, 3, 536; D.R.P., 14,976.

Weidel, Cobenzl, *Monatsh.*, 1880, 1, 862.

Bedall, Fischer, *Ber.*, 1881, 14, 1366.

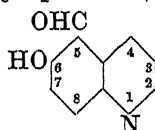
Isiwaru, *Jap. P.*, 94,165, (*Chem. Abstracts*, 1933, 27, 2697).

Winthrop, U.S.P., 1,903,470, (*ibid.*, 3223).

Riedel-E de Haën, B.P. 383,920, (*ibid.*, 4246).

I.G., B.P. 301,545, (*Chem. Abstracts*, 1929, 23, 3931).

6-Hydroxyquinoline-5-aldehyde (6-Hydroxy-5-aldehydoquinoline)



$C_{10}H_7O_2N$ MW, 173

Cryst. from $MeOH$. M.p. 138.5°. Sol. $EtOH$, Et_2O , $CHCl_3$, Me_2CO , C_6H_6 . Mod. sol. $MeOH$. Spar. sol. H_2O . Sublimes.

Oxime: m.p. 235°.

Phenylhydrazone: yellow needles. M.p. 232–4° decomp.

Bobrański, *J. prakt. Chem.*, 1932, 134, 146.

8-Hydroxyquinoline-5-aldehyde (8-Hydroxy-5-aldehydoquinoline).

Brown cryst. powder from quinoline. M.p. above 250°. Sol. $AcOH$. Insol. H_2O , $EtOH$, Et_2O , $CHCl_3$, CCl_4 , Me_2CO , C_6H_6 . No col. with $FeCl_3$.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, 9, 179.

8-Hydroxyquinoline-7-aldehyde (8-Hydroxy-7-aldehydoquinoline).

Red cryst. powder from $EtOH-CHCl_3$. M.p. above 250°. Sol. $CHCl_3$, $AcOH$. Insol. H_2O , $EtOH$, Me_2CO , CCl_4 , C_6H_6 . Greenish-yellow col. with $FeCl_3$.

Sen, Ray, *J. Indian Chem. Soc.*, 1932, 9, 178.

7-Hydroxyquinoline-8-aldehyde (7-Hydroxy-8-aldehydoquinoline).

Yellow needles + $3H_2O$. Becomes anhydrous and colourless on standing. M.p. 135–5.5°. Very sol. H_2O , $CHCl_3$, $EtOH$, Me_2CO , C_6H_6 . Spar. sol. $MeOH$. $Et_2O \rightarrow$ yellow sols. $NH_3 \cdot AgNO_3 \rightarrow$ brown on prolonged boiling.

Oxime: yellow. M.p. 201° decomp.

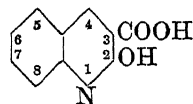
Phenylhydrazone: yellow. M.p. 181–5°.

Kochańska, Bobrański, *Ber.*, 1936, 69, 1807.

4-Hydroxyquinoline-2-carboxylic Acid.

See Kynurenic Acid. Keto form: see γ -Quinolone-2-carboxylic Acid.

2-Hydroxyquinoline-3-carboxylic Acid (Carbostyryl-3-carboxylic acid)



$C_{10}H_7O_3N$ MW, 189

Needles from $EtOH$ or $AcOH$. M.p. above 320°. Mod. sol. hot $EtOH$, hot $AcOH$. Spar. sol. hot H_2O , Et_2O . Brownish-red col. with $FeCl_3$ in H_2O . $PCl_5 \rightarrow$ 2-chloroquinoline-3-carboxylic acid.

Me ester: $C_{11}H_9O_3N$. MW, 203. M.p. 186°.

Me ether: $C_{11}H_9O_3N$. MW, 203. M.p. 182°. *Amide*: m.p. 172°. *Nitrile*: m.p. 74°, b.p. 228°/37 mm.

Et ether: $C_{12}H_{11}O_3N$. MW, 217. Needles. M.p. 133°. *Amide*: m.p. 157.5°. *Nitrile*: m.p. 74°, b.p. 178°/12 mm.

Propyl ether: nitrile, m.p. 58°, b.p. 178°/13 mm.

Isopropyl ether: nitrile, m.p. 57°, b.p. 178°/14 mm.

n-Butyl ether: m.p. 81.5°. *Amide*: m.p. 137°.

Amide: $C_{10}H_8O_3N_2$. MW, 188. Needles from hot H_2O . M.p. 290–1°.

Nitrile: $C_{10}H_8ON_2$. MW, 170. Needles from $EtOH$. M.p. 329–31° decomp. Sol. hot alkalis. Spar. sol. H_2O , $CHCl_3$. Insol. Et_2O .

Friedländer, Göhring, *Ber.*, 1884, 17, 459.

Stuart, *J. Chem. Soc.*, 1888, 53, 144.

Conrad, Reinbach, *Ber.*, 1901, 34, 1342.

Heller, Wunderlich, *Ber.*, 1914, 47, 1627, 2891.

Meyer, *Monatsh.*, 1907, 28, 53.

4-Hydroxyquinoline-3-carboxylic Acid.

M.p. 269–70° (267–8°) decomp.

Et ester: m.p. 275–6°.Gould, Jacobs, *J. Am. Chem. Soc.*, 1939, 61, 2890.**Hydroxyquinoline-4-carboxylic Acid.***See* Hydroxyinchoninic Acid.**6-Hydroxyquinoline-5-carboxylic Acid.**Decomp. above 170° without melting (m.p. 203–4°). Prac. insol. H₂O and org. solvents. Sol. conc. acids. Heat → 6-hydroxyquinoline.*Amide*: C₁₀H₈O₂N₂. MW, 188. M.p. 227–5°.*Nitrile*: C₁₀H₆ON₂. MW, 170. M.p. 293°.Bobrański, *J. prakt. Chem.*, 1932, 134, 141.Schmitt, Altschul, *Ber.*, 1887, 20, 2695.**8-Hydroxyquinoline-5-carboxylic Acid.**Yellow powder. M.p. 301° decomp. (273°, 280°). Spar. sol. hot H₂O, EtOH. Prac. insol. cold H₂O, Et₂O, AcOH. Insol. Me₂CO, C₆H₆, ligroin. Green col. with FeCl₃. Heat → 8-hydroxyquinoline. KMnO₄ → quinolinic acid.*B, HCl, H₂O*: m.p. 260° decomp. (239°).*B₂, H₂SO₄, 2H₂O*: m.p. 240°.*Et ester*: C₁₂H₁₁O₃N. MW, 217. Needles from C₆H₆. M.p. 125°.*Anilide*: m.p. 211–12°.*Me ether*: C₁₁H₉O₃N. MW, 203. M.p. 225–6° decomp.*O-Acetyl*: yellow prisms from AcOEt. M.p. 312° decomp.Niementowski, Sucharda, *Ber.*, 1916, 49, 14.Lippmann, Fleissner, *Ber.*, 1886, 19, 2467; *Monatsh.*, 1887, 8, 311.Matsumura, Sone, *J. Am. Chem. Soc.*, 1931, 53, 1494.**5-Hydroxyquinoline-6-carboxylic Acid.**M.p. 211–7°. Sol. AcOH. Mod. sol. MeOH, EtOH, CS₂, C₆H₆. Insol. Et₂O, CHCl₃, CCl₄, Me₂CO. Sol. acids and alkalis.Bogert, Fisher, *J. Am. Chem. Soc.*, 1912, 34, 1575.**8-Hydroxyquinoline-6-carboxylic Acid.**Granular powder. M.p. 284°. Spar. sol. EtOH, AcOH. Prac. insol. H₂O, Et₂O. Insol. Me₂CO, C₆H₆. Sol. alkalis and acids. Green col. with FeCl₃.*B, HCl*: bronze-yellow powder. M.p. 312°.*B₂, H₂SO₄, H₂O*: m.p. 307°.*Et ester*: C₁₂H₁₁O₃N. MW, 217. Needles. M.p. 147°.Niementowski, Sucharda, *Ber.*, 1916, 49, 20.**1 - [4 - Hydroxy - 2 - quinolyl] - 2 - [3 : 4 - dimethoxyphenyl] - ethane.***See* Galipoline.**ω-Hydroxyresacetophenone.***See* Fisetol.**Hydroxyretene.***See* Retenol.**Hydroxyruban.***See* Rubanol.**5-Hydroxysalicylic Acid.***See* Gentisic Acid.**α-Hydroxysantonin**C₁₅H₁₈O₄

MW, 262

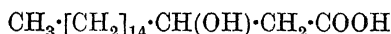
Occurs in urine. Plates from EtOH. M.p. 286° decomp. Sol. hot EtOH. Spar. sol. H₂O, Et₂O, cold AcOEt. [α]_D – 115° approx. in EtOH. Dil. HNO₃ → oxalic acid + HCN.*Acetyl*: plates. M.p. 164–5° (173°).*Phenylhydrazine*: plates. M.p. 264–5°.Lo Monaco, *Gazz. chim. ital.*, 1897, 27, ii, 87.Jaffé, *Z. physiol. Chem.*, 1897, 22, 539.Hecht, *ibid.*, 542.Asahina, Momose, *Ber.*, 1937, 70, 812.**β-Hydroxysantonin**C₁₅H₁₈O₄

MW, 262

Found in the urine of rabbits. Plates from H₂O. Cryst. from CHCl₃–pet. ether. M.p. 128–31°. Sol. EtOH, Et₂O, CHCl₃. Spar. sol. cold H₂O. Insol. pet. ether. Lævorotatory. Orange-red sols. in alc. alkalis.Jaffé, *Z. physiol. Chem.*, 1897, 22, 553.**γ-Hydroxysantonin.***See* Artemisin.**1-Hydroxystearic Acid**CH₃·[CH₂]₁₅·CH(OH)·COOHC₁₈H₃₆O₃

MW, 300

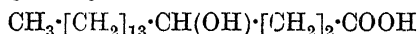
Needles from AcOEt or CHCl₃. M.p. 93°. Sol. EtOH, Et₂O, hot C₆H₆.*Et ester*: C₂₀H₄₀O₃. MW, 328. Needles from dil. EtOH. M.p. 62–3°. Sol. Et₂O, hot EtOH. Insol. H₂O.*Phenacyl ester*: m.p. 76·4–6·8°.*p-Bromophenacyl ester*: m.p. 98–8·5°.*p-Nitrobenzyl ester*: m.p. 76·5°.*Amide*: C₁₈H₃₇O₂N. MW, 299. Plates from EtOH. M.p. 148–9°. Spar. sol. hot EtOH. Insol. Et₂O, H₂O.*Nitrile*: C₁₈H₃₅ON. MW, 281. Plates from pet. ether. M.p. 61·5–62·5°. Sol. EtOH, Et₂O.*Acetyl*: m.p. 70–70·5°.*Me ether*: C₁₉H₃₈O₃. MW, 314. M.p. 62·5°. B.p. 190°/5 mm.Le Suer, *J. Chem. Soc.*, 1904, 85, 831.Darzens, *Compt. rend.*, 1933, 196, 348.

2-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

Plates from CHCl_3 . M.p. 89° . Sol. Et_2O . Spar. sol. hot EtOH , CHCl_3 .

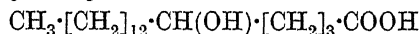
Ponzio, *Gazz. chim. ital.*, 1905, 35, II, 570.

3-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

Lactone: $\text{C}_{18}\text{H}_{34}\text{O}_2$. MW, 282. Plates from EtOH . M.p. $47-8^\circ$. Sol. EtOH , Et_2O .

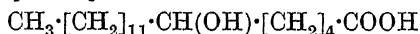
Shukow, Schestakow, *Chem. Zentr.*, 1903, I, 825.

4-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

Cryst. from EtOH . M.p. $54-5^\circ$.

Jegorow, *Chem. Zentr.*, 1915, I, 934.

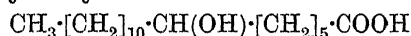
5-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

Cryst. M.p. 83° . Sol. Et_2O , CHCl_3 , C_6H_6 . Insol. pet. ether.

Acetyl: m.p. $52-3^\circ$.

Bougault, Charaux, *Compt. rend.*, 1911, 153, 573.

6-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

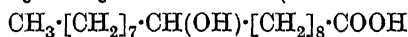
M.p. 82° .

Ca salt: m.p. 131° .

Ba salt: m.p. 155° .

Et ester: m.p. $37-5^\circ$.

Pigulevskii, Simonova, *J. Gen. Chem. U.S.S.R.*, 1939, 9, 1928, (*Chem. Abstracts*, 1940, 34, 378).

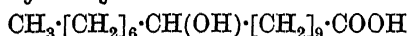
9-Hydroxystearic Acid (Rosilic acid)

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

M.p. $74-5^\circ$ ($83-4^\circ$).

Me ester: $\text{C}_{19}\text{H}_{38}\text{O}_3$. MW, 314. M.p. $45-6^\circ$. B.p. $212-16^\circ/4$ mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 524.

10-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

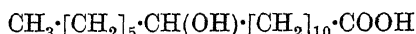
Plates from EtOH . M.p. $81-2^\circ$.

Me ester: $\text{C}_{19}\text{H}_{38}\text{O}_3$. MW, 314. M.p. $53-4^\circ$. B.p. $213-17^\circ/4$ mm.

Et ester: $\text{C}_{20}\text{H}_{40}\text{O}_3$. MW, 328. M.p. 44° . Sol. EtOH , Et_2O .

Phenylhydrazide: m.p. $106-7^\circ$.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 525.

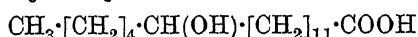
11-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

M.p. $76-7^\circ$.

Me ester: $\text{C}_{19}\text{H}_{38}\text{O}_3$. MW, 314. M.p. $49-50^\circ$. B.p. $204-6^\circ/4$ mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 526.

12-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

M.p. $78-9^\circ$ ($80.5-81^\circ$). $[\alpha]_D^{18} - 0.41^\circ$ in Py.

Me ester: $\text{C}_{19}\text{H}_{38}\text{O}_3$. MW, 314. M.p. $56.6-57.0^\circ$ ($50-1^\circ$). B.p. $202-4^\circ/4$ mm. $[\alpha]_D^{30} - 0.32^\circ$ in Py.

Et ester: m.p. $50.3-51.6^\circ$. Sol. EtOH , Me_2CO .

Propyl ester: m.p. $48.3-49.5^\circ$. Sol. EtOH , Me_2CO .

n-Butyl ester: m.p. $43.7-44.9^\circ$.

Straus, Heinze, Salzmann, *Ber.*, 1933, 66, 632.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 527.

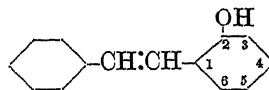
13-Hydroxystearic Acid

$\text{C}_{18}\text{H}_{36}\text{O}_3$ MW, 300

M.p. $77-77.5^\circ$.

Me ester: $\text{C}_{19}\text{H}_{38}\text{O}_3$. MW, 314. M.p. $52-52.5^\circ$. B.p. $185-9^\circ/2$ mm.

Tomecko, Adams, *J. Am. Chem. Soc.*, 1927, 49, 527.

2-Hydroxystilbene (o-Styrylphenol, 1-phenyl-2-o-hydroxyphenylethylene)

$\text{C}_{14}\text{H}_{12}\text{O}$ MW, 196

Cryst. from EtOH.Aq . M.p. 147° . Sol. H_2O and alkalis with green fluor.

Acetyl: needles from EtOH.Aq . M.p. $55-6^\circ$.

Me ether: $\text{C}_{15}\text{H}_{14}\text{O}$. MW, 210. Plates from EtOH.Aq . M.p. 70° .

Funk, v. Kostanecki, *Ber.*, 1905, 38, 940.

v. Kostanecki, Tambor, *Ber.*, 1909, 42, 826.

3-Hydroxystilbene (*m*-Styrylphenol, 1-phenyl-2-*m*-hydroxyphenylethylene).

Needles from H_2O . Very sol. H_2O , EtOH, Et_2O . $\text{FeCl}_3 \rightarrow$ dark red col.

Werner, *Ber.*, 1895, 28, 1999.

4-Hydroxystilbene (*p*-Styrylphenol, 1-phenyl-2-*p*-hydroxyphenylethylene).

Plates from C_6H_6 or AcOH. M.p. 189° (184.5°). Very sol. EtOH. Sol. Et_2O , AcOH, C_6H_6 . Spar. sol. ligroin. Red sol. in H_2SO_4 .

Acetyl: needles from EtOH. M.p. 152° . Sol. EtOH, AcOH.

Me ether: exists in two forms. (i) *Solid, stable form*: white plates from EtOH. M.p. $135-6^\circ$ very sol. Et_2O , warm EtOH, Me_2CO , C_6H_6 , AcOH. Passes readily into the liquid form on ultraviolet irradiation. (ii) *Liquid, labile form*: b.p. $143-5^\circ/1.5$ mm. Dist. at 15 mm. \rightarrow solid form.

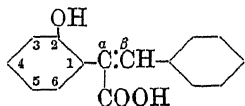
Stoermer, Prigge, *Ann.*, 1915, 409, 33.

Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, 101, 606.

α -Hydroxystilbene.

See α -Stilbenol.

2-Hydroxystilbene- α -carboxylic Acid (2-Phenyl-1-*o*-hydroxyphenylacrylic acid, α -*o*-hydroxyphenylcinnamic acid)



$\text{C}_{15}\text{H}_{12}\text{O}_3$ MW, 240

Plates from EtOH.Aq. M.p. 155° .

Me ether: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. Needles from EtOH.Aq. M.p. $145-6^\circ$.

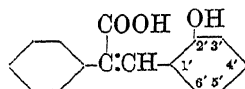
Czaplicki, v. Kostanecki, Lampe, *Ber.*, 1909, 42, 834.

4-Hydroxystilbene- α -carboxylic Acid (2-Phenyl-1-*p*-hydroxyphenylacrylic acid, α -*p*-hydroxyphenylcinnamic acid).

Me ether: needles from C_6H_6 -ligroin. M.p. $132-3^\circ$. Sol. org. solvents. Red sol. in conc. H_2SO_4 . $\text{KMnO}_4 \rightarrow$ benzaldehyde.

Jörlander, *Ber.*, 1917, 50, 413.

2'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-*o*-hydroxyphenylacrylic acid, 2-*hydroxy- α -phenylcinnamic acid*)



$\text{C}_{15}\text{H}_{12}\text{O}_3$ MW, 240

Me ether: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. Needles from EtOH. M.p. $186-7^\circ$. Dist. \rightarrow 3-phenylcoumarin.

Acetyl: needles from H_2O . Decomp. at $170-80^\circ$. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Nitrile: $\text{C}_{15}\text{H}_{11}\text{ON}$. MW, 221. Yellow needles from MeOH.Aq. M.p. 104° . Acids,

alkalis, or hot $\text{H}_2\text{O} \rightarrow$ 3-phenylcoumarin. *Et ether*: $\text{C}_{17}\text{H}_{15}\text{ON}$. MW, 249. Needles from EtOH.Aq. M.p. 82° . Sol. org. solvents. Insol. H_2O , ligroin.

Ogliastro, *Gazz. chim. ital.*, 1879, 9, 428.

Funk, v. Kostanecki, *Ber.*, 1905, 38, 940.

Borsche, Streitberger, *Ber.*, 1904, 37, 3165.

Bistrzycki, Stelling, *Ber.*, 1901, 34, 3087.

3'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-*m*-hydroxyphenylacrylic acid, 3-*hydroxy- α -phenylcinnamic acid*).

Needles from H_2O . M.p. $172-3^\circ$. Sol. EtOH, Et_2O , AcOH. Spar. sol. H_2O . At $240^\circ \rightarrow$ 3-hydroxystilbene.

Et ester: $\text{C}_{17}\text{H}_{16}\text{O}_3$. MW, 268. Cryst. from EtOH.Aq. M.p. 183° .

Me ether: needles from EtOH. M.p. 189° .

Nitrile: leaflets from AcOH.Aq. M.p. $106-7^\circ$. Sol. EtOH, hot C_6H_6 , AcOH. Spar. sol. CS_2 . *Et ether*: leaflets from EtOH. M.p. 72° . Sol. EtOH, C_6H_6 , CS_2 . Acetyl: needles from EtOH. M.p. $75-6^\circ$.

Werner, *Ber.*, 1895, 28, 1998.

Bistrzycki, Stelling, *Ber.*, 1901, 34, 3085.

Funk, v. Kostanecki, *Ber.*, 1905, 38, 940 (Note).

Mayer, Balle, *Ann.*, 1914, 403, 203.

4'-Hydroxystilbene- α -carboxylic Acid (1-Phenyl-2-*p*-hydroxyphenylacrylic acid, 4-*hydroxy- α -phenylcinnamic acid*).

Needles from EtOH. M.p. 223° decomp. Sol. EtOH, Et_2O , Me_2CO , AcOH. Spar. sol. C_6H_6 , pet. ether.

Me ester: $\text{C}_{16}\text{H}_{14}\text{O}_3$. MW, 254. Plates from EtOH. M.p. $168-9^\circ$. Sol. EtOH, Et_2O , AcOH. Acetyl: needles. M.p. 108° . Sol. EtOH, Et_2O , AcOH.

Me ether: exists in two forms. (i) Cryst. from C_6H_6 . M.p. 189° . Dist. \rightarrow 4-methoxystilbene. *Amide*: $\text{C}_{16}\text{H}_{15}\text{O}_2\text{N}$. MW, 253. Plates from C_6H_6 -pet. ether. M.p. $131.5-132.5^\circ$. *Nitrile*: $\text{C}_{16}\text{H}_{13}\text{ON}$. MW, 235. Needles from EtOH. M.p. 93° . (ii) Cryst. from C_6H_6 . M.p. 123° . *Amide*: needles from CHCl_3 -pet. ether. M.p. $168-9^\circ$.

Acetyl: needles from C_6H_6 . M.p. 174° . Sol. EtOH, Et_2O , AcOH.

Nitrile: exists in two forms. (i) Cryst. from EtOH.Aq. M.p. $190-1^\circ$. Spar. sol. cold AcOH. Insol. C_6H_6 , CHCl_3 , CS_2 . Acetyl: plates from EtOH. M.p. $121-2^\circ$. (ii) Needles from EtOH.Aq. M.p. 192° . Sol. usual org. solvents.

Zincke, Geibel, *Ann.*, 1906, 349, 110.

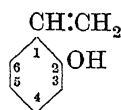
Bistrzycki, Stelling, *Ber.*, 1901, 34, 3084.

Hewitt, Lewcock, Pope, *J. Chem. Soc.*, 1912, 101, 606.

Stoermer, Prigge, *Ann.*, 1915, 409, 30.

Bodroux, *Compt. rend.*, 1911, 153, 350.

o-Hydroxystyrene (o-Vinylphenol, o-hydroxyphenylethylene)



C_8H_8O

MW, 120

Needles. M.p. 29–29.5°. B.p. 77°/15 mm., 56°/4 mm. Very sol. most org. solvents. Readily polymerises on standing in air. $D_4^{18.2}$ 1.0609 (supercooled), $D_4^{35.5}$ 1.0468. $n_D^{25.7}$ 1.577.

Me ether: o-methoxystyrene, o-vinylanisole. $C_9H_{10}O$. MW, 134. B.p. 83–4°/12 mm. $D_4^{17.2}$ 1.0049. $n_D^{17.4}$ 1.557, n_D^{20} 1.5388.

Auwers, *Ann.*, 1917, 413, 296.

Smith, Niederl, *J. Am. Chem. Soc.*, 1931, 53, 807.

Quelet, Golse, *Compt. rend.*, 1946, 223, 159.

m-Hydroxystyrene (m-Vinylphenol, m-hydroxyphenylethylene).

Oil. B.p. 114–16°/16–17 mm.

Me ether: m-methoxystyrene, m-vinylanisole. B.p. 90–93°/15 mm. (89–90°/14 mm). D_4^{16} 0.999. n_D^{16} 1.555.

Komppa, *Ber.*, 1893, 26, (Ref.), 677.

Klages, Eppelsheim, *Ber.*, 1903, 36, 3592.

Sulzbacher, *J. appl. Chem.*, 1951, 1, 95.

p-Hydroxystyrene (p-Vinylphenol, p-hydroxyphenylethylene).

Occurs in *Papaver somniferum*, Linn. M.p. 73–5°. Heat above m.p. → polymers. Fe salts → bluish-green col. H_2SO_4 or H_3PO_4 → deep red col. HCl → blue col.

Me ether: p-methoxystyrene, p-vinylanisole. B.p. 204–5°/756 mm., 95–6°/16 mm., 90–1°/13 mm. D_4^{13} 1.0001. n_D^{13} 1.5642. Polymerises readily.

Et ether: p-ethoxystyrene, p-vinylphenetole. $C_{10}H_{12}O$. MW, 148. Cryst. B.p. 108–10°/12 mm. D_4^{18} 0.9764.

Klages, Eppelsheim, *Ber.*, 1903, 36, 3594.

Tiffeneau, *Ann. chim.*, 1907, 10, 349.

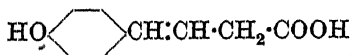
Mannich, Jacobsohn, *Ber.*, 1910, 43, 195.

Quelet, *Compt. rend.*, 1936, 202, 956.

Schmid, Karrer, *Helv. Chim. Acta*, 1945, 28, 722.

Sulzbacher, *J. appl. Chem.*, 1951, 1, 95.

p-Hydroxystyrylacetic Acid (3-p-Hydroxyphenylvinylacetic acid, 2-p-hydroxybenzylidene-propionic acid)



$C_{10}H_{10}O_3$

MW, 178

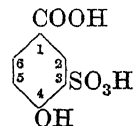
Me ether: 2-anisylidenepropionic acid, 2-p-methoxybenzylidenepropionic acid. Plates from H_2O . M.p. 106–5°. Very sol. EtOH, Et_2O , $CHCl_3$. Sol. CS_2 .

Fittig, Politis, *Ann.*, 1889, 255, 293.

Hydroxysuccinic Acid.

See Malic Acid.

4-Hydroxy-2-sulphobenzoic Acid (p-Hydroxybenzoic acid o-sulphonic acid)



$C_7H_6O_6S$

MW, 218

Me ether: 4-methoxy-2-sulphobenzoic acid, anisic acid o-sulphonic acid, 2-sulphoanisic acid. $C_8H_8O_6S$. MW, 232. Cryst. + $\frac{1}{2}H_2O$. M.p. anhyd. 104°.

Hedrick, *Am. Chem. J.*, 1887, 9, 415.

Moale, *Am. Chem. J.*, 1898, 20, 291.

4-Hydroxy-3-sulphobenzoic Acid (p-Hydroxybenzoic acid m-sulphonic acid).

Needles or plates. Sol. H_2O , EtOH. Insol. Et_2O . $FeCl_3$ → bluish-red col. KOH fusion → protocatechuic acid.

Me ether: 4-methoxy-3-sulphobenzoic acid, anisic acid m-sulphonic acid, 3-sulphoanisic acid. $C_8H_8O_6S$. MW, 232. Needles + $\frac{1}{2}H_2O$. M.p. 236° decomp. Sol. EtOH, H_2O . Insol. Et_2O . *Sulphonamide*: $C_8H_8O_5NS$. MW, 231. Needles or plates from EtOH. M.p. 276–7°. Spar. sol. H_2O .

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Prisms from EtOH. M.p. 258°. Sol. H_2O . *Et ether*: $C_9H_{11}O_5NS$. MW, 245. Needles from H_2O . M.p. 230–1° decomp.

Klepl, *J. prakt. Chem.*, 1883, 28, 196.

Metcalf, *Am. Chem. J.*, 1893, 15, 309.

Alleman, *Am. Chem. J.*, 1904, 31, 41.

Pfeiffer, Negreanu, *Ber.*, 1917, 50, 1472.

Medoks, Dobrovol'skaya, *J. Gen. Chem.*

U.S.S.R., 1940, 10, 705, (*Chem. Abstracts*, 1941, 35, 2486).

5-Hydroxy-3-sulphobenzoic Acid (m-Hydroxybenzoic acid 5-sulphonic acid).

Needles + $1H_2O$ from H_2O . Decomp. at 120°. Sol. EtOH, Et_2O . KOH fusion → 3:5-dihydroxybenzoic acid.

Hopfgartner, *Monatsh.*, 1873, 14, 694.

6-Hydroxy-3-sulphobenzoic Acid (o-Hydroxybenzoic acid 5-sulphonic acid, salicylic acid 5-sulphonic acid, 5-sulphosalicylic acid).

Needles + $2H_2O$ from H_2O . M.p. anhyd. 120°. Sol. H_2O , EtOH, Et_2O . Hygroscopic. Above m.p. → salicylic acid + phenol.

Di-Et ester: $C_{11}H_{14}O_6S$. MW, 274. Cryst. from EtOH. M.p. 56°. Insol. H_2O .

Di-phenyl ester: $C_{19}H_{14}O_6S$. MW, 370. Needles from EtOH. M.p. 172–3°. Insol. H_2O . $FeCl_3 \rightarrow$ brown col.

Sulphonchloride: $C_7H_5O_5ClS$. MW, 236.5. Needles from C_6H_6 . M.p. 171–2° decomp. Sol. Et_2O . Spar. sol. C_6H_6 . *Me ester*: $C_8H_7O_5ClS$. MW, 250.5. Cryst. from ligroin. M.p. 82–3°.

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Plates from EtOH. M.p. 253–5° decomp.

Cohn, *J. prakt. Chem.*, 1900, 61, 545.

Hirsch, *Ber.*, 1900, 33, 3238.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350); D.R.P., 276,331, (*Chem. Zentr.*, 1914, II, 280).

2-Hydroxy-4-sulphobenzoic Acid (*o-Hydroxybenzoic acid p-sulphonic acid, salicylic acid 4-sulphonic acid, 4-sulphosalicylic acid*).

Sulphonamide: $C_7H_7O_5NS$. MW, 217. Needles. M.p. 231° decomp. $FeCl_3 \rightarrow$ red col. *Me ether*: 2-methoxy-4-sulphobenzoic acid. $C_8H_9O_5NS$. MW, 231. Cryst. M.p. 211°.

Bromwell, *Am. Chem. J.*, 1897, 19, 574.

Walker, *ibid.*, 578.

3-Hydroxy-4-sulphobenzoic Acid (*m-Hydroxybenzoic acid p-sulphonic acid*).

Yellowish-green needles + $2\frac{1}{2}(1\frac{1}{2})H_2O$ from H_2O . M.p. 206° (212–14°). Sol. EtOH. Insol. Et_2O . $FeCl_3 \rightarrow$ wine-red col.

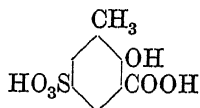
Me ether: 3-methoxy-4-sulphobenzoic acid. $C_8H_8O_6S$. MW, 232. Plates + $2H_2O$ from H_2O . M.p. 228°. *Sulphonchloride*: $C_8H_7O_5ClS$. MW, 250.5. Plates from toluene. M.p. 214°. Spar. sol. org. solvents. *Dichloride*: $C_8H_6O_4Cl_2S$. MW, 269. Plates from CCl_4 . M.p. 87°. Sol. C_6H_6 , toluene. *Sulphonamide*: $C_8H_9O_5NS$. MW, 231. Plates from EtOH.Aq. M.p. 290° decomp. Sol. EtOH, MeOH, Me_2CO . Mod. sol. hot H_2O . Spar. sol. C_6H_6 , toluene. *Diamide*: $C_8H_{10}O_4N_2S$. MW, 230. Needles or plates from H_2O . M.p. 255°.

Senhofer, *Ann.*, 1869, 152, 102.

Ishihara, *J. Pharm. Soc. Japan*, 1930, 50, 132.

Shah, *J. Chem. Soc.*, 1930, 1295.

2-Hydroxy-5-sulpho-m-toluic Acid (*5-Sulpho-o-cresotic acid, 5-sulpho-o-cresotinic acid*)

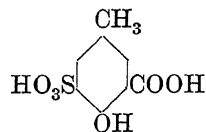


$C_8H_8O_6S$ MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Cryst. from toluene. M.p. 179–80°.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350).

4-Hydroxy-5-sulpho-m-toluic Acid (*5-Sulpho-p-cresotic acid, 5-sulpho-p-cresotinic acid*)

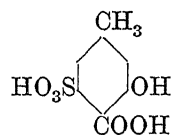


$C_8H_8O_6S$ MW, 232

Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Prisms from toluene. M.p. 189–90°.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350).

3-Hydroxy-5-sulpho-p-toluic Acid (*5-Sulpho-m-cresotic acid, 5-sulpho-m-cresotinic acid*)



$C_8H_8O_6S$ MW, 232

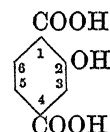
Sulphonchloride: $C_8H_7O_5ClS$. MW, 250.5. Prisms from toluene. M.p. 172–3°.

Bayer, D.R.P., 264,786, (*Chem. Zentr.*, 1913, II, 1350).

3-Hydroxyterephthalaldehydic Acid.

See 3-Hydroxy-4-aldehydobenzoic Acid.

Hydroxyterephthalic Acid



$C_8H_6O_5$ MW, 182

Cryst. powder from H_2O . M.p. above 300°. Very sol. MeOH, EtOH. Sol. Et_2O . Spar. sol. H_2O . Part. sublimes. k (first) = 2.5×10^{-3} ; (second) = 4.5×10^{-5} . $FeCl_3 \rightarrow$ violet-red col. Dist. \rightarrow phenol.

1-Me ester: $C_9H_8O_5$. MW, 196. Needles. M.p. 206–8°. Very sol. EtOH, Et_2O . Sol. hot C_6H_6 . Less sol. $CHCl_3$ than 4-Me ester. $k = 2.5 \times 10^{-4}$ at 25°.

4-Me ester: needles. M.p. 175–176.5°. Very sol. EtOH, Et_2O . Sol. hot C_6H_6 . $k = 2.7 \times 10^{-3}$ at 25°.

Di-Me ester: $C_{10}H_{10}O_5$. MW, 210. Needles from MeOH. M.p. 94°. Very sol. EtOH, Et_2O . Sol. hot H_2O . *Acetyl*: needles from EtOH. M.p. 76°.

Me ether: methoxyterephthalic acid. $C_9H_8O_5$. MW, 196. Prisms from H_2O . M.p. 274–5° (276–9°). Very sol. EtOH. Sol. Et_2O . Spar. sol. H_2O , $CHCl_3$, C_6H_6 . *Di-Me ester*: $C_{11}H_{12}O_5$. MW, 224. Needles from MeOH. M.p. 71.5°.

Et ether: ethoxyterephthalic acid. $C_{10}H_{10}O_5$. MW, 210. Cryst. M.p. 253–4°. Very sol. EtOH. Sol. Et_2O , C_6H_6 , hot H_2O . Insol. cold H_2O .

Benzyl ether: $C_{15}H_{12}O_5$. MW, 272. Needles from EtOH. M.p. 230–40°.

Hähle, *J. prakt. Chem.*, 1891, 44, 14.

Wegscheider, *Monatsh.*, 1902, 23, 333, 383.

Baeyer, Tutein, *Ber.*, 1889, 22, 2187.

Paternò, Canzoneri, *Gazz. chim. ital.*, 1879, 9, 460.

Burkhard, *Ber.*, 1877, 10, 147.

Schulz, *Chem. Abstracts*, 1942, 36, 7015.

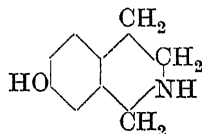
Hydroxytetracosane.

See Tetracosanol.

1-Hydroxytetracosanic Acid.

See Cerebronic Acid.

7-Hydroxy-1 : 2 : 3 : 4-tetrahydroisoquinoline



$C_9H_{11}ON$ MW, 149

B.p. 210–20°/18 mm. Sol. EtOH with violet fluor. Spar. sol. Et_2O . Zn dust dist. \rightarrow isoquinoline.

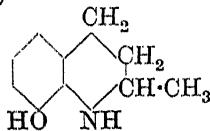
Picrate: m.p. 198–201°.

Pictet, Spengler, *Ber.*, 1911, 44, 2036.

Hydroxytetrahydronaphthalene.

See Tetrahydronaphthol.

8-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline (8-Hydroxy-2-methyl-1 : 2 : 3 : 4-tetrahydroquinoline)



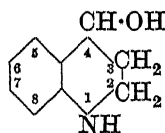
$C_{10}H_{13}ON$ MW, 163

B.p. 278–82°.

Me ether: $C_{11}H_{15}ON$. MW, 177. B.p. 270°. Sol. EtOH, Et_2O . Spar. sol. H_2O .

Döbner, Miller, *Ber.*, 1884, 17, 1706.

4-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline



$C_9H_{11}ON$ MW, 149

Prisms. M.p. 83–4°. Sol. warm H_2O and most org. solvents. Sol. cold conc. H_2SO_4 to pale red sol.

Diacetyl: prisms from ligroin. M.p. 95–6°.

Clemon, Perkin, *J. Chem. Soc.*, 1924, 125, 1620.

5-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

Needles from C_6H_6 . M.p. 116–17°. Sol. EtOH, Et_2O . Mod. sol. hot H_2O . Spar. sol. C_6H_6 . Prac. insol. ligroin. Sublimes. Gives dark red col. with $FeCl_3$. Aq. in aq. sol.

Et ether: $C_{11}H_{15}ON$. MW, 177. Cryst. from Et_2O . M.p. 73°. Sol. EtOH, C_6H_6 . Spar. sol. H_2O , ligroin.

Riemerschmied, *Ber.*, 1883, 16, 723.

6-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

M.p. 148°. Sol. acids and caustic alkalis.

Me ether: see Thalline.

Et ether: hydrochloride, m.p. 251°.

Acetyl: needles. M.p. 82°.

Badische, D.R.P., 42,871.

8-Hydroxy-1 : 2 : 3 : 4-tetrahydroquinoline.

Prisms from C_6H_6 . M.p. 122.5°. Sol. EtOH, C_6H_6 . Mod. sol. hot H_2O . Spar. sol. ligroin. Sublimes. Non-volatile in steam. Reddish-brown col. with $FeCl_3$. Aq. in aq. sol.

Et ether: b.p. 275–6°/716 mm.

N-Me: see Kairine.

N-Et: see Kairine A.

Bedall, Fischer, *Ber.*, 1881, 14, 1368.

Hydroxytetralin.

See Tetrahydronaphthol.

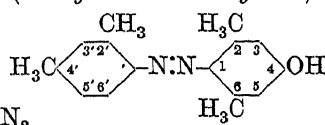
Hydroxytetramethylammonium hydroxide.

See Formocholine.

Hydroxytetramethylammonium iodide.

See under Formocholine.

4-Hydroxy-2 : 6 : 2' : 4'-tetramethylazobenzene (m-Xyleneazo-m-5-xyleneol)



$C_{16}H_{18}ON_2$ MW, 254

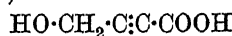
Orange-yellow cryst. from pet. ether. M.p. 124–5°. Sol. dil. alkalis.

Auwers, Michaelis, *Ber.*, 1914, 47, 1292.

Hydroxytetramethylbenzene.

See Durenol, Isodurenol and Prehnitenol.

3-Hydroxytetrolic Acid (Hydroxymethylpropionic acid)



$C_4H_4O_3$ MW, 100

Cryst. from C_6H_6 . M.p. 115–16°. Very sol. EtOH, H_2O , Me_2CO , AcOH. Sol. Et_2O . Spar. sol. $CHCl_3$, ligroin, C_6H_6 .

Et ester: $C_6H_8O_3$. MW, 128. B.p. 126–7°/14 mm.

Dibromide: m.p. 137–9°.

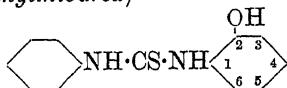
Lespieau, Viguier, *Compt. rend.*, 1908, 146, 295.

Lespieau, *Ann. chim.*, 1912, 27, 178.

Hydroxythioanisole.

See under Thiohydroquinone and Thioresorcinol.

***o*-Hydroxythiocarbanilide** (2-Hydroxy-sym.-diphenylthiourea)



$C_{13}H_{12}ON_2S$

MW, 244

Plates from 95% EtOH. M.p. 146°.

Me ether: $C_{14}H_{14}ON_2S$. MW, 258. M.p. 126°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Kalekhoff, *Ber.*, 1883, 16, 1829.

***m*-Hydroxythiocarbanilide** (3-Hydroxy-sym.-diphenylthiourea).

Plates from EtOH. M.p. 155-6°.

Meyer, Sundmacher, *Ber.*, 1899, 32, 2116.

***p*-Hydroxythiocarbanilide** (4-Hydroxy-sym.-diphenylthiourea).

Plates from Et₂O. M.p. 162°. Sol. EtOH, alkalis. Spar. sol. Et₂O, C₆H₆, H₂O, dil. acids.

Me ether: m.p. 138°.

Acetyl: m.p. 137°.

Otterbracher, Whitmore, *J. Am. Chem. Soc.*, 1929, 51, 1909.

Kalekhoff, *Ber.*, 1883, 16, 1831.

3-Hydroxythionaphthene.

See Thioindoxyl.

3-Hydroxythionaphthene-2-carboxylic Acid.

See Thioindoxyllic Acid.

Hydroxythionaphthol.

See Mercaptanaphthol.

Hydroxythiophene.

See Thienol.

Hydroxythiophenetole.

See under Thiohydroquinone and Thioresorcinol.

Hydroxythiophenol.

See Thiocatechol, Thiohydroquinone and Thioresorcinol.

ω -Hydroxytoluene.

See Benzyl Alcohol.

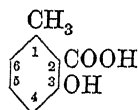
Hydroxytoluene.

See Cresol.

ω -Hydroxytoluic Acid.

See Hydroxymethyl-benzoic Acid.

3-Hydroxy-*o*-toluic Acid (6-Hydroxy-2-methylbenzoic acid, β -*m*-homosalicylic acid, *m*-cresol-2-carboxylic acid, 6-methylsalicylic acid)



$C_8H_8O_3$

MW, 152

Occurs in *Eriodictyon angustifolium*, Nuttley. Needles from CHCl₃. M.p. 170-1° (168°). Sol. hot H₂O, EtOH, Et₂O. Mod. sol. CHCl₃.

$k = 1.06 \times 10^{-3}$ at 25°. FeCl₃ \rightarrow violet col. Volatile in steam. Sublimes in high vacuum.

Me ether: $C_9H_{10}O_3$. MW, 166. Prisms or needles. M.p. 139°. No col. with FeCl₃.

Acetyl: prisms from C₆H₆. M.p. 131°. No col. with FeCl₃.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, 35, 139.

Simonis, *Ber.*, 1917, 50, 783.

Asahina, Furukawa, *J. Pharm. Soc. Japan*, 1917, 429, 967.

Asahina, Kondo, *J. Pharm. Soc. Japan*, 1922, 482, 264.

Anslow, Raistrick, *Biochem. J.*, 1931, 25, 39.

4-Hydroxy-*o*-toluic Acid (5-Hydroxy-2-methylbenzoic acid, *p*-cresol-2-carboxylic acid).

Needles or prisms from H₂O. M.p. 183-4° (179°). Sol. EtOH, Et₂O. Mod. sol. H₂O. Spar. sol. CHCl₃. FeCl₃ \rightarrow brown ppt. Volatile in steam. Sublimes.

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 74-5-75°.

Et ester: $C_{10}H_{12}O_3$. MW, 180. Cryst. M.p. 67°.

Me ether: needles from H₂O. M.p. 146°.

Chloride: b.p. 125-6°/10 mm.

Jacobsen, *Ber.*, 1884, 17, 163.

Einhorn, Pfyl, *Ann.*, 1900, 311, 57.

Auwers, *Z. physik. Chem.*, 1895, 18, 611.

Asahina, Furukawa, *J. Pharm. Soc. Japan*, 1917, 429, 967.

5-Hydroxy-*o*-toluic Acid (4-Hydroxy-2-methylbenzoic acid, *m*-cresol-6-carboxylic acid).

Needles + $\frac{1}{2}$ H₂O from H₂O. M.p. anhyd. 177-8°. Sol. hot H₂O, EtOH, Et₂O. Insol. CHCl₃. At 200° \rightarrow *m*-cresol + CO₂. No col. with FeCl₃.

Et ester: needles from ligroin. M.p. 98° (92°). B.p. 300°. No col. with FeCl₃.

Me ether: 2-methylanisic acid. Needles from H₂O. M.p. 176°. Me ester: $C_{10}H_{12}O_3$. MW, 180. Oil. Volatile in steam.

Et ether: $C_{10}H_{12}O_3$. MW, 180. Needles from H₂O. M.p. 146°.

Tiemann, Schotten, *Ber.*, 1878, II, 778.

Schall, *Ber.*, 1879, 12, 819.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Claisen, *Ann.*, 1897, 297, 46.

Gomberg, Johnson, *J. Am. Chem. Soc.*, 1917, 39, 1679.

6-Hydroxy-*o*-toluic Acid (3-Hydroxy-2-methylbenzoic acid, *o*-cresol-6-carboxylic acid).

Cryst. from H₂O. M.p. 145-6° (142°). KOH fusion \rightarrow *o*-cresol.

Me ester: cryst. M.p. 74-5-75-5°.

Et ester: prisms. M.p. 69°.

Nitrile: C_8H_7ON . MW, 133. Needles from H₂O. M.p. 195°.

Acetyl: needles. M.p. 144-5°.

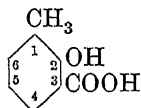
Baudisch, Perkin, *J. Chem. Soc.*, 1909, 95, 1885.

Einhorn, Pfyl, *Ann.*, 1900, 311, 52.

Auwers, *Z. physik. Chem.*, 1895, 18, 611 (Note).

Noelting, *Ber.*, 1904, 37, 1027.

2-Hydroxy-*m*-toluic Acid (*o*-Cresotic acid, *o*-cresotinic acid, *o*-homosalicylic acid, 2-hydroxy-3-methylbenzoic acid, *o*-cresol-3-carboxylic acid, 3-methylsalicylic acid)



$C_8H_8O_3$ MW, 152

Needles from H_2O or EtOH.Aq. M.p. 163-4°. Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. $k = 1.018 \times 10^{-3}$ at 25°. $FeCl_3 \rightarrow$ intense violet col. Conc. HCl at 210° \rightarrow *o*-cresol + CO_2 .

Me ester: $C_9H_{10}O_3$. MW, 166. Cryst. M.p. 28-30°. B.p. 235°, 111°/13 mm. D_0^{20} 1.1683, $D^{16.8}$ 1.529. $n_D^{16.8}$ 1.5354.

Et ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 242°.

Phenyl ester: $C_{14}H_{12}O_3$. MW, 228. Needles. M.p. 48°.

m-Nitrophenyl ester: m.p. 86-7°.

p-Nitrophenyl ester: m.p. 153°.

p-Nitrobenzyl ester: $C_{15}H_{13}O_5N$. MW, 287. Cryst. M.p. 98-5°.

Phenacyl ester: $C_{16}H_{14}O_4$. MW, 270. Cryst. from EtOH.Aq. M.p. 138-5°.

2-Naphthyl ester: m.p. 77-8°.

Acetyl: needles from C_6H_6 . M.p. 113°.

Chloride: $C_8H_7O_2Cl$. MW, 170.5. Cryst. M.p. 27-8°. B.p. 87-9°/16 mm. Easily decomp. Acetyl: cryst. M.p. 48-9°.

Amide: $C_8H_9O_2N$. MW, 151. Needles from EtOH.Aq. M.p. 112°. Oxime: plates from H_2O . M.p. 126-5°. Sol. hot H_2O , EtOH, C_6H_6 , $CHCl_3$. Insol. ligroin.

Nitrile: C_8H_7ON . MW, 133. Plates from EtOH. M.p. 88-5°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . Insol. ligroin.

Me ether: $C_9H_{10}O_3$. MW, 166. Needles from H_2O . M.p. 85°. *Me* ester: $C_{10}H_{12}O_3$. MW, 180. B.p. 249.5-250.5°/763 mm., 129-31°/14 mm. D_0^{20} 1.1258, $D^{17.4}$ 1.1102. $n_D^{17.4}$ 1.5166. Hydrazide: m.p. 79.5-80°. Benzene-sulphonyl deriv. of hydrazide: m.p. 149-50°. Anilide: m.p. 82.5-83°.

Paschen, *Ber.*, 1891, 24, 3669.

Anschutz, Schroeder, Weber, Anspach, *Ann.*, 1906, 346, 343.

Anschutz, Scholl, *Ann.*, 1911, 379, 340.

Lyons, Reid, *J. Am. Chem. Soc.*, 1917, 39, 1737.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, 41, 83.

Shigorin, Syrkin, *Chem. Abstracts*, 1946, 40, 1473.

4-Hydroxy-*m*-toluic Acid (*p*-Cresotic acid, *p*-cresotinic acid, *p*-homosalicylic acid, 6-hydroxy-3-methylbenzoic acid, *p*-cresol-3-carboxylic acid, 5-methylsalicylic acid).

Needles from H_2O or pet. ether. M.p. 153° (151°). Sol. hot H_2O , EtOH, Et_2O , $CHCl_3$. $k = 8.41 \times 10^{-5}$ at 25°. Volatile in steam. $FeCl_3 \rightarrow$ violet col.

Me ester: f.p. -1°. B.p. 242°, 122-4°/14 mm. D_0^{20} 1.1673, $D^{16.8}$ 1.1534. $n_D^{16.8}$ 1.5351. Insol. H_2O .

Et ester: b.p. 251°.

Phenyl ester: needles from EtOH. M.p. 92-3°.

m-Nitrophenyl ester: m.p. 110-11°.

p-Nitrophenyl ester: m.p. 136°.

p-Nitrobenzyl ester: cryst. from EtOH.Aq. M.p. 147°.

Phenacyl ester: cryst. from EtOH.Aq. M.p. 145-5°.

Acetyl: needles or prisms from C_6H_6 . M.p. 151-3°.

Propionyl: plates or needles from C_6H_6 . M.p. 136-40°.

Chloride: acetyl, cryst. from Et_2O . M.p. 47°. B.p. 148-50°/16 mm. decomp. Sol. C_6H_6 , $CHCl_3$.

Amide: needles from EtOH. M.p. 177-8°.

Et ether: $C_{10}H_{13}O_2N$. MW, 179. Needles from EtOH.Aq. M.p. 152°. Oxime: needles from H_2O , plates from C_6H_6 . M.p. 123-4°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. H_2O . Insol. ligroin.

Nitrile: cryst. M.p. 100-1°. Sol. EtOH, Et_2O , C_6H_6 , $CHCl_3$. Spar. sol. ligroin.

Acetyl: cryst. from Et_2O . M.p. 56-7°. Sol. EtOH, Et_2O , Me_2CO , C_6H_6 , $CHCl_3$, hot ligroin. Spar. sol. H_2O .

Me ether: needles from H_2O . M.p. 69°. *Me* ester: b.p. 263-5°, 143-6°/14 mm. D_0^{20} 1.1430, $D^{17.2}$ 1.1287. $n_D^{17.2}$ 1.5311. Amide: $C_9H_{11}O_2N$. MW, 165. Needles from EtOH.Aq. M.p. 163°. Nitrile: C_9H_9ON . MW, 147. Yellow oil. B.p. 270°.

Schering, D.R.P., 138,563, (*Chem. Zentr.*, 1903, I, 372).

Zeltner, Landau, D.R.P., 258,887, (*Chem. Zentr.*, 1913, I, 1641).

Guillaumin, *Bull. soc. chim.*, 1910, 7, 337.

Gattermann, *Ann.*, 1888, 244, 66.

Auwers, *Ber.*, 1916, 49, 821.

Lyons, Reid, *J. Am. Chem. Soc.*, 1917, 39, 1737.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, 41, 83.

5-Hydroxy-*m*-toluic Acid (5-Hydroxy-3-methylbenzoic acid, *m*-cresol-5-carboxylic acid).

Needles from H_2O . M.p. 210°. Non-volatile in steam. Sublimes. No col. with $FeCl_3$.

Me ester: plates from EtOH.Aq. M.p. 92-3°. Spar. volatile in steam.

Me ether: needles from AcOH. M.p. 134°.

Me ester: oil. B.p. 262-8°/752 mm.

Jacobsen, *Ber.*, 1881, 14, 2357.

Meldrum, *J. Chem. Soc.*, 1911, 99, 1716.

Liebermann, Voswinckel, *Ber.*, 1897, 30, 1742.

6-Hydroxy-*m*-toluic Acid (4-Hydroxy-3-methylbenzoic acid, *o*-cresol-5-carboxylic acid).

Needles + $\frac{1}{2}$ H₂O from H₂O. M.p. anhyd. 174-5°. Sol. hot H₂O, EtOH, Et₂O. Spar. sol. hot CHCl₃. No col. with FeCl₃.

Et ester: needles from C₆H₆-ligroin. M.p. 98-9°. Sol. org. solvents.

Nitrile: C₈H₇ON. MW, 133. Needles from H₂O. M.p. 93°. Sol. EtOH, C₆H₆, CHCl₃. Insol. ligroin.

Acetyl: plates from EtOH.Aq. M.p. 75-6°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Insol. H₂O, ligroin.

Me ether: 3-methylanisic acid. Needles from H₂O. M.p. 193°. *Me ester*: plates from EtOH.Aq. M.p. 67°. Sol. EtOH, Et₂O, C₆H₆, CHCl₃. Spar. sol. H₂O. *Amide*: C₉H₁₁O₂N. MW, 165. Cryst. from EtOH.Aq. M.p. 144°.

Et ether: C₁₀H₁₂O₃. MW, 180. Needles from EtOH. M.p. 200-1° (198°). Volatile in steam. *Et ester*: C₁₂H₁₆O₃. MW, 208. B.p. 274-5°. D_4^{20} 1.057. n_D^{25} 1.519. *Amide*: C₁₀H₁₃O₂N. MW, 179. Needles from EtOH.Aq. M.p. 167°.

Schall, *Ber.*, 1879, 12, 819.

Gattermann, Hess, *Ann.*, 1888, 244, 65.

Gattermann, *Ann.*, 1907, 357, 355.

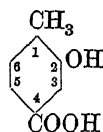
Meldrum, Perkin, *J. Chem. Soc.*, 1909, 95, 1894.

Auwers, *Ber.*, 1906, 39, 3174; *Ann.*, 1918, 415, 158.

Paschen, *Ber.*, 1891, 24, 3673.

Shigorin, Syrkin, *Chem. Abstracts*, 1946, 40, 1473.

2-Hydroxy-*p*-toluic Acid (3-Hydroxy-4-methylbenzoic acid, *o*-cresol-4-carboxylic acid)



C₈H₈O₃ MW, 152

Needles or prisms from H₂O. M.p. 206-7°. Sol. hot H₂O, EtOH, Et₂O. Spar. sol. C₆H₆, pet. ether. Sublimes. Spar. volatile in steam. No col. with FeCl₃.

Me ether: C₉H₁₀O₃. MW, 166. Needles. M.p. 156°. Sol. EtOH, Et₂O. Insol. H₂O.

Et ether: C₁₀H₁₂O₃. MW, 180. Cryst. M.p. 74-5°.

Acetyl: needles from C₆H₆. M.p. 162°.

Nitrile: C₈H₇ON. MW, 133. Needles from EtOH.Aq. M.p. 99-5°.

v. Gerichten, *Ber.*, 1878, 11, 368, 1589.

Perkin, *J. Chem. Soc.*, 1898, 73, 851.

Meldrum, Perkin, *J. Chem. Soc.*, 1908, 93, 1420.

Borsche, Böcker, *Ber.*, 1903, 36, 4359.

3-Hydroxy-*p*-toluic Acid (*m*-Cresotic acid, *m*-cresotinic acid, α -*m*-homosalicylic acid, 2-hydroxy-4-methylbenzoic acid, 4-methylsalicylic acid, *m*-cresol-4-carboxylic acid).

Needles from H₂O, plates from CHCl₃. M.p. 177° (173°). Sol. EtOH, CHCl₃. Mod. sol. H₂O. $k = 6.84 \times 10^{-4}$ at 25°. Sublimes. FeCl₃ \rightarrow violet col.

Me ester: C₉H₁₀O₃. MW, 166. Cryst. M.p. 27-8°. B.p. 236-7°, 242-4°/760 mm. D_4^{20} 1.1621, D_4^{25} 1.1483. $n_D^{15.2}$ 1.5378.

Et ester: C₁₀H₁₂O₃. MW, 180. B.p. 254°, 133°/11 mm. D_4^{23} 1.0950. Alc. FeCl₃ \rightarrow intense violet col.

Phenyl ester: C₁₄H₁₂O₃. MW, 228. Needles from EtOH. M.p. 49°.

m-Nitrophenyl ester: m.p. 114-15°.

p-Nitrophenyl ester: m.p. 127-8°.

p-Nitrobenzyl ester: C₁₅H₁₃O₅N. MW, 287. Cryst. from EtOH.Aq. M.p. 174-5-175°.

Phenacyl ester: C₁₆H₁₄O₄. MW, 270. Cryst. from EtOH.Aq. M.p. 116-5°.

2-Naphthyl ester: m.p. 119-20°.

Acetyl: needles from H₂O or C₆H₆. M.p. 139° (125-6°). Sol. EtOH, C₆H₆, AcOH. Spar. sol. cold H₂O.

Chloride: C₈H₇O₂Cl. MW, 170.5. *Acetyl*: cryst. M.p. 15°. B.p. 141°/10 mm.

Me ether: plates from H₂O. M.p. 74° (69°).

Me ester: C₁₀H₁₂O₃. MW, 180. Oil. B.p. 259-61°. D_4^{20} 1.1462.

Et ether: cryst. M.p. 78-5°.

Tiemann, Schotten, *Ber.*, 1878, 11, 777.

Eijkmann, *Chem. Zentr.*, 1904, I, 1597.

Anschütz, *Ann.*, 1909, 367, 219.

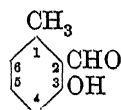
Béhal, Tiffeneau, *Bull. soc. chim.*, 1908, 3, 730.

Pinner, *Ber.*, 1890, 23, 2938.

Lyons, Reid, *J. Am. Chem. Soc.*, 1917, 39, 1737.

Rather, Reid, *J. Am. Chem. Soc.*, 1919, 41, 83.

3-Hydroxy-*o*-toluic Aldehyde (6-Hydroxy-2-methylbenzaldehyde, β -*m*-homosalicylaldehyde, *m*-cresol-2-aldehyde, 6-methylsalicylaldehyde)



C₈H₈O₂

MW, 136

Needles from H_2O . M.p. 31.4–31.9°. B.p. 228–9.3°/728 min. Sol. C_6H_6 . Spar. sol. pet. ether. Volatile in steam. $\text{FeCl}_3 \rightarrow$ violet col. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 118.5–119.5°. Sol. EtOH.

Semicarbazone: plates from EtOH. M.p. 212–14° decomp.

Phenylhydrazone: cryst. M.p. 172°.

Me ether: $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 150. Needles. M.p. 41.5–42°. Sol. hot pet. ether. Forms bisulphite comp.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, 35, 139.

Anselmino, *Ber.*, 1917, 50, 395.

5-Hydroxy-*o*-toluic Aldehyde (4-Hydroxy-2-methylbenzaldehyde, *m*-cresol-6-aldehyde).

Plates from H_2O . M.p. 110°. Sol. EtOH, Et_2O . Mod. sol. CHCl_3 . Sol. alkalis. $\text{FeCl}_3 \rightarrow$ yellowish-red col. Non-volatile in steam. Stable to most oxidising agents. KOH fusion \rightarrow 5-hydroxy-*o*-toluic acid.

Me ether: 2-methylanisaldehyde. Cryst. from MeOH. B.p. 257°. *Oxime*: needles from ligroin. M.p. 81°.

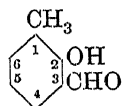
Et ether: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. B.p. 260–2°. *Oxime*: cryst. from CHCl_3 -ligroin. M.p. 84°.

Gattermann, Berchemann, *Ber.*, 1898, 31, 1767.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Gattermann, *Ann.*, 1907, 357, 358.

2-Hydroxy-*m*-toluic Aldehyde (2-Hydroxy-3-methylbenzaldehyde, *o*-homosalicylaldehyde, *o*-cresol-3-aldehyde, 3-methylsalicylaldehyde)



$\text{C}_8\text{H}_8\text{O}_2$

MW, 136

Cryst. M.p. 17°. B.p. 208–9°. Sol. EtOH, Et_2O , CHCl_3 . Spar. sol. H_2O . Volatile in steam. $\text{FeCl}_3 \rightarrow$ blue col.

Acetyl: b.p. 267°. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 99°. Sol. EtOH, Et_2O , C_6H_6 , CHCl_3 . Insol. cold H_2O , ligroin.

Phenylhydrazone: plates from ligroin. M.p. 97°.

p-Bromophenylhydrazone: plates from ligroin. M.p. 108°.

Semicarbazone: needles from AcOH. M.p. 248° (241°) decomp.

Azine: yellow needles from AcOH. M.p. 229°. Spar. sol. AcOH.

Me ether: $\text{C}_9\text{H}_{10}\text{O}_2$. MW, 150. Oil. B.p. about 120°/6 mm. Conc. $\text{H}_2\text{SO}_4 \rightarrow$ red col.

Dict. of Org. Comp.—II.

Oxime: needles from MeOH. M.p. 118°. *Semicarbazone*: needles from EtOH. M.p. 224°.

Tiemann, Schotten, *Ber.*, 1878, 11, 772.

Paschen, *Ber.*, 1891, 24, 3668.

Anselmino, *Ber.*, 1902, 35, 4104.

Simonsen, *J. Chem. Soc.*, 1918, 113, 777.

Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

Hill, Short, *J. Chem. Soc.*, 1937, 260.

4-Hydroxy-*m*-toluic Aldehyde (6-Hydroxy-3-methylbenzaldehyde, *p*-homosalicylaldehyde, *p*-cresol-3-aldehyde, 5-methylsalicylaldehyde).

Plates from EtOH.Aq. M.p. 56°. B.p. 217–18°. Sol. EtOH, Et_2O , CHCl_3 . Spar. sol. H_2O . D_4^{20} 1.0913. n_D^{20} 1.547. Volatile in steam. $\text{FeCl}_3 \rightarrow$ deep blue col.

Acetyl: needles from EtOH.Aq. M.p. 57°. Non-volatile in steam. Forms spar. sol. bisulphite comp. *Azine*: cryst. from EtOH. M.p. 163°.

Oxime: needles from H_2O . M.p. 105°.

Phenylhydrazone: yellow needles from EtOH. M.p. 149°. *Acetyl*: needles from ligroin. M.p. 126°. *Benzoyl*: yellow prisms from EtOH. M.p. 161°.

p-Bromophenylhydrazone: yellow plates from EtOH. Decomp. at 181°.

Semicarbazone: needles from AcOH. Decomp. at 238°.

Hydrazone: powder. M.p. 72–4°.

(CH_2NH_2)₂ deriv.: m.p. 164°.

Me ether: b.p. 250°, 130.2°/12 mm., 138–9°/19 mm. D_4^{20} 1.0988. n_D^{20} 1.554. *Oxime* needles from H_2O . M.p. 144–5°.

Et ether: $\text{C}_{10}\text{H}_{12}\text{O}_2$. MW, 164. Needles from ligroin. M.p. 32–3°. B.p. 257°. *Oxime*: needles from ligroin. M.p. 87°. *Azine*: yellow prisms from EtOH- CHCl_3 . M.p. 154–5°.

Benzyl ether: m.p. 58–9°. B.p. 150–5°/1 mm.

Tiemann, Schotten, *Ber.*, 1878, 11, 773.

Schotten, *ibid.*, 785.

Geigy, D.R.P., 105,798, (*Chem. Zentr.*, 1900, I, 523).

Goldbeck, *Ber.*, 1891, 24, 3658.

Auwers, *Ann.*, 1915, 408, 241.

Adams, *J. Am. Chem. Soc.*, 1919, 41, 268.

A.G.F.A., B.P. 145,581, (*Chem. Abstracts*, 1920, 14, 3427).

Simonsen, *J. Chem. Soc.*, 1928, 2222.

Liggett, Diehl, *Chem. Abstracts*, 1947, 41, 111.

6-Hydroxy-*m*-toluic Aldehyde (4-Hydroxy-3-methylbenzaldehyde, *o*-cresol-5-aldehyde).

Prisms from H_2O . M.p. 118° (115°). Sol. hot H_2O , EtOH, Et_2O . Mod. sol. CHCl_3 . Sol. alkalis. Non-volatile in steam. $\text{FeCl}_3 \rightarrow$ bluish-violet col.

Acetyl: needles from EtOH.Aq. M.p. 39–40°. B.p. about 275°. Forms bisulphite comp.

Oxime: needles from H_2O . M.p. 143.5°.

Semicarbazone: needles from AcOH. M.p. 216°.

Me ether: 3-methylanisaldehyde. Oil. B.p. 251°, 135°/13 mm. *Oxime*: cryst. from C₆H₆-ligroin. M.p. 68-70°.

Et ether: needles from ligroin. M.p. 33-4°. B.p. 258-60°. *Oxime*: needles from EtOH.Aq. M.p. 92-3°.

Paschen, *Ber.*, 1891, 24, 3672.

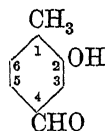
Gattermann, Berchemann, *Ber.*, 1898, 31, 1766.

Gattermann, Frenzel, *Ber.*, 1898, 31, 1150.

Gattermann, *Ann.*, 1907, 357, 355.

Bell, Henry, *J. Chem. Soc.*, 1928, 2222.

2-Hydroxy-*p*-toluic Aldehyde (3-Hydroxy-4-methylbenzaldehyde, *o*-cresol-4-aldehyde)



C₈H₈O₂ MW, 136

Yellow needles from H₂O. M.p. 73°.

Sidgwick, Allott, *J. Chem. Soc.*, 1923, 123, 2820.

3-Hydroxy-*p*-toluic Aldehyde (2-Hydroxy-4-methylbenzaldehyde, α -*m*-homosalicylaldehyde, *m*-cresol-4-aldehyde, 4-methylsalicylaldehyde).

Needles from EtOH or H₂O. M.p. 60-1°. B.p. 219-21°/726 mm. Sol. most org. solvents. Spar. sol. H₂O, cold EtOH. Volatile in steam. FeCl₃ \rightarrow violet col.

Oxime: plates from EtOH.Aq. M.p. 108-5-109°. Sol. EtOH, C₆H₆. Insol. pet. ether.

Semicarbazone: cryst. M.p. 268°.

Phenylhydrazone: cryst. M.p. 161°.

Me ether: C₉H₁₀O₂. MW, 150. Needles. M.p. 42-3°. B.p. 263-4°/720 mm. Sol. EtOH, C₆H₆. Spar. sol. hot H₂O. Volatile in steam. No col. with FeCl₃. Forms bisulphite comp.

Tiemann, Schotten, *Ber.*, 1878, 11, 773.

Chuit, Bolsing, *Bull. soc. chim.*, 1906, 35, 134.

Fries, Klostermann, *Ber.*, 1906, 39, 872.

Anselmino, *Ber.*, 1917, 50, 395.

Duff, *J. Chem. Soc.*, 1941, 547.

ω -Hydroxy-*p*-toluic Aldehyde.

See *p*-Hydroxymethylbenzaldehyde.

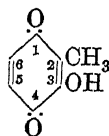
Hydroxytoluidine.

See Aminocresol.

Hydroxytoluquinaldine.

See 4-Hydroxy-2 : 6-dimethylquinoline and 4-Hydroxy-2 : 8-dimethylquinoline.

3-Hydroxytoluquinone (3-Hydroxy-2-methyl-*p*-benzoquinone)



C₇H₆O₃

MW, 138

Me ether: C₈H₈O₃. MW, 152. Oil. Slowly solidifies. M.p. 19-20°. B.p. 130°/15 mm. H₂S.Aq. \rightarrow 3 : 6-dihydroxy-2-methoxytoluene.

Majima, Okazaki, *Ber.*, 1916, 49, 1490.

5-Hydroxytoluquinone (5-Hydroxy-2-methyl-*p*-benzoquinone).

Yellow needles from C₆H₆. M.p. 142° decomp. Sol. H₂O. Reacts acid. Red sols in alkalis.

Acetyl: yellow prisms from ligroin. M.p. 75-6°.

Me ether: needles from EtOH. M.p. 170-2° decomp. Sol. hot H₂O, EtOH, C₆H₆. Spar. sol. Et₂O, pet. ether. Volatile in steam. H₂S \rightarrow 2 : 5-dihydroxy-4-methoxytoluene.

Et ether: C₉H₁₀O₃. MW, 166. Yellow cryst. from pet. ether. M.p. 101°. Sol. EtOH, C₆H₆, ligroin. Readily sublimes.

Thiele, Winter, *Ann.*, 1900, 311, 350.

Jacobson, Jankowski, *Ann.*, 1909, 369, 20.

Luff, Perkin, Robinson, *J. Chem. Soc.*, 1910, 97, 1137.

6-Hydroxytoluquinone (6-Hydroxy-2-methyl-*p*-benzoquinone).

Me ether: cryst. M.p. 147°.

Henrich, Nachtigall, *Ber.*, 1903, 36, 894.

Hydroxytolylenediamine.

See Diaminocresol.

Hydroxytoxicarol

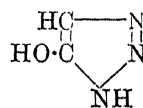
C₂₃H₂₄O₈ MW, 428

Yellow prisms. M.p. 226-7°. FeCl₃ \rightarrow deep green col. 5% Alc. HCl \rightarrow dehydrotoxicarol.

Acetyl: plates from AcOH. M.p. 184°.

Clark, *J. Am. Chem. Soc.*, 1934, 56, 987.

5-Hydroxy-1 : 2 : 3-triazole



C₂H₃ON₃ MW, 85

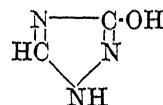
Needles. M.p. 130°. Very sol. EtOH, H₂O. Sol. AcOH. Spar. sol. Et₂O. Insol. ligroin, C₆H₆. Acid to litmus.

Dibenzoyl deriv.: needles from EtOH. M.p. 104°.

Dimroth, *Ann.*, 1910, 373, 352.

Curtius, Boekmuhl, *Ber.*, 1910, 33, 2444.

3-Hydroxy-1 : 2 : 4-triazole



C₂H₃ON₃ MW, 85

Cryst. from EtOH. M.p. 234°. Very sol. H₂O, EtOH, HCl. Insol. Et₂O. Acid to litmus.

O : N-Diacetyl: plates from EtOH. M.p. 137°. Very sol. H₂O, EtOH.

Widman, Cleve, *Ber.*, 1898, 31, 379.

Monchat, Noll, *Ann.*, 1905, 343, 25.

Hydroxytricarballic Acid.

See Citric Acid and Isocitric Acid.

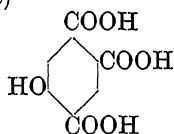
2-Hydroxy-3 : 4 : 6-triethoxybenzoyl-formic Acid.

See Gossypetonic Acid.

2-Hydroxytriethylamine.

See 2-Diethylaminoethyl Alcohol.

5-Hydroxytrimellitic Acid (Phenol-2 : 4 : 5-tricarboxylic acid)



C₉H₆O₇

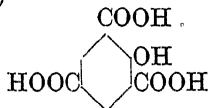
MW, 226

Prisms + 2H₂O from H₂O. M.p. anhyd. 240-5° decomp. Sol. EtOH. Spar. sol. H₂O. KOH fusion → phenol. HCl at 230-40° → *m*-hydroxybenzoic acid. FeCl₃ → brownish-red col.

Kögl, Erxleben, Jänecke, *Ann.*, 1930, 482, 117.

Jacobsen, *Ber.*, 1883, 16, 192.

Hydroxytrimesic Acid (Phenol-2 : 4 : 6-tricarboxylic acid)



C₉H₆O₇

MW, 226

Prisms + 1H₂O from H₂O. M.p. 306°. Spar. sol. Et₂O. Insol. CHCl₃, C₆H₆, ligroin. FeCl₃ → reddish-brown col. Heat → salicylic acid + 4-hydroxyisophthalic acid + phenol.

Tri-Et ester: C₁₅H₁₈O₇. MW, 310. Prisms from EtOH. M.p. 83°. Sol. Et₂O, C₆H₆, hot H₂O.

Me ether: anisole-2 : 4 : 6-tricarboxylic acid. C₁₀H₈O₇. MW, 240. Needles from AcOH. M.p. 248°. Sol. EtOH, Et₂O, AcOH, hot H₂O. Insol. C₆H₆. *Tri-Me ester*: C₁₃H₁₄O₇. MW, 282. Needles from pet. ether. M.p. 86°. Sol. EtOH, Et₂O, C₆H₆.

Ost, *J. prakt. Chem.*, 1877, 15, 302.

Errera, *Ber.*, 1898, 31, 1684.

Ullmann, Brittner, *Ber.*, 1909, 42, 2543.

Seebach, *Ber.*, 1940, 73, 1338.

7-Hydroxy-1 : 2 : 11-trimethoxyaporphine.

See Isocorydine.

5-Hydroxy-1 : 2 : 3-trimethoxybenzene.

See Antiarol.

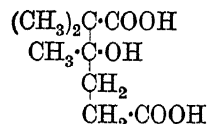
Hydroxytrimethylacetaldehyde.

See Hydroxypivalic Aldehyde.

Hydroxytrimethylacetic Acid.

See Hydroxypivalic Acid.

2-Hydroxy-1 : 1 : 2-trimethyladipic Acid



C₉H₁₆O₅

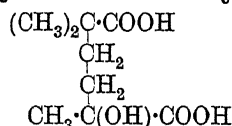
MW, 204

Exists only in solution. Warm H₂SO₄ → levulinic and isobutyric acids.

Lactone: C₉H₁₄O₄. MW, 186. Prisms from Et₂O. M.p. 108-9°. *Et ester*: C₁₁H₁₈O₄. MW, 214. B.p. 165-8°/18 mm.

Harding, *J. Chem. Soc.*, 1912, 101, 1593.

4-Hydroxy-1 : 1 : 4-trimethyladipic Acid



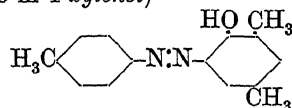
C₉H₁₆O₅

MW, 204

Cryst. from H₂O. M.p. 145-8°. Sol. H₂O. Insol. C₆H₆. HI → 1 : 1 : 4-trimethyladipic acid.

Auwers, Hessenland, *Ber.*, 1908, 41, 1813.

2-Hydroxy-3 : 5 : 4'-trimethylazobenzene (Tolueneazo-*m*-4-xylenol)



C₁₅H₁₆ON₂

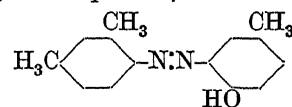
MW, 240

Red needles from EtOH. M.p. 99°. Sol. dil. alkalis. Spar. sol. pet. ether.

Et ether: C₁₇H₂₀ON₂. MW, 268. Red prisms from pet. ether. M.p. 51-2°. Sol. EtOH, C₆H₆, pet. ether.

Jacobsen, *Ann.*, 1909, 369, 24.

6-Hydroxy-3 : 2' : 4'-trimethylazobenzene (*m*-Xyleneazo-*p*-cresol)



C₁₅H₁₆ON₂

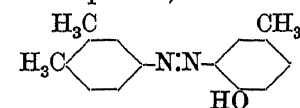
MW, 240

Reddish-brown needles from EtOH.Aq. M.p. 85°. B.p. 230-33°/30 mm.

Et ether: red plates from ligroin. M.p. 51°. B.p. 238-42°/25 mm. Sol. EtOH, C₆H₆.

Jacobsen, *Ann.*, 1909, 369, 31.

6-Hydroxy-3 : 3' : 4'-trimethylazobenzene (*o*-Xyleneazo-*p*-cresol)



C₁₅H₁₆ON₂

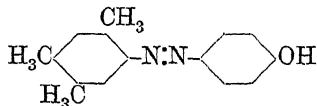
MW, 240

4-Hydroxy-2' : 4' : 5'-trimethylazobenzene 836

Brown cryst. from AcOH.Aq. M.p. 131-2°. Sol. Et₂O, AcOH. Spar. sol. MeOH, ligroin. Acetyl : orange-yellow leaflets from AcOH.Aq. M.p. 106°.

Auwers, *Ann.*, 1909, 365, 292, 304.

4-Hydroxy-2' : 4' : 5'-trimethylazobenzene (*ψ*-Cumeneazophenol)



C₁₅H₁₆ON₂ MW, 240

Yellow leaflets pptd. from NH₄OH by CO₂. M.p. 94°. Sol. EtOH, C₆H₆. Spar. sol. ligroin. B.HCl : m.p. 162°. Acetyl : orange needles from EtOH. M.p. 105°.

Me ether : *ψ*-cumeneazoanisole. C₁₆H₁₈ON₂. MW, 254. Brown needles. M.p. 89°.

Goldschmidt, Brubacher, *Ber.*, 1891, 24, 2312.

Farmer, Hantzsch, *Ber.*, 1899, 32, 3097.

Hydroxytrimethylbenzaldehyde.

See Trimethylsalicylaldehyde.

6-Hydroxy-2 : 3 : 5-trimethylbenzyl Alcohol.

See 3 : 5 : 6-Trimethylsaligenin.

2-Hydroxy-1 : 1 : 2-trimethylbutyric Acid.

See 2-Hydroxy-1 : 1-dimethylisovaleric Acid.

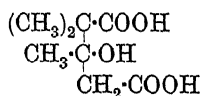
2-Hydroxy-1 : 1 : 4-trimethylcaproic Acid.

See 2-Hydroxy-1 : 1-dimethylisoamylacetic Acid.

2-Hydroxytrimethylenediamine.

See 1 : 3-Diaminoisopropyl Alcohol.

2-Hydroxy-1 : 1 : 2-trimethylglutaric Acid



C₈H₁₄O₅ MW, 190

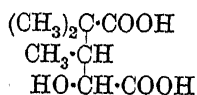
Prisms from pet. ether. M.p. 128°. Sol. H₂O, org. solvents.

Di-Et ester : C₁₂H₂₂O₅. MW, 246. B.p. 160-70°/30 mm.

Perkin, Thorpe, *J. Chem. Soc.*, 1897, 71, 1179.

Ranganathan, *Chem. Abstracts*, 1937, 31, 1020.

3-Hydroxy-1 : 1 : 2-trimethylglutaric Acid



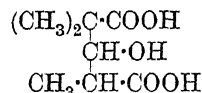
C₈H₁₄O₅ MW, 190

2-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid

Lactone : C₈H₁₂O₄. MW, 172. Needles from toluene. M.p. 110°. Alk. KMnO₄ → trimethylsuccinic acid.

Bardhan, *J. Chem. Soc.*, 1928, 2620.

2-Hydroxy-1 : 1 : 3-trimethylglutaric Acid



C₈H₁₄O₅ MW, 190

Cis :

Cryst. from toluene. M.p. 115°. Sol. H₂O, EtOH, Et₂O. Spar. sol. C₆H₆, CHCl₃.

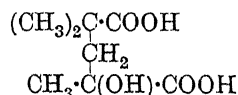
Trans :

Cryst. from warm Et₂O. M.p. 156-7°. Sol. H₂O, EtOH. Spar. sol. Et₂O, C₆H₆, CHCl₃, toluene.

Perkin, Smith, *J. Chem. Soc.*, 1903, 83, 775.

Cahn, Gibson, Penfold, Simonsen, *J. Chem. Soc.*, 1931, 293.

3-Hydroxy-1 : 1 : 3-trimethylglutaric Acid

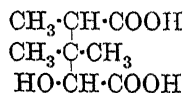


C₈H₁₄O₅ MW, 190

Di-nitrile : C₈H₁₂ON₂. MW, 152. Needles from AcOEt-pet. ether. M.p. 165-6°. Sol. H₂O, CHCl₃. Spar. sol. pet. ether.

Lapworth, *J. Chem. Soc.*, 1904, 85, 1223.

3-Hydroxy-1 : 2 : 2-trimethylglutaric Acid



C₈H₁₄O₅ MW, 190

Lactone : C₈H₁₂O₄. MW, 172. Prisms from H₂O. M.p. 165-6°. Sol. H₂O, EtOH, Et₂O. Spar. sol. C₆H₆, pet. ether.

Balbiano, *Ber.*, 1894, 27, 2136.

Chandrasena, Ingold, Thorpe, *J. Chem. Soc.*, 1922, 121, 1550.

3-Hydroxy-2 : 4 : 4-trimethylhexane.

See Isopropyl-*tert*-amylcarbinol.

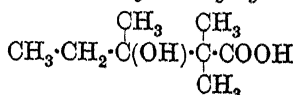
1-Hydroxy-2 : 2 : 2-trimethylpropionic Acid.

See 1-Hydroxy-2 : 2-dimethylbutyric Acid.

Hydroxytrimethylsuccinic Acid.

See Trimethylmalic Acid.

2-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid (1 : 1 : 2-Trimethyl-2-ethylhydracrylic acid)



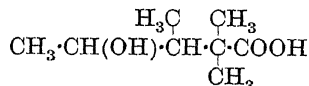
C₈H₁₆O₃ MW, 160

3-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid 837

Et ester: $C_{16}H_{20}O_3$. MW, 188. B.p. 92°/11 mm. D_4^{20} 0.969. n_D^{20} 1.4357.

Bardhan, *J. Chem. Soc.*, 1928, 2615.
Colonge, Dumont, *Bull. soc. chim.*, 1947, 38.

3-Hydroxy-1 : 1 : 2-trimethyl-*n*-valeric Acid



$C_8H_{16}O_3$ MW, 160
Lactone: $C_8H_{14}O_2$. MW, 142. B.p. 121-3°/33 mm.

Jacobs, Scott, *J. Biol. Chem.*, 1931, 93, 145.

2-Hydroxy-1 : 1 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 1-dimethylisocaproic Acid.

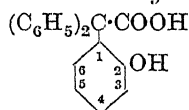
2-Hydroxy-1 : 2 : 3-trimethyl-*n*-valeric Acid.

See 2-Hydroxy-1 : 2-dimethylisocaproic Acid.

1-Hydroxy-1 : 3 : 3-trimethyl-*n*-valeric Acid.

See 1-Hydroxy-1 : 3-dimethylisocaproic Acid.

2-Hydroxytriphenylacetic Acid (2-Hydroxytriphenylmethane- α -carboxylic acid)



$C_{22}H_{16}O_3$ MW, 304

Cryst. from Et_2O . M.p. 149-50°. Slowly changes to lactone.

Me ether: $C_{21}H_{18}O_3$. MW, 318. Cryst. from EtOH. M.p. 234-5°. Sol. Me_2CO , AcOH, C_6H_6 . Spar. sol. EtOH. Loses CO_2 at 300° \rightarrow 2-methoxytriphenylmethane. Conc. H_2SO_4 \rightarrow 2-methoxytriphenylcarbinol. *Me ester*: $C_{22}H_{16}O_3$. MW, 332. Prisms from EtOH. M.p. 134°. Sol. conc. H_2SO_4 to violet sol.

Et ether: $C_{22}H_{20}O_3$. MW, 332. Needles from AcOH. M.p. 264°. Sol. hot AcOH. Spar. sol. EtOH, Et_2O , Me_2CO , C_6H_6 . Sol. conc. H_2SO_4 to red sol. *Et ester*: $C_{24}H_{24}O_3$. MW, 360. Cryst. from EtOH. M.p. 84°. Sol. EtOH, Me_2CO , AcOH, C_6H_6 . Sol. conc. H_2SO_4 to violet sol.

Lactone: $C_{20}H_{14}O_2$. MW, 286. Leaflets from Et_2O -EtOH. M.p. 120°. Sol. Et_2O , Me_2CO , AcOEt, C_6H_6 . Spar. sol. EtOH.

Liebig, Keim, *Ann.*, 1908, 360, 207.

4-Hydroxytriphenylacetic Acid (4-Hydroxytriphenylmethane- α -carboxylic acid).

Needles from EtOH.Aq. M.p. 212° decomp. Sol. MeOH, EtOH, Et_2O , Me_2CO , AcOH, C_6H_6 . Spar. sol. CHCl_3 . Insol. ligroin. Sol. conc. H_2SO_4 to yellow sol.

Me ether: needles from 50% AcOH. M.p.

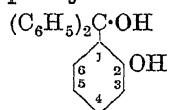
4-Hydroxytriphenylcarbinol

174°. *Me ester*: prisms from AcOH. M.p. 138-9°. Sol. EtOH.

Mixed anhydride with CH_3COOH : $C_{24}H_{20}O_5$. MW, 388. Needles from AcOH. M.p. 208° decomp.

Bistrzycki, Nowakowska, *Ber.*, 1901, 34, 3063.

2-Hydroxytriphenylcarbinol



$C_{19}H_{16}O_2$ MW, 276

Prisms from Et_2O -ligroin. M.p. 140-5° (142°). Very sol. EtOH, Et_2O , CHCl_3 , C_6H_6 . Insol. ligroin.

Me ether: $C_{20}H_{18}O_2$. MW, 290. Leaflets from EtOH. M.p. 134° (128-9°).

Phenyl ether: $C_{25}H_{20}O_2$. MW, 352. Needles from ligroin. M.p. 120°. Very sol. Et_2O , C_6H_6 . Sol. boiling ligroin.

Baeyer, *Ann.*, 1907, 354, 167.

Liebig, *Ann.*, 1908, 360, 213.

Ullmann, Engi, *Ber.*, 1904, 37, 2368.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 769.

Fuhrmann, *Ber.*, 1940, 73, 1193.

Nesmeyanov, Pecherskaya, *Chem. Abstracts*, 1944, 38, 5492.

3-Hydroxytriphenylcarbinol.

Plates from C_6H_6 -ligroin. M.p. 147-8°.

Me ether: cryst. from Et_2O . M.p. 88°.

Baeyer, *Ann.*, 1907, 354, 170.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 770.

4-Hydroxytriphenylcarbinol.

Exists in two forms.

(i) *High melting (benzenoid) form.*

Needles from EtOH (containing trace of NH_3). M.p. 157-9° after turning yellow at 110-20°. Sol. 150 parts C_6H_6 at ord. temp. Converted to low melting form by cryst. from solvents containing a trace of acid.

(ii) *Low melting (quinonoid) form.*

Yellow cryst. from 40-50% AcOH. M.p. 139-40°. Sol. 150 parts C_6H_6 at ord. temp.

Me ether: $C_{20}H_{18}O_2$. MW, 290. Exists in two forms. (i) M.p. 84°. (ii) M.p. 61°.

Di-Me ether: $C_{21}H_{20}O_2$. MW, 304. Cryst. M.p. 74°.

Di-Et ether: $C_{23}H_{24}O_2$. MW, 332. Plates from EtOH.Aq. M.p. 87°.

Acetyl: plates from AcOH. M.p. 136°.

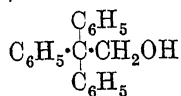
Gomberg, Jickling, *J. Am. Chem. Soc.*, 1915, 37, 2589.

Gomberg, *J. Am. Chem. Soc.*, 1913, 35, 209.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 771.

Baeyer, Villiger, *Ber.*, 1902, 35, 3027.

2-Hydroxy-1 : 1 : 1-triphenylethane
(2 : 2 : 2-Triphenylethyl alcohol, α -hydroxymethyltriphenylmethane)



$\text{C}_{20}\text{H}_{18}\text{O}$ MW, 274

Cryst. from EtOH. M.p. 110-5° (107°). Sol. Et_2O , ligroin.

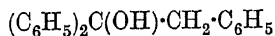
Acetyl: needles from EtOH. M.p. 136°.

Phenylurethane: cryst. M.p. 205-6°.

Danilow, *J. Russ. Phys.-Chem. Soc.*, 1920, 51, 122.

Schlenk, Ochs, *Ber.*, 1916, 49, 610.

1-Hydroxy-1 : 1 : 2-triphenylethane (Diphenylbenzylcarbinol, 1 : 1 : 2-triphenylethyl alcohol)



$\text{C}_{20}\text{H}_{18}\text{O}$ MW, 274

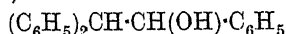
Needles from C_6H_6 -pet. ether. M.p. 89-90° (88°). B.p. 222°/11 mm. Sol. EtOH, AcOH. Spar. sol. Et_2O , ligroin.

Hell, Wiegandt, *Ber.*, 1904, 37, 1429.

Paternò, Chieffi, *Gazz. chim. ital.*, 1909, 39, 422.

Gilman *et al.*, *J. Am. Chem. Soc.*, 1940, 62, 1514.

2-Hydroxy-1 : 1 : 2-triphenylethane
(Phenylbenzhydrylcarbinol, 1 : 2 : 2-triphenylethyl alcohol)



$\text{C}_{20}\text{O}_{18}\text{O}$ MW, 274

Needles from AcOH. M.p. 87°. B.p. 234°/16 mm.

Urethane: m.p. 156-7°.

Gardeur, *Chem. Zentr.*, 1897, II, 661.

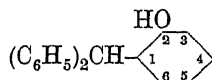
Hydroxytriphenylethylene.

See Diphenylbenzoylmethane.

α -Hydroxytriphenylmethane.

See Triphenylcarbinol.

2-Hydroxytriphenylmethane (o-Benz-hydrylphenol)



$\text{C}_{19}\text{H}_{16}\text{O}$ MW, 260

Needles from C_6H_6 -ligroin or EtOH. M.p. 76° (with EtOH of cryst.), 124° (EtOH free). Green sol. in conc. H_2SO_4 .

Me ether: $\text{C}_{20}\text{H}_{18}\text{O}$. MW, 274. Cryst. from EtOH. M.p. 114° (116°). Very sol. Et_2O , C_6H_6 , AcOH. Green sol. in conc. H_2SO_4 .

Et ether: $\text{C}_{21}\text{H}_{20}\text{O}$. MW, 288. Prisms from EtOH. M.p. 63.5-64° (68°). Sol. EtOH, Et_2O , warm ligroin.

Acetyl: plates from EtOH. M.p. 81-2°.

Baeyer, *Ann.*, 1907, 354, 169.

Liebig, Keim, *Ann.*, 1908, 360, 216.

Salomon, *Chem. Zentr.*, 1899, I, 172.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 774.

3-Hydroxytriphenylmethane (m-Benz-hydrylphenol).

Prisms from ligroin. M.p. 106°.

Me ether: plates from EtOH. M.p. 86°.

Very sol. Et_2O , CHCl_3 , C_6H_6 . Sol. EtOH, AcOH. Yellow sol. in conc. H_2SO_4 .

Baeyer, *Ann.*, 1907, 354, 171.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 770.

4-Hydroxytriphenylmethane (p-Benz-hydrylphenol).

Needles from EtOH.Aq. M.p. 110° (118°). Very sol. Et_2O , EtOH. Spar. sol. ligroin, 50% AcOH.

Me ether: prisms from CHCl_3 -MeOH. M.p. 61° (64-5°).

Et ether: prisms from AcOH.Aq. M.p. 70-1°. Sol. most org. solvents.

Acetyl: needles from AcOH.Aq. M.p. 84°. Very sol. most org. solvents.

Bistrzycki, Herbst, *Ber.*, 1902, 35, 3137.

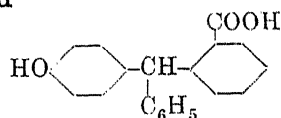
Baeyer, Villiger, *Ber.*, 1903, 36, 2790.

Kauffmann, Pannwitz, *Ber.*, 1912, 45, 771.

Hydroxytriphenylmethane- α -carboxylic Acid.

See Hydroxytriphenylacetic Acid.

4'-Hydroxytriphenylmethane-2-carboxylic Acid



$\text{C}_{20}\text{H}_{16}\text{O}_3$ MW, 304

Needles from EtOH.Aq. M.p. 210-11°. Sol. EtOH, Me_2CO , AcOH, C_6H_6 . Violet sols in alkalis.

Acetyl: needles from AcOH.Aq. M.p. 148°. Sol. Me_2CO . Spar. sol. EtOH, AcOH, C_6H_6 .

Orndorff, Barrett, *J. Am. Chem. Soc.*, 1924, 46, 2495.

v. Pechmann, *Ber.*, 1880, 13, 1616.

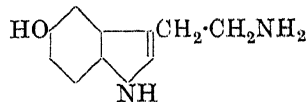
α -Hydroxytriphenylmethane-carboxylic Acid.

See Triphenylcarbinol-carboxylic Acid.

4-Hydroxy-2 : 3 : 4-triphenyl-n-valeric Acid.

See Amaric Acid.

5-Hydroxytryptamine (Serotonin, enteramine)



$\text{C}_{10}\text{H}_{12}\text{ON}_2$

MW, 176

B.HCl: cryst. M.p. 167–8°.

O-Benzyl: hydrochloride, cryst. M.p. 265°.

Rapport, Green, Page, *J. Biol. Chem.*, 1948, **176**, 1243.

Rapport, *J. Biol. Chem.*, 1949, **180**, 961.

Hamlin, Fischer, *J. Am. Chem. Soc.*, 1951, **73**, 5007.

Speeter, Heinzelmann, Weisblat, *ibid.*, 1951, **73**, 5007.

Asero, Colo, Erspamer, Vercellone, *Ann.*, 1952, **576**, 69.

Erspamer, Asero, *Nature*, 1952, **169**, 800.

Reid, Rand, *ibid.*, 801.

Hydroxyundecane.

See cross references under Undecanol.

1-Hydroxyundecylic Acid (1-Hydroxyundecoic acid)



$\text{C}_{11}\text{H}_{22}\text{O}_3$ MW, 202

Needles from pet. ether or CHCl_3 . M.p. 69°.

Sol. EtOH, Et₂O. Spar. sol. cold H₂O.

Et ester: $\text{C}_{13}\text{H}_{26}\text{O}_3$. MW, 230. Cryst. from CHCl_3 . M.p. 38°.

Anilide: cryst. from AcOEt-pet. ether. M.p. 80°.

Bagard, *Bull. soc. chim.*, 1907, **1**, 310, 354.

3-Hydroxyundecylic Acid (3-Hydroxyundecoic acid)



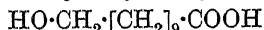
$\text{C}_{11}\text{H}_{22}\text{O}_3$ MW, 202

M.p. 34°. Readily forms lactone.

Lactone: $\text{C}_{11}\text{H}_{20}\text{O}_2$. MW, 184. B.p. 286°.

Shukow, Schestakow, *Chem. Zentr.*, 1908, **II**, 1415.

10-Hydroxyundecylic Acid (10-Hydroxyundecoic acid, ω -hydroxyundecylic acid)



$\text{C}_{11}\text{H}_{22}\text{O}_3$ MW, 202

Needles from H₂O. M.p. 76°. Sol. EtOH. Et₂O. Spar. sol. ligroin, C_6H_6 .

Me ester: $\text{C}_{12}\text{H}_{24}\text{O}_3$. MW, 216. M.p. 27–27.5°. B.p. 168–9°/8 mm. Sol. EtOH, Et₂O, C_6H_6 .

Nitrile: $\text{C}_{11}\text{H}_{21}\text{ON}$. MW, 183. M.p. 12–13°. B.p. 186–7°/13 mm. D₂₀ 0.910.

Acetyl: m.p. 34°. B.p. 184–5°/2 mm.

Me ether: m.p. 32–7°. B.p. 170°/4 mm. *Me ester*: b.p. 164°/21 mm.

Cohen, *J. Chem. Soc.*, 1932, 596.

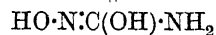
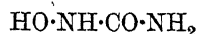
Chuit, Hausser, *Helv. Chim. Acta*, 1929, **12**, 476.

See also Lycan, Adams, *J. Am. Chem. Soc.*, 1929, **51**, 628.

5-Hydroxyuracil.

See Isobarbituric Acid.

Hydroxyurea (Carbamylhydroxylamine)



$\text{CH}_4\text{O}_2\text{N}_2$

MW, 76

Needles from EtOH. M.p. 139–40° (128–30°). Sol. H₂O. Spar. sol. cold EtOH. Reduces Fehling's and warm $\text{NH}_3\cdot\text{AgNO}_3$. FeCl_3 —> intense bluish-violet col.

Dresler, Stein, *Ann.*, 1869, **150**, 242.

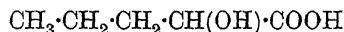
Hantzsch, *Ann.*, 1898, **299**, 99.

Francesconi, Partrozani, *Gazz. chim. ital.*, 1901, **31**, 334.

Hydroxyuvitic Acid.

See Hydroxy-5-methylisophthalic Acid.

1-Hydroxy-*n*-valeric Acid (Valerolactinic acid, propylglycollic acid)



$\text{C}_5\text{H}_{10}\text{O}_3$

MW, 118

Hygroscopic plates. M.p. 28–9° (34°). Sublimes. Sol. H₂O, EtOH.

Et ester: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 190°. Sol. EtOH, Et₂O. Spar. sol. H₂O.

Nitrile: butyraldehyde cyanhydrin. $\text{C}_5\text{H}_9\text{ON}$. MW, 99. B.p. 111°/20 mm. D₁₅ 0.9434. n_D^{25} 1.4228. Sol. EtOH, Et₂O. Insol. H₂O. *Acetyl*: b.p. 194°. D₂₄ 0.9696. Sol. EtOH, Et₂O. Insol. H₂O.

Et ether: $\text{C}_7\text{H}_{14}\text{O}_3$. MW, 146. B.p. 124°/17 mm., 114°/11 mm. *Me ester*: $\text{C}_8\text{H}_{16}\text{O}_3$. MW, 160. B.p. 70°/15 mm. *Et ester*: $\text{C}_9\text{H}_{18}\text{O}_3$. MW, 174. B.p. 84°/17 mm., 76°/12 mm. *Chloride*: $\text{C}_7\text{H}_{13}\text{O}_2\text{Cl}$. MW, 164.5. B.p. 57–58°/12 mm. *Amide*: $\text{C}_7\text{H}_{15}\text{O}_2\text{N}$. MW, 145. M.p. 91°.

Fittig, Dannenberg, *Ann.*, 1904, **331**, 132.

Levene, Haller, *J. Biol. Chem.*, 1928, **77**, 555.

Blaise, Picard, *Bull. soc. chim.*, 1912, **11**, 544.

Juslin, *Ber.*, 1884, **17**, 2504.

Henry, *Chem. Zentr.*, 1899, **I**, 194.

2-Hydroxy-*n*-valeric Acid (2-Ethylhydracrylic acid)



$\text{C}_5\text{H}_{10}\text{O}_3$

MW, 118

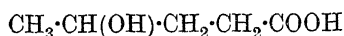
Not solid at –32°. $[\alpha]_D^{20}$ –10.0°. Sol. EtOH, Et₂O, CHCl_3 , C_6H_6 . Insol. CS₂, ligroin. Dist. —> 1 : 2- and 2 : 3-pentenic acids.

Et ester: b.p. 75–7°/9 mm. $[\alpha]_D^{20}$ –15.6° in Et₂O.

Nitrile: $[\alpha]_D^{20}$ +10° in Et₂O.

Levene, Mori, *J. Biol. Chem.*, 1928, **78**, 5.

Fittig, Spenser, *Ann.*, 1894, **283**, 74.

3-Hydroxy-*n*-valeric AcidC₅H₁₀O₃

MW, 118

Very unstable, readily reverting to lactone.
 $k = 2.02 \times 10^{-5}$ at 25°. $[\alpha]_D^{25} - 9.3^\circ$ in H₂O.

Et ester: b.p. 85–6°/2 mm. $D_{25}^{25} 0.9532$. $n_D^{25} 1.4265$. Misc. with EtOH, Et₂O. Insol. H₂O. Dist. at pressures greater than 2 mm. → 3-valerolactone.

Lactone: see γ -Valerolactone.

Amide: C₅H₁₁O₂N. MW, 117. Leaflets from EtOH–Et₂O. M.p. 56°. Sol. H₂O. Spar. sol. Et₂O, CHCl₃. Insol. C₆H₆, ligroin. Heat → 3-valerolactone.

Nitrile: b.p. 110–12°/18 mm. $[\alpha]_D^{21} + 13^\circ$ in EtOH.

Hydrazone: cryst. M.p. 61–2°. Loses N₂H₄ at 200°. Spar. sol. most org. solvents.

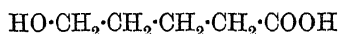
Levene, Haller, *J. Biol. Chem.*, 1928, 76, 415.

Lease, McElvain, *J. Am. Chem. Soc.*, 1933, 55, 807.

Neugebauer, *Ann.*, 1885, 227, 100.

Blaise, Luttringer, *Compt. rend.*, 1905, 140, 792.

Barbier, Locquin, *Bull. soc. chim.*, 1913, 13, 226.

4-Hydroxy-*n*-valeric Acid (ω -Hydroxyvaleric acid)C₅H₁₀O₃

MW, 118

Very unstable, readily reverting to lactone.

Me ether: C₆H₁₂O₃. MW, 132. B.p. 133–4°/15 mm. $D_4^{15} 1.0387$. $k = 1.91 \times 10^{-3}$ at 25°. *Me ester*: C₇H₁₄O₃. MW, 146. B.p. 185°. $D_4^{15} 0.9747$.

Et ether: b.p. 252°. Sol. H₂O. *Chloride*: b.p. 52°/0.25 mm. $n_D^{20} 1.4347$.

Phenyl ether: *hydrazide*, m.p. 285–7°.

2 : 4-Dichlorophenyl ether: m.p. 65°.

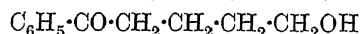
Lactone: see δ -Valerolactone.

Amide: m.p. 56°. $[\alpha]_D^{25} + 9.5^\circ$ in EtOH.

Levene, Haller, *J. Biol. Chem.*, 1926, 69, 169; 1928, 79, 487.

Palomaa, *Chem. Zentr.*, 1912, II, 596.

Fittig, Beiswenger, *Ber.*, 1903, 36, 1201.

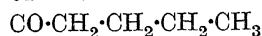
 ω -Hydroxyvalerophenone (4-Benzoylbutyl alcohol, 4-hydroxybutyl phenyl ketone)C₁₁H₁₄O₂

MW, 178

Plates from H₂O. M.p. 40–1°. Sol. EtOH, MeOH, Et₂O, C₆H₆. Spar. sol. pet. ether.

Oxime: m.p. 56–7°.

Kipping, Perkin, *J. Chem. Soc.*, 1890, 57, 311.

p-Hydroxyvalerophenone (*p*-Valerylphenol, butyl *p*-hydroxyphenyl ketone)C₁₁H₁₄O₂

MW, 178

M.p. 63°. B.p. 210°/15 mm., 197.5–198.5°/10 mm.

Me ether: *p*-valerylanisole. C₁₂H₁₆O₂. MW, 192. Prisms. M.p. 27–8°. B.p. 196.5°/40 mm., 150.5°/6 mm. Sol. EtOH, Et₂O, pet. ether. *Phenylhydrazone*: m.p. 78°. *Semicarbazone*: m.p. 164°.

Et ether: *p*-valerylphenetole. C₁₃H₁₈O₂. MW, 206. Needles from EtOH. M.p. 31°. *Semicarbazone*: needles. M.p. 192°.

Benzoyl: m.p. 92°.

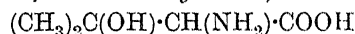
Sandulesco, Girard, *Bull. soc. chim.*, 1930, 47, 1309.

Skraup, Nieten, *Ber.*, 1924, 57, 1301.

Noller, Adams, *J. Am. Chem. Soc.*, 1924, 46, 1891.

Layraud, *Bull. soc. chim.*, 1907, 35, 234.

2-Hydroxyvaline (2-Hydroxy-1-aminoisovaleric acid, 2 : 2-dimethylserine)

C₅H₁₁O₃N

MW, 133

Plates from EtOH.Aq. M.p. 218° decomp. Sol. H₂O. Insol. EtOH, Et₂O, C₆H₆, AcOEt.

Phenylurethane: m.p. 162°. Sol. EtOH, Et₂O, AcOEt.

β -Naphthalenesulphonyl deriv.: needles from EtOH. M.p. 261°.

Me ether: C₆H₁₃O₃N. MW, 147. Plates. M.p. 250–60° decomp. Sol. H₂O. Insol. EtOH, Et₂O, CHCl₃, AcOEt.

Schrauth, Geller, *Ber.*, 1922, 55, 2789.

Prokof'ev, Botvinnik, *Compt. rend. acad. sci. U.R.S.S.*, 1939, 25, 488, (*Chem. Abstracts*, 1940, 34, 4055).

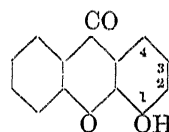
1-Hydroxyvinylacetic Acid.

See Vinylglycollic Acid.

Hydroxyvinyl phenyl Ketone.

See Benzoylacetalddehyde.

1-Hydroxyxanthone

C₁₃H₈O₃

MW, 212

Needles from EtOH.Aq. M.p. 242°. Sol. EtOH, Et₂O, AcOH. Mod. sol. hot C₆H₆. Spar. sol. H₂O, ligroin. Conc. H₂SO₄ → yellow sol. with green fluor. Sublimes.

Me ether: C₁₄H₁₀O₃. MW, 226. Needles

from EtOH. M.p. 173°. Sol. Et₂O, C₆H₆.
Mod. sol. hot EtOH, hot ligroin.

Acetyl: cryst. from EtOH.Aq. M.p. 137-8°.
Benzoyl: needles. M.p. 172°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1649.

Ullmann, Zlokasoff, *Ber.*, 1905, 38, 2118.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

2-Hydroxyxanthone.

Needles from EtOH. M.p. 246° (242°). Sol. EtOH. Mod. sol. AcOH. Spar. sol. Et₂O, C₆H₆. Sol. alkalis. Conc. H₂SO₄ → yellow sol. with blue fluor. Zn dust dist. → xanthene.

Me ether: plates from EtOH.Aq. M.p. 129°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. ligroin. Sol. conc. H₂SO₄ with blue fluor.

Acetyl: needles from EtOH.Aq. M.p. 157-8°.
Benzoyl: needles. M.p. 147°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1651.

Ullmann, Wagner, *Ann.*, 1907, 355, 370.

Atkinson, Heilbron, *J. Chem. Soc.*, 1926, 2689.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

3-Hydroxyxanthone.

Yellow needles from EtOH.Aq. M.p. 240° (231°). Sol. EtOH, hot C₆H₆. Insol. H₂O, ligroin. Conc. H₂SO₄ → yellow sol. with blue fluor.

Me ether: needles from EtOH. M.p. 131°. Sol. EtOH, C₆H₆, AcOH. Conc. H₂SO₄ → yellow sol. with green fluor.

Acetyl: needles from EtOH.Aq. M.p. 161°.

Benzoyl: needles from EtOH. M.p. 151°.

v. Kostanecki, Rutishauser, *Ber.*, 1892, 25, 1648.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

Ullmann, Zlokasoff, *Ber.*, 1905, 38, 2119.

Ullmann, Denzler, *Ber.*, 1906, 39, 4334.

Asahina, Tanase, *Proc. Imper. Acad. Tokyo*, 1940, 16, 297.

4-Hydroxyxanthone.

Yellow needles from EtOH. M.p. 147°. Spar. sol. hot H₂O. Zn dust dist. → xanthene. KOH fusion → resorcinol + salicylic acid.

Me ether: yellow needles from C₆H₆-ligroin or EtOH. M.p. 138°. Sol. EtOH, C₆H₆, AcOH. Spar. sol. hot ligroin.

Acetyl: prisms from EtOH. M.p. 167-8°.

Benzoyl: needles from EtOH. M.p. 206-5°.

Michael, *Am. Chem. J.*, 1883, 5, 91.

Graebe, *Ann.*, 1889, 254, 290.

König, v. Kostanecki, *Ber.*, 1894, 27, 1996.

Ullmann, Pachaud, *Ann.*, 1906, 350, 113.

Tambor, *Ber.*, 1910, 43, 1883.

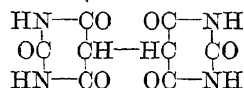
Hydroxy-xylene.

See Xylenol.

ω-Hydroxy-xylenol.

See Homosaligenin and Hydroxymethylbenzyl Alcohol.

Hydurilic Acid (5-5'-Dibarbituric acid)



C₈H₆O₆N₄

MW, 254

Plates + 2H₂O from H₂O. M.p. 320-30° decomp. Spar. sol. H₂O. Prac. insol. most org. solvents. Heat of comb. C_p = 658.5 Cal. FeCl₃ → green col. Sol. conc. H₂SO₄, alkalis. HNO₃ → alloxan. Ox. → 5-hydroxyhyd-urilic acid → oxalic acid. HCl + KClO₃ → dichlorohydurilic acid.

Di-Me deriv: C₁₀H₁₀O₆N₄. MW, 282. Cryst. from H₂O. M.p. 306-8° decomp. Sol. 4 parts H₂O. Spar. sol. most org. solvents. FeCl₃ → green col. Ox. → hydroxydimethylhydurilic acid.

Tetra-Me deriv: *see* Deoxyamalic Acid.

Biltz, Hamburger, *Ber.*, 1916, 49, 659.

Baeyer, *Ann.*, 1863, 127, 14.

Biltz, Heyn, *Ber.*, 1919, 52, 1302.

Conrad, *Ann.*, 1907, 356, 29.

Murdoch, Doebner, *Ber.*, 1876, 9, 1102.

Biltz, *Ann.*, 1914, 404, 188.

Roeder, *Ber.*, 1913, 46, 2563.

Hyenanchin

C₁₅H₁₈O₇

MW, 310

Constituent of *Hyenanche globosa*, Lamb. Needles from H₂O. M.p. 234° decomp., darkens at 200°. Spar. sol. H₂O, EtOH, Me₂CO, AcOEt. [α]_D²⁰ + 14.7° in H₂O. Reduces Fehlings and NH₃.AgNO₃. Yellow ppt. with Br water. Yields no sugar on hyd. Boiled with alkalis → acetol. Gives no ketonic derivs.

Acetyl: needles from EtOH.Aq. M.p. 126°.

Henry, *J. Chem. Soc.*, 1920, 117, 1620.

Hyenic Acid

C₂₅H₅₀O₂

MW, 382

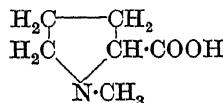
Occurs combined as glyceride in *Hyæna striata* and Montan wax. Needles from C₆H₆. M.p. 77-8°. Sol. Et₂O. Spar. sol. EtOH.

Ca salt: cryst. powder. M.p. 85-90°.

Carius, *Ann.*, 1864, 129, 168.

Tropsch, Kreutzer, *Chem. Zentr.*, 1922, IV, 561.

Hygric Acid (N-Methylpyrrolidine-2-carboxylic acid, N-methylproline)



C₆H₁₁O₂N

MW, 129

l.

Occurs in plants of the *Solanaceae* family. Syrup. Sol. H_2O and most org. solvents. Less sol. C_6H_6 and pet. ether. $[\alpha]_D^{20} - 18^\circ$ in EtOH, -28° in H_2O . Powerful narcotic and mydriatic. Sedative in small doses. Racemised rapidly by alkalis. Gives white ppt. with $HgCl_2$. Aq. Dil. acids or alkalis \rightarrow l-tropic acid + dl-scopoline (dl-oscine).

B, HCl : m.p. 200° .

$B, HBr, 3H_2O$: m.p. anhyd. $193-4^\circ$. $[\alpha]_D - 15-72^\circ$ in EtOH, $-25-9^\circ$ in H_2O . Sol. H_2O , EtOH. Spar. sol. $CHCl_3$. Insol. Et_2O .

$B, HAuCl_4$: needles. M.p. $208-9^\circ$ decomp. Spar. sol. H_2O .

$B, HAuBr_4$: red leaflets. M.p. $191-2^\circ$.

Picrate: yellow needles. M.p. $187-8^\circ$.

d.

Syrup.

$B, HBr, 3H_2O$: m.p. anhyd. $193-4^\circ$. $[\alpha]_D + 26.3$ in H_2O .

$B, HAuCl_4$: needles. M.p. $204-5^\circ$ decomp.

Picrate: needles. M.p. $187-8^\circ$ decomp.

dl.

Scopolamine, atropine.

Needles + $1H_2O$, m.p. $56-7^\circ$: needles + $2H_2O$, m.p. $37-8^\circ$. Anhydrous compound is a syrup.

$B, HBr, 3H_2O$: m.p. $181-2^\circ$ anhyd.

$B, HAuCl_4$: needles. M.p. $214-15^\circ$.

$B, HAuBr_4$: red leaflets. M.p. $209-10^\circ$.

Picrate: needles. M.p. $173.5-174.5^\circ$.

King, *J. Chem. Soc.*, 1919, 115, 476.

Chemnitzius, *J. prakt. chem.*, 1928, 120, 221.

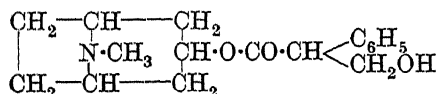
Ladenburg, *Ann.*, 1880, 206, 299.

Schmidt, *Arch. Pharm.*, 1894, 232, 409.

Carr, Reynolds, *J. Chem. Soc.*, 1912, 101, 950.

Jowett, *J. Chem. Soc.*, 1897, 71, 680.

Hyoscyamine (Tropine ester of l-tropic acid)



$C_{17}H_{23}O_3N$

MW, 289

l.

Occurs to about 1% in *Hyoscyamus muticus* (Egyptian henbane), mandragora root, henbane, etc. Needles from EtOH. M.p. $108-5^\circ$. Sol. EtOH, $CHCl_3$, C_6H_6 . Less sol. H_2O , Et_2O . $[\alpha]_D^{15} - 22^\circ$ in 50% EtOH. Resembles atropine in taste and mydriatic action but is physiologically more active. Racemises slowly in EtOH, rapidly on addition of alkali or on melting. $H_2O \rightarrow$ l-tropic acid + dl-tropine.

$B_2, H_2SO_4, 2H_2O$: needles from EtOH. M.p. anhyd. 206° . Sol. H_2O . Deliquescent.

B, HBr : prisms. M.p. $151-8^\circ$. Deliquescent.

B_2, H_2PtCl_6 : orange prisms. M.p. 206° .

$B, HAuCl_4$: yellow plates from dil. HCl. M.p. 165° .

$B, HAuBr_4$: red needles. M.p. $115-20^\circ$.

$B_2, (COOH)_2$: m.p. 176° .

Methobromide: m.p. $210-12^\circ$.

Picrate: m.p. 165° .

dl.

See Atropine.

Ladenburg, *Ann.*, 1880, 206, 282.

Gadamer, *Arch. Pharm.*, 1901, 239, 294.

Sandoz, B.P. 131,283, (*Chem. Abstracts*, 1920, 14, 95).

Carr, Reynolds, *J. Chem. Soc.*, 1910, 97, 1329.

Hypaconine.

See under Hypaconitine.

Hypaconitine

$C_{33}H_{45}O_{10}N$

MW, 615

Alkaloid accompanying aconitine. Occurs abundantly in *Aconitum senanense*, Nakai. Prisms from Et_2O . M.p. $197.5-198.5^\circ$. $[\alpha]_D^{17} + 22.4^\circ$ in $CHCl_3$. Boiling H_2O at $160-70^\circ \rightarrow$ acetic acid, benzoic acid, and hypaconine (tetra-acetyl: m.p. $182-4^\circ$). Boiling dil. $H_2SO_4 \rightarrow$ benzohypaconine ($B, HCl, 3\frac{1}{2}H_2O$: m.p. $242-4^\circ$. $[\alpha]_D^{13} - 6.5$ in H_2O). Heated in vacuo under N \rightarrow pyrohypaconitine (m.p. $119-20^\circ$. $[\alpha]_D^{13} 18.1^\circ$). Ox. \rightarrow hypoxonitine (m.p. $267-8^\circ$ decomp. $[\alpha]_D^{15} - 63.1^\circ$ in $CHCl_3$).

$B, HBr, 2\frac{1}{2}H_2O$: cryst. from H_2O . M.p. $178-9^\circ$. $[\alpha]_D^{17} - 19.7^\circ$ in H_2O .

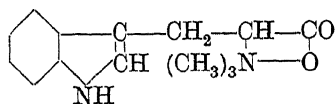
$B, HAuCl_4$: prisms from EtOH. M.p. $243-5^\circ$.

$B, HClO_4$: prisms from EtOH- Et_2O . M.p. $178-80^\circ$ decomp. $[\alpha]_D^{15} - 11.2^\circ$ in EtOH.

Acetyl: m.p. $197-200^\circ$.

Majima, Morio, *Ann.*, 1929, 476, 171, 210.

Hypaphorine



$C_{14}H_{18}O_2N_2$

MW, 246

Present in seeds of the *Erythrina* genus. Cryst. from H_2O . M.p. anhyd. 255° decomp. Very sol. H_2O , EtOH. Insol. most other solvents. $[\alpha]_D + 91-3^\circ$ in H_2O , $[\alpha]_D^{25} + 113.6^\circ$ in H_2O .

B, HCl : m.p. $234-5^\circ$ ($231-2^\circ$, 227°). $[\alpha]_D^{20} + 89.2^\circ$ in H_2O , $[\alpha]_D^{25} + 89.6^\circ$ in H_2O .

B, HBr : m.p. 225° .

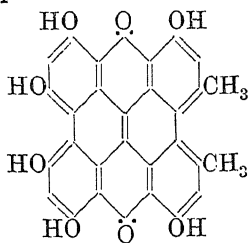
B, HI : m.p. $220-1^\circ$.

B, HNO_3 : m.p. $215-20^\circ$ ($217-19^\circ$, $220-2^\circ$, $223.5-224.5^\circ$). $[\alpha]_D + 94.7^\circ$. Spar. sol. H_2O .

Romburgh, Barger, *J. Chem. Soc.*, 1911, 99, 2069.

Marañón, Santos, *Chem. Abstracts*, 1932, 26, 5609.

Hypericin

 $C_{30}H_{14}O_8$

MW, 502

Occurs in *Hypericum perforatum*. Reddish-violet needles. Decomp. above 330° . Dist. with Zn \rightarrow meso-anthrodianthrone.

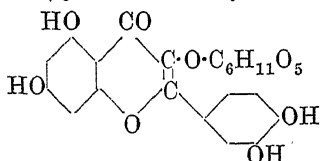
Hexabenzoyl: yellow leaflets. M.p. 228° .

Hexa-p-bromobenzoyl: orange needles. M.p. 270° .

Horsley, *J. Pharmacol.*, 1934, 50, 310.

Brockmann, *Ann.*, 1942, 553, 1; *Naturwiss.*, 1939, 27, 550.

Brockmann, Falkenhausen, Neef, Dorlars, Budde, *Ber.*, 1951, 84, 865.

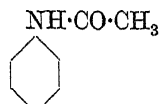
Hyperin (*Quercetin-3- α -D-galactoside*) $C_{21}H_{20}O_{12}$

MW, 464

Occurs in *Hypericum perforatum*. Hygroscopic solid. M.p. $237-8^\circ$ decomp. $[\alpha]_D^{24} -59^\circ \pm 6^\circ$ in Py-EtOH. Dil. acids \rightarrow quercetin. $FeCl_3 \rightarrow$ greenish-brown col. Reduces Fehling's. Violet Molisch reaction.

Tetra-Me ether: needles from MeOH. M.p. $219-21^\circ$. Hygroscopic.

Jerzmanowska, *Chem. Abstracts*, 1939, 33, 7299.

Hypnoacetin (*p-Hydroxyacetanilide phenacyl ether*) $C_{16}H_{15}O_3N$

MW, 269

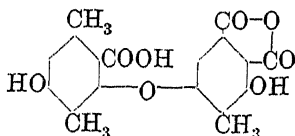
Plates from EtOH. M.p. about 160° decomp. Sol. EtOH. Spar. sol. $CHCl_3$, CS_2 , C_6H_6 . Insol. H_2O , Et_2O . Hypnotic and antipyretic.

Vignolo, *Atti accad. Lincei*, 1895, 4, i, 360; 1897, 6, i, 71.

Hypnone.

See Acetophenone.

Hyposalazinic Acid

 $C_{18}H_{14}O_8$

MW, 358

Prisms from Me_2CO . M.p. 280° decomp. Sol. EtOH, Me_2CO . Alc. $FeCl_3 \rightarrow$ red col. Sol. conc. H_2SO_4 to deep red sol. Sol. alkalis to yellow sols. which slowly darken. KOH fusion \rightarrow 3:5-dihydroxy-p-toluic acid.

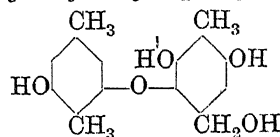
Di-Me ether: Me ester, $C_{21}H_{20}O_8$. MW, 400. Leaflets from Me_2CO . M.p. 165° . Sol. EtOH, Me_2CO . No col. with $FeCl_3$.

Penta-Me deriv.: $C_{23}H_{24}O_8$. MW, 428. Needles from EtOH. M.p. 146° .

Asahina, Asano, *Ber.*, 1933, 66, 696, 1215.

Asahina, Tanase, *Ber.*, 1934, 67, 1435.

Hyposalazinol (4:6:3'-Trihydroxy-5:2:5'-trimethyl-2-hydroxymethyl-diphenyl ether)

 $C_{16}H_{18}O_5$

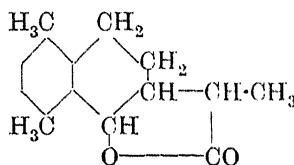
MW, 290

Needles from H_2O . M.p. 197° . KOH fusion \rightarrow 3:5-dihydroxy-p-toluic acid + β -orcinol. H(+Pd) \rightarrow deoxyhyposalazinol.

Tri-Me ether: $C_{19}H_{24}O_5$. MW, 332. M.p. 146° .

Asahina, Asano, *Ber.*, 1933, 66, 895.

Hyposantonin

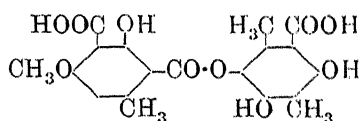
 $C_{15}H_{18}O_2$

MW, 230

Tablets from Et_2O or C_6H_6 . M.p. $152-3^\circ$. Sublimes. Very sol. $CHCl_3$, C_6H_6 , AcOH, EtOH. Mod. sol. Et_2O . Insol. H_2O .

Gucci, *Gazz. chim. ital.*, 1889, 19, 378.

Hypothamnolic Acid

 $C_{19}H_{18}O_{10}$

MW, 406

Depside from *Cladonia uncialis* F. obtusata. M.p. $217-18^\circ$ decomp. $FeCl_3 \rightarrow$ reddish-violet col.

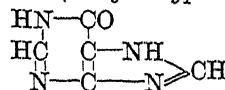
Di-Me ester: m.p. $197-8^\circ$.

Asahina, Aoki, Huzikawa, *Ber.*, 1941, 74, 824.

Hypotonin.

See under Ethylenediamine.

Hypoxanthine (6-Hydroxypurine, sarcine)

 $C_5H_4ON_4$

MW, 136

Occurs in mustard, black pepper, potato, yeast, beetroot, bone marrow, and in extracts of muscle, spleen, liver, etc. Needles. Decomp. at 150°. Spar. sol. cold H₂O, more sol. hot. Ppd. by PdCl₂ as co-ordinated comp. Forms cryst. salts with acids and with some bases.

Riboside: see Inosine.

Fischer, *Ber.*, 1897, 30, 2226.

Traube, *Ann.*, 1904, 331, 78.

Sundwik, *Z. physiol. Chem.*, 1912, 76, 486.

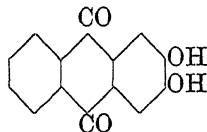
Hypoxonitine.

See under Hypaconitine.

Hyraldite.

See under Formaldehyde.

Hystazarin (2:3-Dihydroxyanthraquinone, *hystazine*)



C₁₄H₈O₄

MW, 240

Yellow needles from AcOH. M.p. above 260°. Spar. sol. most org. solvents. Insol. C₆H₆. Sol. caustic alkalis to bright blue sols. Sol. NH₃.Aq.

to violet-blue sol. Violet-red sol. in conc. H₂SO₄. Green col. with FeCl₃ in EtOH. Zn dust dist. → anthracene. H₂SO₄ + HNO₃ → 1-nitro- and 1:4-dinitro derivs.

Mono-Me ether: C₁₅H₁₀O₄. MW, 254. Orange yellow needles from EtOH or plates from C₆H₆. M.p. 236°.

Di-Me ether: C₁₆H₁₂O₄. MW, 268. Yellow needles from EtOH or AcOH. M.p. 237°. Spar. sol. EtOH. Zn + NH₄OH → 2:3-dimethoxyanthracene.

Mono-Et ether: C₁₆H₁₂O₄. MW, 268. Yellow needles from EtOH. M.p. 234–40°.

Di-Et ether: C₁₈H₁₆O₄. MW, 296. Yellow needles from EtOH. M.p. 160–3°.

Diacetyl: yellow needles from AcOH. M.p. 205–7° (210°).

Dibenzoyl: yellow. M.p. 236°.

Di-p-toluenesulphonyl: yellow. M.p. 204°.

Bayer, D.R.P., 298,345, (*Chem. Zentr.*, 1917, II, 256).

Liebermann, *Ber.*, 1888, 21, 2501.

Schoeller, *ibid.*, 2503.

Liebermann, Hohenemser, *Ber.*, 1902, 35, 1778.

Lagodzinski, *Ann.*, 1905, 342, 102.

Waldmann, *J. prakt. Chem.*, 1938, 150, 113.

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